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Paper No. 1

Export-Led-Growth or Growth-Led-Export Hypothesis: An Empirical Study of Nepal

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This paper empirically analyses the Export-led-Growth (ELG) and Growth-led-Export (GLE) hypothesis considering real export and real GDP of Nepal during FY 1974/75-2012/13 allowing one structural break. Employing the Zivot and Andrew Test (1992) (ZA test), a structural break at FY 1991/92 (possibly due to liberalization) was endogenously realized for export. Then, Toda and Yamamoto (1995) and Dolado and Lhtkepohl (1996) Granger non causality test (TYDL) illuminated a strong evidence for GLE rather than ELG hypothesis. The bound testing using unrestricted error correction model (UECM) employing the methodology of Pesaran and Shin (1999) and Pesaran et al. (2001) detected an existence of one cointegration among variables. The long run multiplier extracted by UECM indicated insignificantly that GDP could have negatively affected export. Finally imposing a restricted error correction model (ECM), speed of convergence in long run equilibrium was identified as 29 percentage. Probably, inward-looking strategies of development that discriminate against exports and import substitution strategies are suitable policies to affect GDP and export.

JEL classification: C32, F43, O11

Key words (3-5 words): Export-Led Growth; Structural Break, Causality; ARDL Approach

1. Introduction

In most generic economic intuition, the exportation amplifies the development. A positive association between export and growth designates export-led growth (ELG) hypothesis. Compare to import-substitution, export often signalizes as an engine of growth. The nexus of export and growth became eminent among policy makers in the late 1970s as a development strategy and their linchpin was the economic openness that later propelled to international economic integration agendas. The International Monetary Fund (IMF) and World Bank (WB) became the apostles of the economic openness with the banner of structural adjustment programs (SAPs). They proliferated the idea of economic openness by providing financial assistantships to implement SAPs to developing nations. Nepal did not remain untouched, hence, Nepal abandoned the import-substitution policy and welcomed the "neo-liberal policy of privatization of state owned enterprises, market determined price system, trade liberalization, financial sector liberalization, fiscal consolidation and indirect monetary policy instruments as early as mid-1980s" Shrestha (2010).

Several surveys have established the export led growth (ELG) hypothesis as well as the growth led export (GLE) hypothesis. Still, the debate – Does the export causes growth or growth does the export? – has not yet ended in econometric literatures since 1980. However, for Nepal limited works were realized to analyze ELG or GLE hypothesis but incorporating possible structural break,

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there exists a dearth in literatures. Nepalese trade has been agonized by chronic trade deficits, sky rocketing imports and growth evasive sluggish exports. Supply side constraints with deteriorating export competitiveness tenacity have made Nepal lame to penetrate the market and to harvest the benefits of openness. The trade concentration with India has emerged as long-standing deficits. The pegged Nepalese currency to Indian rupees in addition to mostly openly land linkedness with India with similar cultural diversity can be seen as bliss as well as curse. Against these backdrops, the quests of empirical cogitations with cogent economic arguments on export, growth and structural break (liberalization) have intrigued the Nepalese policymakers and worthy for investigation.Hence, this paper seeks a concentricity between econometric approaches and economic discussions in Nepalese experiences which revolves on the general objective– to detect the direction and magnitude of the causal relationship of real export and real GDP of Nepal allowing one endogenous structural break from data during FY 1974/75 to 2012/13. The specific aims are: a) to identify possible structural break endogenously from data; b) to realize the direction of causal relationships between export and GDP; and c) to estimate the magnitude of such intercourse.

2. Literature Reviews

On the theoretical ground, the seminal work of Thirwall (1979) elaborated the role of export on growth. The Thirwall law states "the growth rate of output is given by the ratio of the growth rate of exportations to the income elasticity of demand for imports" Abu-Qarn, Aamer and Abu-Bader (2011). Palley (2011) stated that, "Export-led growth is a development strategy aimed at growing productive capacity by focusing on international markets". He put forward three favor arguments for ELG hypothesis, Alimi and Muse (2012) summarized them as: a) Hecksher–Ohlin–Samuelson comparative advantage theory, which shows the benefits from trade between countries with different capital–labor ratios; b) the benefits of openness for controlling rent seeking (political economy benefits) and; c) the benefits of openness for growth. However, Krugman (1989), on his theoretical framework for the GLE hypothesis, remonstrated the Thirlwall's Law. He claimed that the exports are determined by the increment of income but not the reverse as elaborated by Thirwall (1979). However, Alimi and Muse (2012) specify that the GLE hypothesis is apposite to the nations at their premature phase of economic growth. As per Dreger and Herzer (2012), the extent of overall studies can be split on four divisions: a) cross-country studies that mainly focuses on correlations between export and growth; b) causal studies between exports and output that incorporate Granger's (1969) or Sims' (1972) causality tests without pre testing cointegrating relationship; c) causal studies between export and output allowing cointegration techniques to examine the long-run relationship and; d) panel cointegration methods.

Ahumada and Sanguinetti (1995) reframed the export-led growth hypothesis on endogenous growth and tested with Granger tests on panel data. They proclaimed, "exports did behave as the engine of growth as they Granger-caused investment, output growth and imports". Thornton, (1997) examined the relationship between real exports and real GNP for six European countries taking data from around the mid-19th Century till 1913 first world war. They imposed average tariff rate for each country to control for trade liberalization then they employed the Johansen (1988) maximum likelihood approach to cointegration and a standard Granger causality test. Data validated ELG for Italy, Norway and Sweden; GLE for United Kingdom and; bidirectional relationship for Denmark and Germany. Kónya (2006) also observed mixed results of Granger causality between the logarithms of real exports and real GDP in twenty-four OECD countries from 1960 to 1997. He applied panel data approach on seemingly unrelated regressions (SUR) and Wald tests with country specific bootstrap critical values on bivariate (GDP–exports) model and a

trivariate (GDP–exports–openness) model, both without and with a linear time trend. Ramos (2001) utilized the Granger-causality between exports, imports, and economic growth in Portugal over the period 1865-1998. He found only the feedback effect between exports-output growth and imports-output growth, hence, concluded that "the growth of output for the Portuguese economy during that period revealed a shape associated with a small dual economy in which the intra-industry transactions were very limited". Based on the neoclassical growth model framework, Awokuse (2007) investigated ELG and GLE hypothesis for Bulgaria, Czech Republic and Poland employing granger causality tests on multivariate vector error correction model. Their variables were GDP, export, capital, labor and import. They found ELG and GLE hypothesis valid for Bulgaria and ELG and ILG (import led growth) plausible for other countries.

Maneschiöld (2008) captured the export-led growth hypothesis for Argentina, Brazil, and Mexico using cointegration and causality techniques considering break after introduction of the NAFTA. He employed the Zivot and Andrews (1992) unit root test to suspect the possible break in data. He reported "the causal relationship is either bi-directional or unidirectional from export to GDP revealing support to the hypothesis and an outward oriented policy". Abu-Qarn et. al (2011) detected both ELG and GLE hypothesis true on the post trade liberalized Brazilian experiences. They implemented a vector autoregressive model (VAR) model and standard granger causality test. Prior to that, they followed the logic of Perron (1988) that standard unit root becomes biased for time series with structural breaks, and employed the modified Dickey-Fuller unit root allowing one time jump in intercept in level unit to detect structural break.

Abu-Qarn and Abu-Bader (2001) augmented import as a third variable to examine ELG hypothesis for nine Middle East and North Africa (MENA) countries in vector autoregressive and error correction models. Almost for all countries the results converged to reject the ELG, but interestingly, when they contemplated only manufactured exports, they derived no causality and bidirectional causality for countries with relatively low shares and high shares of manufactured exports in total merchandise exports respectively. Hence their finding evinced a certain threshold of manufactured exports as a prerequisite for validation of ELG hypothesis. Reppas and Christopoulos (2005) analysis, using panel unit roots and panel cointegration tests, on export and growth for 22 less developed Asian and African countries over the period 1969–1999 confirmed GLE hypothesis but not ELG. They pointed out that the greater the investment ratio, the higher the level of exports and a negative relation seems to exist between export growth and a country's size.

Ahumada et al. (2011) found, for Korea, Singapore and Thailand, GLE hypothesis is applicable and no evidence of ELG. They performed cointegration analysis and Granger causality tests considering industrial production, real exports, real imports, and real effective exchange rate. Foon et al. (2015) modeled bivariate (exports and GDP) and trivariate (exports, GDP and exchange rate) models to inspect the ELG hypothesis for Asia's Four Little Dragons (Hong Kong, South Korea, Singapore, and Taiwan) by employing Johansen multivariate cointegration and MWALD causality test on the augmented-VAR system developed by Toda and Yamamoto (1995) on 50, 60 and 70 observations rolling window sizes,. The rolling regression-based MWALD tests showed that ELG were not stable for each of the four economies. Finally, they suggested to revamp policy thoughts to pursue immediate diversification of export markets through regional integration and to retrench export dependencies. Ibrahim (2002) examined the ELG hypothesis for Malaysia using cointegration and error correction modeling and found bi-directional causality between exports and real output per capita. He stated that the Lucas (1976) critique– the relationship between exports and real output per capita is not invariant to policy changes or regime shifts– applies for Malaysia.

With cointegration methodology and orthogonal impulse responses, for Bangladesh, Dawson (2006) traced impression of trade liberalization on export, import and income relationship. His findings exhibited experiences of export elevations but not for extended period. To quantify the effect, he reported the long-run elasticities without standard errors by normalizing cointegrating vector with GDP. To test ELG, Love and Chandra (2005) used annual data for the period 1972–2000 for Bangladesh and employed Johansen's multivariate framework taking the terms of trade as an additional variable. They found GLE true for both long and short-term causality run from income to exports and suspected the inward-looking strategy of development that discriminated against exports as cause for GLE. Alimi and Muse (2012) applied an error-correction framework and concluded GLE hypothesis for Nigeria then recommended import substitution industrialization (ISI) strategy as policy tool to enhance economic growth as well as to affect exports. They considered the annual time series data of total export, oil export, non-oil export and GDP.

For Nepal, Dodaro (1993), while observing data form 1967-86 for various 87 countries, has found no casual direction. Same was true with data from 1961-87 considered by Arnade and Vasavada (1995). Riezman et al. (1996) detected ELG true for Nepal while he consider the data from 1950-90 for various 126 countries. Islam (1998), with the data for Nepal 1967:91, found contradictory result: bivariate model showed ELG whereas multivariate model showed no causality. Interestingly, Reppas and Christopoulos (2005) showed GLE applies for Nepal with data from 1969–1999 on panel data set. In chronological order, it appears till 1980s there was non-causality, but ELG evolved in mids of 1990s and later joint effects of GLE and ELG were seen.

To investigate the relation of import, export and growth for six South Asian nation: Pakistan, Bangladesh, India, Sri Lanka, Nepal and Bhutan, Hye et al. (2013) incorporated autoregressive distributed lag (ARDL) approach to identify a long-run relationship along with the modified Granger causality test to determine the short-run and long-run direction of causality. They found: ELG model is relevant for all countries except Pakistan; GLE applies to all countries except Bangladesh and Nepal and; growth-led import (GLI) and import-led growth (ILG) models are relevant to all countries. They also illuminated possibilities that joint coalitions for domestic demand through south–south can expand the trade. Tang and Chea (2013) examined the export-led growth (ELG) hypothesis for Cambodia during 1972 and 2008. The Granger's non-causality tests supported both ELG and performed innovation accounting using impulse response functions and variance decomposition.

Literature reviews show Granger non causality test have prevailed the literature. The finding of literatures appear heterogeneous to support ELG, however, GLE rather than ELG for developing countries appear mostly as Alimi and Muse (2012) have stated. But, to aggregate all relevant literatures Giles and Williams (2000a, 2000b) is advantageous. Giles and Williams (2000a) compiled a comprehensive survey of more than one hundred and fifty export-growth applied papers. They found, time series methodologies are trending which include causality via exclusions restrictions tests, impulse response function analysis and forecast error variance decompositions. Since, the Granger non causality test have prevailed the literatures and to deal with non stationarity issues, Giles and Williams (2000b) studied the sensitivity of Granger non causality test and found possibilities for non robustness. Hence, they suggested to exercise extreme care to avoid spurious outcomes while using Granger non causality tests. Giles and Williams (2000b) have suggested and carefully praised two approach: a) Toda and Yamamoto (1995) and Dolado and Lhtkepohl (1996) method (TYDL) as it "does not require specification of the cointegrating rank, seemed relatively robust to the deterministic trend degree" and; b) "a general-to-specific testing strategy to

determine the deterministic trend degree, while an alternative approach is to use an information criterion to simultaneously determine the lag order and the trend terms".

The literatures have enlightened as well as beclouded the ELG in methodological framework. Following Giles and Williams (2000b) suggestion, Toda and Yamamoto (1995) and Dolado and Lhtkepohl (1996) will be pursued to analyze the causality. To capture the structural break in data, ZA test of Zivot and Andrews (1992) will be followed, as performed by Maneschiöld (2008). ARDL and VECM will be performed to quantify the hypothesis.

3. Data, Methodology and Results

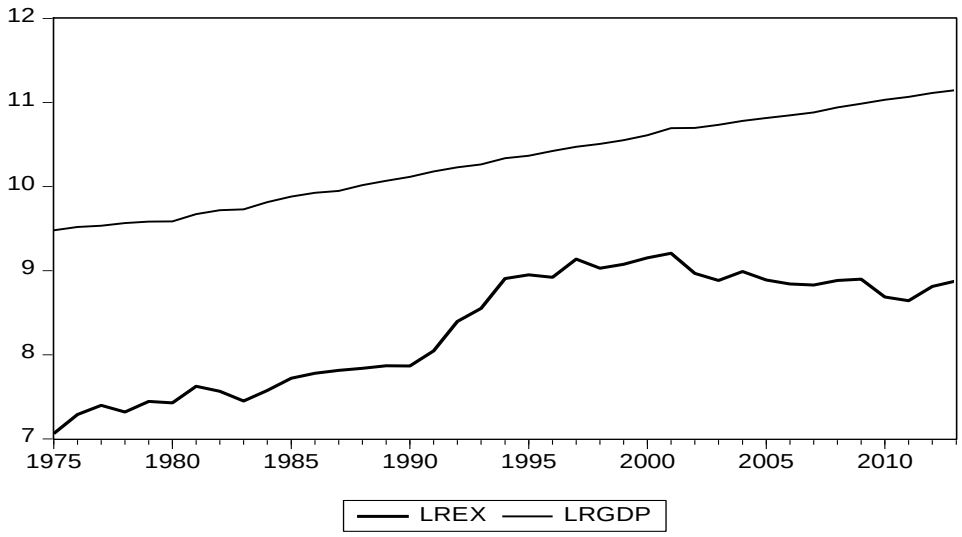
The following empirical analysis are based on the annual time series (from FY 1974/75 till FY 2012/13) of export (LREX) and gross domestic product (LRGDP) in constant price of FY 2000/01 and transformed to natural logarithm. The data were retrieved from the Economic Survey Report of FY 2012/13 and 2013/14 published by the Ministry of Finance GON. This paper will consider FY 1974/75 as 1975 and FY 2012/13 as 2012 for sake of simplicity.

Table 1: Descriptive Statistic

Variable	Mean	Std. Dev.	Jarque-Bera	Probability	Obs
LREX	8.324	0.687	4.428	0.109	39
LRGDP	10.304	0.529	2.792	0.248	39

Note: Sample: 1975 2013; Correlation= 0.892.

Figure 1: Trend of LRGDP and LREX



The Table 1 shows descriptive statistics for these two series. The correlation coefficient between LREX and LRGDP was found to be positive 0.892 suggesting a fairly strong positive linear association. The Figure 1 exhibits an increasing trend of the LRGDP, while for LREX, the trend is steady upward from 1975 till 1990, followed by a sharp increment till 1994, then sluggish hike till 2001 then it exhausted.

The methodology involves: a) firstly, to identify the order of integration of time series using Augmented Dickey Fuller (ADF) unit root test of Dickey and Fuller (1979) and to identify order of integration of time series allowing one structural break employing Zivot-Andrew (ZA) unit root test; b) at second, ELG or GLE hypothesis will be explored using Toda and Yamamoto (1995) and Dolado and Lhtkepohl (1996) Granger Non Causality Test (TYDL); c) after the valid causality is identified, to quantify the relation, the methodology involves to identify the cointegration relation using Bound test of Pesaran and Shin (1999) and Pesaran et al. (2001) by developing an unrestricted error correction model (UECM); d) if the cointegration exist then using autoregressive distributed lags (ARDL) model, the long run multipliers will be extracted. Finally, ARDL will be transformed into an error correction model (ECM) to extract the error correcting term (ECT) which will give an insight how the system converge into the equilibrium.

3.1 Unit Root Tests

3.1.1 Augmented Dickey Fuller Unit Root Test

The very first step, to check presence of unit root using conventional ADF test, is exhibited below.

$$\Delta y_t = a_0 + \delta y_{t-1} + \sum_{i=2}^{p} \beta_i \Delta y_{t-i+1} + \varepsilon_t \qquad (1)$$

Where, y_t is the variable to be tested? The sufficient lag lengths, i are chosen using schwarz information criterion (SIC) after testing for first and higher order serial correlation in the residuals. The sufficient lag lengths p of Δy_t whiten the errors. The ε_t is an iid error terms. These test are employed under $H_0 : \delta = 0$ against the one-tailed alternative that it is negative. If δ is found to be significantly negative, the stationarity of y_t cannot be rejected. Table-2 shows the results of ADF tests for both series. Results of the two tests indicate that the two series are nonstationary at levels, but stationary at first differences. Hence, the LREX and LRGDP variables are $I(1)$ independently.

Table 2: Augmented Dickey Fuller Unit Root Test

Variable	Augmented Dickey Fuller Unit Root Test			
	Level (lag length)	prob	First difference (lag length)	prob
LREX	-1.825 (0)	0.363	-5.209 (0)	0.000***
LRGDEP	-0.080 (2)	0.944	-6.808 (0)	0.000***

Note: The 9 lags are allowed as maximum lags while the optimal lag length are selected automatically using Schwarz Info Criterion. Only intercept in ADF test equation is allowed.

3.1.2 Zivot-Andrews Unit Root Test

The regression might be misleading or spurious if data are contaminated by unit root. Again the unit root can also be misleading if the data possess structural break. To overcome this problem, Zivot and Andrews (1992) adopted three models to check the hypothesis of a one-time structural

break in the series as follows (i) The first model allows a one-time change in variables at the level form, (ii) the second model allows a one-time change in the slope (iii) the last model has a one-time change both in the intercept and trend.

$$\left.\begin{aligned}\Delta x_t &= a + ax_{t-1} + bt + cDU_t + \sum_{j=1}^{k} d_j \Delta x_{t-j} + u_t \\ \Delta x_t &= b + bx_{t-1} + ct + bDU_t + \sum_{j=1}^{k} d_j \Delta x_{t-j} + u_t \\ \Delta x_t &= c + cx_{t-1} + dt + dDU_t + dDT_t + \sum_{j=1}^{k} d_j \Delta x_{t-j} + u_t\end{aligned}\right\} \quad (2)$$

Where DU_t is the dummy variables displaying mean shift occurred at each point with time break while trend shift variables is presented by bt, ct and dt. So.

$$DU_t = \begin{cases} 1 \ldots \text{if } t > TB \\ 0 \ldots \text{if } t < TB \end{cases} \text{and} \; DU_t = \begin{cases} t - TB \ldots \text{if } t > TB \\ 0 \ldots \text{if } t < TB. \end{cases}$$

The null hypothesis of unit root break date is $c = 0$ which indicates that the series is not stationary with a drift not having information about structural break point, while, the $c < 0$ hypothesis implies that the variable is trend-stationary with one unknown time break. The Zivot–Andrews unit root test fixes all points as potential for possible time breaks and does estimation through regression for all possible break points successively. After that, this unit root test selects that time break which decreases the one-sided t- statistic to test $\hat{c} < 0$.

Table 3: Zivot-Andrews Unit Root Test

Variable	Zivot-Andrews Unit Root Test			
	Level [chosen break] (lag length)	Prob.	Level [chosen break] (lag length)	Prob.
LREX	-4.973 [1992] (0)	0.000***	-6.324 [1998] (0)	0.017**
LRGDEP	-4.598 [2003] (2)	0.013**	-3.206 [1988] (0)	0.019**

Note: The values in brackets present the time break and values in parentheses indicate the lag length. Finally, ***, ** and * illustrate the statistical significance at the 1%, 5% and 10% levels, respectively. The critical values for ZA test on level are -5.570, -5.080 and -4.820 at the 1%, 5% and 10% significance levels, respectively. The critical values for ZA test on first difference are -5.340, -4.930 and -4.580 at the 1%, 5% and 10% significance levels, respectively.

The Table-3 exhibits the Zivot-Andrews test statistic to test the presence of unit root allowing one structural break under the null hypothesis that series is infected by the unit root with a structural break. The table shows LREX and LRGDP both are I(1) at level with one break and becomes I(0)

after first differencing. It was found endogenously from the data that for LREX, year 1991/92 and for LRGDP, year 2002/03 are structural breaks.

1991/92 can be possible structural break for LREX due to accumulated effect of a) the financial liberalization of mid 1980s when the government green signaled the entry of commercial bank in joint venture with foreign bank; b) Nepal entry to a three-year Structural Adjustment Programme (SAP) with the IMF in 1887/88 and c) the shift of political power due to restoration of democracy in 1990 and d) Nepal re-entrance on Structural Adjustment Facility (ESAF) with the IMF in 1992/93. Before 1991/92 is therefore termed as pre-liberalization period and after 1991/92 is termed as post liberalization period. While 2002/03 can be possible structural break for LRGDP due to a) chronic conflict (1996-2006) initiated by Maoist, b) 2001 royal massacre and c) negative growth rate of GDP in 2000/01.

3.2 TYDL Granger Non Causality Test

To detect the casual relations (ELG or GLE hypothesis), relatively new Toda and Yamamoto (1995) and Dolado and Lhtkepohl (1996) TYDL approach is performed. The TYDL is superior to standard Granger causality test as it allows standard statistical inferences in the level vector auto regressive (VAR) models with integrated and possibly cointegrated variable without pretesting the variables for the integration and cointegration properties. Hence, the TYDL approach avoids the possible pretest biases. The TYDL is based on the augmented VAR modeling that performs a modified Wald test statistic (MWALD) to test the causal relation.

The TYDL approach, first involves, finding the maximum order of integration $d_{\max}$ of the series that are to be incorporated in the model. For this conventional ADF unit root test is applied in each series and the maximal order of integration is identified. The TYDL approach, secondly, specifies a well behaved k^{th} optimal lag order vector autoregressive model in levels. The number of optimal lags is usually determined by a selection criterion such as the Akaike Information criterion (AIC), Bayesian information criterion (BIC), or Schwarz Info Criterion (SIC) or the democracy of these criterions.

The TYDL approach, thirdly, intentionally over-fits the underlying k^{th} optimal lag order VAR model with additional $d_{\max}$ order of integration. The $(k+d_{\max})$ order VAR for LREX and LRGDP is exhibited below:

$$\left.\begin{aligned} LREX_t &= \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} LREX_{t-i} + \sum_{j=k+1}^{d_{\max}} \alpha_{2i} LREX_{t-i} + \sum_{i=1}^{k} \beta_{1i} LRGDP_{t-i} + \sum_{j=k+1}^{d_{\max}} \beta_{2i} LRGDP_{t-i} + \varepsilon_{1t} \\ LRGDP_t &= \phi_0 + \sum_{i=1}^{k} \phi_{1i} LRGDP_{t-i} + \sum_{j=k+1}^{d_{\max}} \phi_{2i} LRGDP_{t-i} + \sum_{i=1}^{k} \delta_{1i} LREX_{t-i} + \sum_{j=k+1}^{d_{\max}} \delta_{2i} LREX_{t-i} + \varepsilon_{2t} \end{aligned}\right\} \quad (3)$$

Finally, to draw valid casual inferences, the TYDL procedure utilizes a modified Wald test statistic (MWALD) restricting the parameters of k^{th} optimal lag order of the vector autoregressive. The MWALD statistic has an asymptotic chi-square distribution when VAR $(k+d_{\max})$ is estimated. Following are the expressions:

a) to test the causality running from LREX to LRGDP (Export led Growth– ELG Hypothesis)

$$H_0^{LREX \Rightarrow LRGDP} : \delta_{11} = \delta_{12} = ... = \delta_{1k} = 0$$

b) test the causality running from LRGDP to LREX (Growth led Export– GLE Hypothesis)

$$H_0^{LRGDP \Rightarrow LREX} : \beta_{11} = \beta_{12} = ... = \beta_{1k} = 0$$ and

From the Table-2, it has been know that LREGDP and LREX are I(1) independently. Hence the $d_{\max}$ = 1. The Table-4 shows the optimum lag length k =4 for the level VAR.

Table 4: Optimal Lag Length Selection for Level VAR

Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-29.469	NA	0.023	1.907	1.998	1.938
1	111.518	256.340*	0.000	-6.395	-6.123*	-6.304*
2	115.889	7.416	0.000	-6.418	-5.964	-6.265
3	120.830	7.786	0.000	-6.475	-5.840	-6.261
4##	126.029	7.562	5.06e-06*	-6.547*	-5.731	-6.273
5	127.476	1.930	0.000	-6.392	-5.395	-6.057
6	128.860	1.678	0.000	-6.234	-5.055	-5.837

Note: * indicates lag order selected by the criterion and ## is the chosen lag/s

Table 5:Toda Yamamoto Granger Causality Test

Independent Variable	Dependent variable: LREX			Dependent variable: LRGDP		
	Chi-sq	df	Prob.	Chi-sq	df	Prob.

LREX	–			3.069	4	0.546
LRGDP	13.704	4	0.008***	–		

Note: *,,***** represents significant in 10%, 5% and 1% level of significance.

Now, the $(k+d_{\max})$ VAR for LREX and LRGDP or VAR with fifth lags is developed and modified Wald test statistic (MWALD) restricting the parameters of optimal lag order of the vector autoregressive is performed in given in Table-5.

The Table-5 shows: null hypothesis–that LREX does not granger cause LRGDP– is failed to be rejected as p-value is greater than level of significance, while, another null hypothesis– that LRGDP does not granger cause LREX– is rejected as p-value is significant at 1% level of significance. Therefore, there is a strong evidence that LRGDP is causing LREX. Hence rather than export causing growth (ELG) hypothesis, growth is causing the export (GLE) is true in Nepalese context. In other words, it was found that LRGDP as independent and LREX as dependent variable.

3.3 Unrestricted Error Correction Model and Bound Testing

The TYDL showed the causal direction but failed to foreshadow the magnitude. To investigate magnitude, this study employs ARDL bounds testing approach of cointegration developed by Pesaran and Shin (1999) and Pesaran et al. (2001). The ARDL approach have mainly following advantages: i) it can accommodate stationary I(0), non-stationary I(1) or mutually cointegrated variables in the same regression; ii) it is the more statistically significant approach to determine the cointegration relation in small samples; iii) it can deal with the endogeneity issues of some variables in the regression by providing unbiased long-run estimates with valid t-statistics. Fourth, the ARDL approach allows assessing simultaneously both the short- and long-run effect of a particular variable on the other and it also separates short-run and long-run effects. The unrestricted error correction model (UECM) version of the ARDL model for GLE hypothesis is expressed as follows:

$$\Delta LREX_t = \sum_{i=1}^{l} \gamma_{1i} \Delta LREX_{t-i} + \sum_{j=1}^{m} \gamma_{2i} \Delta LRGDP_{t-j} + \gamma_3 LREX_{t-1} + \gamma_4 LRGDP_{t-1} + \gamma_5 dum_{LREX} + \lambda_t \quad (4)$$

The first difference operator is shown by Δ, λ_t is for residual terms and dum_{LREX} is dummy imposed by using break dates for LREX. The appropriate lag length of the first difference regression is chosen on the basis of minimum value of akaike information criteria (AIC) Pesaran and Shin (1999) and Pesaran et al. (2001) developed the F-test to determine the joint significance of the coefficients of the lagged under the null of $H_0 : \gamma_3 = \gamma_4 = 0$. This procedure examines the likelihood of any possible long-run relationship among the respective variables under the null hypothesis that the cointegrating relationships do not exist among the variables: The F-statistics can be then compared against the critical values of the upper and lower bounds, as in Pesaran and Shin (1999) and Pesaran et al. (2001). If the F-statistics are higher than the upper bound I(1) critical value, then it can be concluded that variables are I(1), or if, F-statistics is lower than the lower bound I(0) critical value then it can be concluded that variables are I(0) and if the F-statistics fall between lower and upper bound then the test is inconclusive.

Table 6: UECM Lag selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	26.988	NA*	0.014	-1.411	-1.276*	-1.365
1##	28.387	2.468	0.0140*	-1.435*	-1.255	-1.373*
2	28.398	0.020	0.015	-1.376	-1.152	-1.300
3	29.202	1.323	0.015	-1.365	-1.095	-1.273
4	29.473	0.431	0.016	-1.322	-1.008	-1.215

Note: * indicates lag order selected by the criterion and ## is the chosen lag/s

Table-6 shows the appropriate lags using various criterions. Following the democracy of criterions, appropriate lag as 1 is chosen for UECM. Table-7 shows the estimates of UECM, its diagnostics checks and bound testing i.e. $H_0 : \gamma_3 = \gamma_4 = 0$. The UECM is well behaved as per the diagnostics checks. The bound tests confirms the existence of cointegration as the F-statistics is significant and is well above the upper I(1) critical bound.

Table 7: UECM and Bound Testing

LREX=f(LREX, LRGDP, DUMLREX)					
Dependent Variable: D(LREX)					
Variable		**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(LREX(-1))	c1	-0.026	0.195	-0.135	0.894
D(LRGDP(-1))	c2	0.351	1.138	0.309	0.760
LREX(-1)	c3	-0.277	0.094	-2.956	0.006***
LRGDP(-1)	c4	-0.065	0.096	-0.677	0.504
DUMLREX	c5	0.391	0.124	3.162	0.004***
C	c6	2.782	0.959	2.902	0.007***
Diagnostic Checks					
R-squared = 0.313; Adjusted R-squared = 0.203; F-statistic (prob) = 2.836 (0.032)**					
JB = 0.258 (0.879); LM-1 = 0.810 (0.368); LM-2 = 1.460 (0.482); LM-3 = 4.754 (0.191); LM-4 = 6.055 (0.195); ARCH [1] = 2.224 (0.136); ARCH [2] = 3.976 (0.137)]; ARCH [3] = 3.896 (0.273); ARCH [4] = 5.606 (0.231)					
ARDL Bound Testing					

Null: c3=c4=0		Case II: Intercept but no trend		Numbers of regressors (k) = 1	
Test Statistic	Value	df	Probability	95%	
F-statistic	5.951	(1, 31)	0.007***	I(0)	I(1)
Chi-square	11.901	2	0.003***	4.934	5.764

Note: *,**,*** represents significant in 10%, 5% and 1% level of significance.

3.4 ARDL Model, Long Run Multipliers and ECT

After UECM, an ARDL(p, q) model is specified as LREX as dependent and LRGDP as independent variable, which is given below as:

$$LREX_t = \varphi_0 + \sum_{n=1}^{p} \varphi_{1n} LREX_{t-n} + \sum_{n=1}^{q} \varphi_{2n} LRGDP_{t-n} + \varphi_3 dum_{LREX} + \eta_t \quad (5)$$

The optimal lag is given by p and q for LREX and LRGDP respectively, η_t is residual terms and dum_{LREX} is dummy imposed by using break dates for LREX. The long run multiplier is given by $-\gamma_4/\gamma_3$ of Equation-4, but this will not give the standard errors, therefore, in this research we depend MicorFit4.1 to estimate the multipliers along with the standard errors. Finally, a VECM is develop which is given as:

$$\Delta LREX_t = \omega_0 + \sum_{n=1}^{p} \omega_{1n} \Delta LREX_{t-n} + \sum_{n=1}^{q} \varpi_{2n} \Delta LRGDP_{t-n} + \varpi_3 dum_{LREX} + \varpi_4 ect_{t-1} + \vartheta_t \quad (6)$$

where, ϑ_t is residual terms and ect is the error correction term.

Table 8: ARDL Model LREX as Dependent Variable

ARDL(1,1) selected based on Schwarz Bayesian Criterion

Dependent variable is LREX

38 observations used for estimation from 1977 to 2012

Regressor	Coefficient	Standard Error	T-Ratio	Prob
LREX(-1)	0.70751	0.066101	10.7035	0.00***
LRGDP	3.2246	0.69735	4.6241	0.00***
LRGDP(-1)	-3.2882	0.70104	-4.6905	0.00***
DUMLREX	0.40865	0.08205	4.9804	0.00***

C	2.7541	0.59121	4.6584	0.00***

Diagnostic Checks

R-squared = 0.984; Adjusted R-squared = 0.982; F(4,33) = 515.8939 (0.000)***

Serial Correlation: CHSQ(1)= 0.005 (0.946); F(1, 32)= 0.004 (0.951)

Functional Form: CHSQ(1)= 0.705 (0.401); F(1, 32)=0.605 (0.442)

Normality: CHSQ(2)=0.836 (0.658)

Heteroscedasticity: CHSQ(1)= 0.8368E-3 (0.977); F(1,36)= 0.7928E-3(.978)

Long Run Multipliers

Regressor	Coefficient	Standard Error	T-Ratio	Prob
LRGDP	-0.21748	0.2497	-0.87097	0.390
DUMLREX	1.3971	0.23544	5.9341	0.00***
C	9.4159	2.403	3.9184	0.00***

Error Correction Representation for the Selected ARDL Model

Dependent variable is d(LREX)

Regressor	Coefficient	Standard Error	T-Ratio	Prob
d(LRGDP)	3.2246	0.69735	4.6241	0.00***
d(DUMLREX)	0.40865	0.08205	4.9804	0.00***
ecm(-1)	-0.29249	0.066101	-4.4249	0.00***

ecm = LREX + .21748*LRGDP -1.3971*DUMLREX -9.4159*C

Note: *,**,*** represents significant in 10%, 5% and 1% level of significance.

An ARDL(1,1) model is developed with same lag as UECM including the dummy. The diagnostic and the stability tests are conducted. The Table-8 shows the ARDL(1,1) model with LREX as the dependent variable. The ARDL (1,1) seems well behaved as per the diagnostics checks. Since the bound test had confirmed the existence cointegration, hence, the multipliers of ARDL are interpretable. The long run multiplier of LRGDP was found to be negative 0.22 which suggests the rate of change of LREX with respect to LRGDP is negative or in other words, 1% increase in LRGDP leads to 0.22% fall in LREX. However, such relation is found not to be significant. The dummy variable DUMLREX was found to be significant and compare to pre liberalization period, in post liberalization period the export was 1.4 unit higher. The error correcting term (ECT) is negative 0.29 and significant which further validates the existence of long run relation among respective variables and ECT also shows any shock on the system corrects itself by nearly 29% per annum.

5. Conclusion, Recommendations, Limitations and Directions for Future Researches

This study has explored the causal relationship between export and GDP of Nepal over a period of 1975-2012. First, both the series were found to be I(1) independently then ZA test confirmed for LREX that it has a unit root with the structural shift in year 1992. The TYDL Granger non causality test showed the causality runs from LRGDP to LREX which indicates the LRGDP led to LREX or GLE hypothesis but not the ELG hypothesis. The Bound test on well behaved UECM also confirmed the existence of cointegration. Finally, a well behaved ARDL (1,1) is implemented to extract the long run multipliers, it showed the 1% increase in LRGDP leads to 0.22% fall in LREX but such relation was insignificant, and the post liberalization period export was 1.4 unit higher than pre liberalization period. Finally an error correcting term was extracted by VECM representation of ARDL(1,1) which illuminated any disequilibrium of on the system converges to equilibrium by nearly 29% per annum.

The findings of this study can be relevant to policy makers. The uni-directional causality from export to growth implies that GLE hypothesis. This study showed insignificant negative export elasticity of growth. Discrimination against exports and import substitution strategy can be worthy to implement in the context of Nepal to affect exports and growth. Probably, a certain threshold of manufactured exports is required as a prerequisite for validation of ELG hypothesis as specified by Abu-Qarn and Abu-Bader (2001).

In the ELG equation, many studies have augmented import (Awokuse, 2007; Hye et al., 2013; Mahadevan and Suardi, 2008; Pistoresi and Rinaldi, 2012; Ramos, 2001) while some incorporated the disaggregated export (Abu-Qarn and Abu-Bader, 2001; Alimi and Muse, 2012) while other have induced share of investment, exchange rates, labor ratio, trade openness and terms of trade (unit export value/unit import value). This research's limitations open the floor to venture to mitigate such knowledge gaps.

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On the Impact of Remittances on Central Bank Balance Sheets, Inflation and Welfare in Nepal

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Frank Westermann***

Abstract

Remittances are often viewed as underutilized in Nepal. In our paper, we analyze the how the central bank policies influence the welfare effects of remittances, using a set of stylized central bank balance sheets. We also estimate the impact of remittances on inflation, using a VAR framework. We find a positive impact of remittances on inflation in Nepal, even after controlling inflation from India. The domestic monetary base, on the other hand, has lost significance in the latest 10 years of our sample period. This evidence is consistent with the so-called "trilemma" hypothsis.

1. Introduction and descriptive Statistics from the Nepal Standards of Living Survey

The impact of remittances on welfare in Nepal is topic of high importance for a country which has received remittances of up to 25% relative to GDP recently per year. The general impression of several observers, however, is that the remittances in the current form are underutilized in Nepal.

On the one hand, this is because the lions share of these inflows is used for the purpose of daily consumption, rather than savings, education or investment. Thus it does not appear to facilitate the build up of a domestic capital stock that could help to increase domestic per capita income in the long run (see Figure A1, which displays data from the Nepal Standards of Living Survey, NSLS).

Furthermore, despite the efforts to promote the use of official channels when sending the money back home, the share of remittances transferred via the banking system is below its potential. Figure 2 illustrates this for key countries from which remittances are being sent. India clearly has the lowest share with close to 10%. The UK still has a value below 50% and other important countries, Malaysia, Saudia Arabia and Qatar vary between 60% and 80%. Thus – even for a transitory period – the domestic banking system is not experiencing a substantial step forward in financial development, to the extend Aggarwal et al (2009) have observed it for other countries1.

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[1] See also Maskay, Steinkamp and Westermann (2014) for the impact of remittances on financial development in Nepal.

In this paper, we aim to shed light on these two observations, by analyzing the central banks reponse to large remittances inflows and investigating the resulting impact on domestic inflation. In the first part of the paper, we analyze a hypothetical impact of remittances on stilzed central bank balance sheets under different exchange rate regimes. In the second part of the paper, we estimate a simple Vector Autoregression (VAR) to illustrate the inflationary pressure that is created by large remittances inflows.

We find that in the full sample, inflation in Nepal primarily reponds to inflation in India. However there is also a partial effect of changes in the monetary base on inflation. However this observation is largely driven by the early part of the sample period. In a second VAR that only includes data from the past 10 years, the signficant impact of the monetary base on inflation disappears. Instead, remittances entering the country from abroad start to become a significant determinant of inflation.

These VAR findings, fit to the analysis of balance sheet data in section 5, which illustrates that the NRB continuously uses the incoming FX reserves to purchase Indian currency, which it sells to its customers. The Indian Rupees correspond to the net trade deficit with India. On the other hand, they also confirm the "trilemma" hypothesis, according to which countries cannot at the same time have an open capital account, a fixed exchange rate, and independent control over monetary policy.

In the final part we discuss various implications for welfare and policy options.

2. The impact of remittances on central bank balance sheets

2.1 The central bank sterilizes remittances inflows

When remittances inflows are moderately large, the central bank of Nepal can sterilize the impact on its balance sheet by selling other assets – for instance domestic government bonds – or by reducing loans to the private banking system. The simplified balance sheet below illustrates the impact of an additional unit of foreign currency remittances on the balance sheet of both, private and central banks.

Private Bank	
C BN ↑	DDC ↑

Central Bank	
FXUS ↑ FXIND BN ↓	MN ↑ ↓

Where C = credit to firms, DDC = domestic currency deposits, BN = domestic government bonds, FXUS = Reserves of the central bank in convertible currency, FXIND = Reserves in non-convertible currency and MN = Money in circulation in Nepal.

In the first instance, the incoming remittances raise the deposits of the private bank. Within 15 days, the deposits need to be converted to domestic currency, which raises the foreign exchange holdings of the central bank as well as money in circulation.

In the next step, however, the central bank sells domestic government bonds to the private bank and thus mops up the newly created liquidity. The money in circulation, as well as the length of the central bank balance sheet remain unchanged. The only thing which has changed for the central bank is the composition of the asset side. Also the private banks balance sheet has expanded.

In this scenario, the domestic price level as well as the equilibrium exchange rate with respect to India remain unchanged. The central bank balance sheet can be viewed as less prone to crisis, as it has increased its holdings of convertible reserve assets.

2.2 Non-sterilized remittances, with a flexible exchange rate

A sterilization of remittances as described above cannot be sustained indefinitely by the central bank, as eventually it will run out of domestic government bonds or other assets to sell. At this point, further remittances inflows will increase the length of the central bank balance sheet, as illustrated below:

Private Bank	
C ↑ BN	DDC ↑

Central Bank	
FXUS ↑ FXIND BN	MN ↑

These non-sterilized inflows have the drawback of causing inflation in Nepal, as the currency in circulation goes up2. In principle the resulting inflation could lead to a depreciation of the exchange rate. However, as traded goods prices are internationally fixed, and non-traded goods prices increase, most countries experience an appreciation of the exchange rate allowing large remittances inflows.

Pn ↑ and e ↑

2.3 Non-sterilized remittances, with a fixed exchange rate

The third case, which is reflective of the current policy stance in Nepal, is a scenario in which the central bank does not sterilize remittances inflow, but at the same time fixes the exchange rate to another country (India). In this case, we need to distinguish between a transitory and a long-term equilibrium impact of remittances inflows.

The transitory impact is initially similar to the case of a flexible exchange rate. Both private and central bank balance sheets increase and the price level in Nepal PN increases.

Private Bank

Central Bank (Nepal)

Central bank (India)

[2] As a positive side-effect the involuntary monetary expansion could increase the credit availability for households and firms, provided by the private banks,

C ↑ ↓ BN	DDC ↑ ↓

FXUS ↑ ↓ FXIND ↑ BN	MN ↑

FXUS ↑	MIND ↑

However, unlike under flexible exchange rates, the exchange rate cannot appreciate. The central bank of Nepal prevents the appreciation by selling its convertible FX reserves and purchases non-convertible FX assets from India, such as cash in indian Rupees. As a consequence, the central bank of India becomes involved, which provides the Indian currency and buys FXUS assets from the central bank of Nepal. This way the pressure on the exchange rate to appreciate is reduced.

By providing the rupees the length of the balance sheet of the central bank of India also increases, as well as prices in India increase, albeit to a much smaller extent in relative terms, as India is a much larger country.

A new long term equilibrium is reached, when the central bank of Nepal uses the Indian currency to satisfy the domestic excess demand for non-convertible currency. The Nepalese private and central banks balance sheets shrink in this process. Theoretically, this shrinkage could be up to the point of their initial length.

2.4 A financially open economy

An alternative policy would be to liberalize the capital market. To some extend this is already in existence in Nepal. Foreign currency deposits have been gradually been liberalized (See Maskay, Steinkamp and Westermann (2014)) and currently account for about 5% of the liabilities of the aggregate commercial banking system. However, substantial limits still apply. In particular, remittances entering the country through official channels need to be converted to domestic currency within the first 15 days. The highly transitory nature of these deposits as well as regulations on the asset side, prevent lending in foreign currency to domestic firms. Currently, banks are allowed to lend in foreign currency only to traded goods sector firms with special authorization of the NRB and for the purpose of financing imported goods. The total amount of such loans make up only about 1% of the aggregate bank balance sheet.

If Nepal would decide to further liberalize FX deposits and FX lending – for instance to non-traded goods sectors, the private banking system would help the NRB to sterilize FX inflows from remittances. The balance sheet analysis below shows a situation where a bank is allowed to take FX deposits and give FX loans. Remittances inflows would increase the length of private banks balance sheet, but not the balance sheet of the central bank.

Private Bank	
C CFX ↑	DDC DFX ↑

Central Bank	
FXUS FXIND	MN

BN	

BN	

3. Empirics: The link between inflation, remittances and the exchange rate

The section above illustrated that remittences can have inflationary consequences for the domestic economy, in particular when inflows are non-sterilized and the exchange rate is flexible. While Nepal's exchange rate is fixed vis-à-vis India, there could still be an inflationary impact, as for a transitory period remittances inflows increase the monetary base.

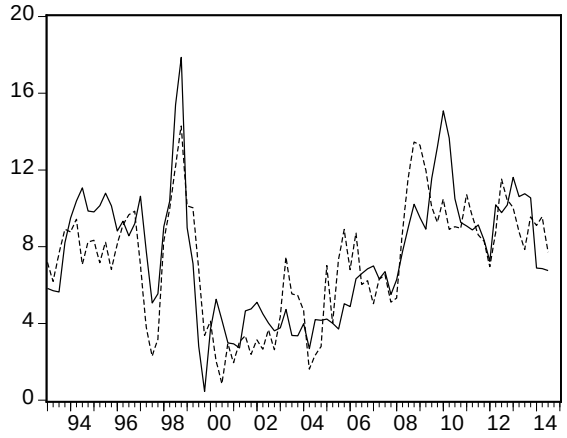
For several developing countries, earlier research has also documented that large remittances inflows lead to a real appreciation of the currency (See for instance Ball, Lopez and Reyes (2013)). The motivation is that non-tradable goods price increase, while non-traded goods prices are largely unaffected.

In this section, we perform an empirical analysis in which we investigate, whether an increase in remittances indeed create an inflationary pressure in Nepal. In a simple four-variable VAR analysis, that includes inflation in Nepal, inflation in India, remittances and changes in the monetary base, we estimate whether inflation in Nepal responds to the quarterly inflows of remittances. As both time series are stationary in first differences, we can estimate the VAR without the risk of a spurious regression.

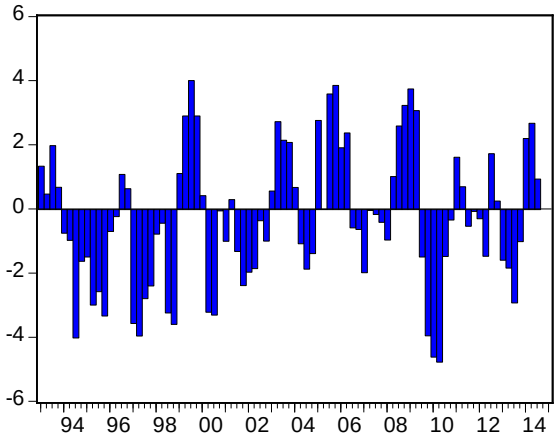
Figure 3 illustrates the key variables of our VAR. In Figure 3a, we first see that inflation rates in Nepal are largely determined by the Indian inflation rate, due to the fixed exchange rate system. However there are are also some transitory differences in the inflation rates that are displayed in Figure 3(b). These inflation differentials might be influence by remittances, displayed in figure 3 (c) and changes in the monetary base, displayed in Figure 3 (d).

Figure 3

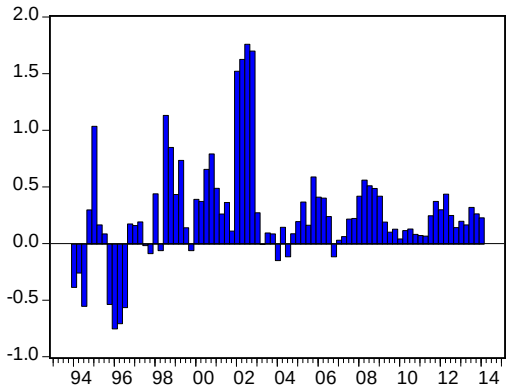
Inflation in Nepal (dotted line)



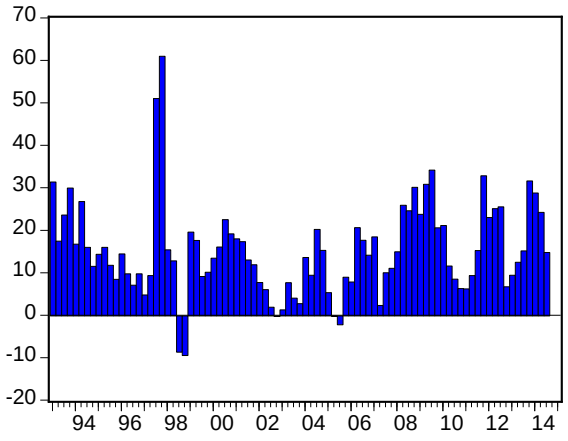
B) Inflation diff. between India and Nepal and India (solid line)



Remittances



D) Changes in the monetary base



The impulse response pattern displayed in Figure 4 a and 4 b are computed from these VAR coefficients. They show the reaction derived as generalized impulse response functions, i.e. the graph displays a reaction to a system-shock to one variable, taking the contemporaneous correlation with the other variable into account. This approach has the advantage that the impulse response patterns are independent of the ordering in the VAR. A potential disadvantage is the fact that each shock may not be precisely identified. However, the contemporaneous correlation is quite low and an alternative approach, for instance a Cholesky decomposition, would yield similar results. The full sample (1993:1 to 2014:1)

Figure 4a shows the impulse response functions in the full sample period from 1993:1 to 2014:1. In the first graph, panel (A), we see the reaction of an unanticiptated change in inflation in India on the inflation rate in Nepal. It is statitiscally significant and positive for about 5-6 quarters. It shows the importance of the Indian economy, as well as the policy of the central bank of Nepal. By fixing the exchange rate, Nepal effectively imports the inflation rate from India – as visible in Figure 3a.

However, changes on the monetary base – over the longer term - , have not been entirely uneffective. Thus, despite its close link to India, Nepal has manged to reserve some control over inflation. After a shock in the monetary base, there is (with a delay of about 2-3 quarters) a positive reponse of inflation that is statistically significant, although of course transitory and insignificant in the longer term. While this observation violates the so called "trilemma" hypothsis, according to which economies cannot have a fixed exchange rate and (to some extend) open capital account and an independen monetary policy at the same time, it is not unreasonable, given Nepals considerable capital controls which are still in place.

Remittances on the other hand, only have a very short lived, but positive impact on inflation when considering the full sample period. The reaction is statistically significant in the first quarter only. Thereafter, remittances do not appear to contribute to explaining the path of inflation in Nepal.

The last 10 years (2004:1 to 2014:1)

There are several good resons to perform a sample split and also consider the most recent period in Nepal separately. First, by looking at Figure 3, there are several large observations, for instance 1997 in the monetary base, 1998 in inflation rates and 2001 in remittances. Although these observations are not outliers in a statistical sense, they may still domintate the overall findings. The variance of all variables has been substantially smaller in the later period. Also one cannot fully rule out the possibility that these observations from early data-recording reflect data mistakes rather than larger underlying economic movements.

Secondly there are historical reasons for such a sample split. The insurcency that occurred in Nepal in the early 2000s has contributed to an economic downturn and a substantial increase of remittances. While remittances where negliable in the 1990ies, they have grown to be an increasingly important element of national income from about 2003/4 onwards. In this period of large remittances inflows – considering the central bank balance sheet analysis above – one might expect a different reaction of inflation reates as large sums of inflows cannot be easily sterilized by the central bank.

In Figure 4b we can see that India, just as in the whole sample, plays a key role in determining inflation rates in Nepal. The magnitude and time pattern are quite similar to Figure 4a, with the possible exception that there seems to be a short delay before the shocks are transmitted.

Panel (B) of Figure 4b, on the other hand illustrates that the impact of the monetary base has changed in the later period. While the impact was positive and significant before, it now has no clear sign direction, and is statistically insignificant over the full 25 period which were simulated.

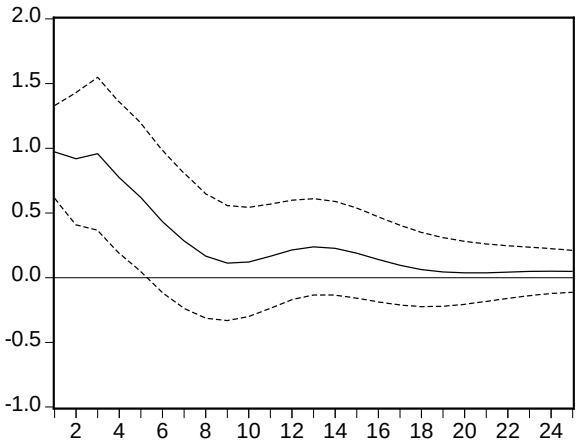
Instead, as documented in Panel (C), the reponse to remittances has become much more pronounced, and is positive and significant over a similar time interval of two to seven quarters, comparable to the indian inflation rate.

These impulse response pattern – although derived from a very simple VAR – are quite interesting, as they are consistent with the discussion of remittances and central banks balance sheets above. While initifally, small remittances inflows during the 1990ies and early 2000s where mangable from the central banks point of view, in the sense that the cental bank was able to sterilze its impact in inflation – while maintaint some scope to control inflation in its own – the later period appears to be dominated by the remittances inflows.

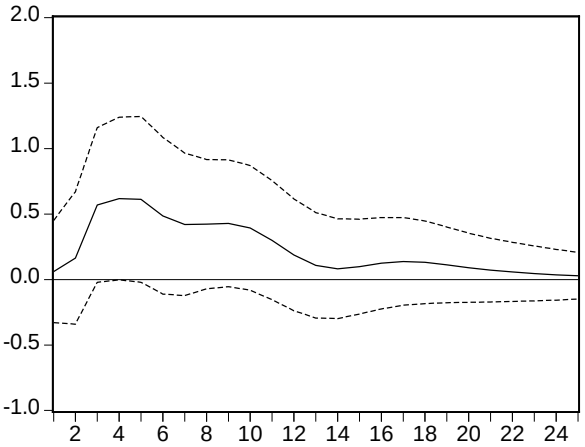
What appears to happen is that the remittances create inflationary pressure in Nepal, but thereafter the central bank policy of stabilizing the exchange rate ensure that this effect is transitory and prevent a longer term impact on inflation. The NRB steers against this inflationary pressure by selling US assets and purchasing Indian curreny, as will documented in the following section. In the process, it has lost the ability of exert an independent impact of managing domestic inflation.

Figure 4a: Impulse reponse pattern of the inflation to a shock in... (Full Sample)

Inflation in India



The monetary base in Nepal



Remittances

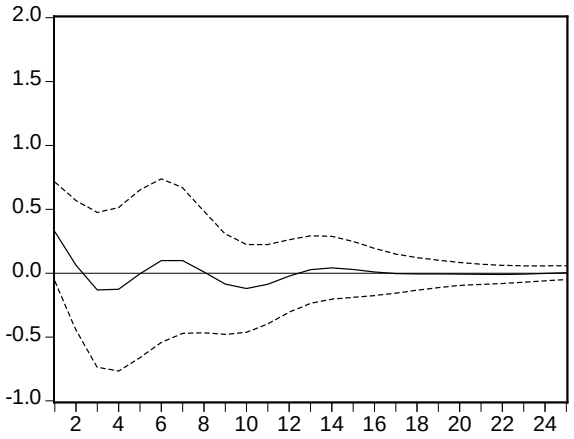
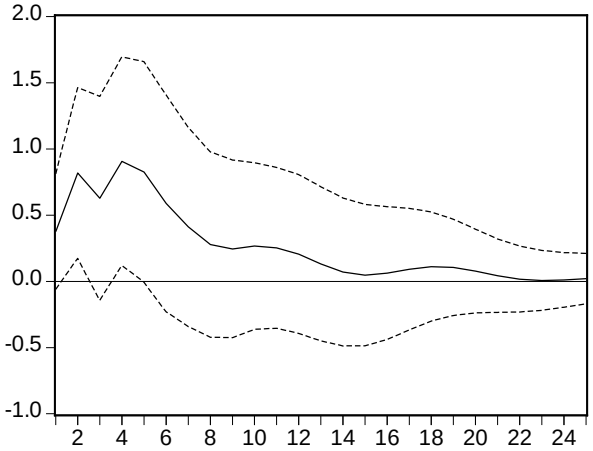
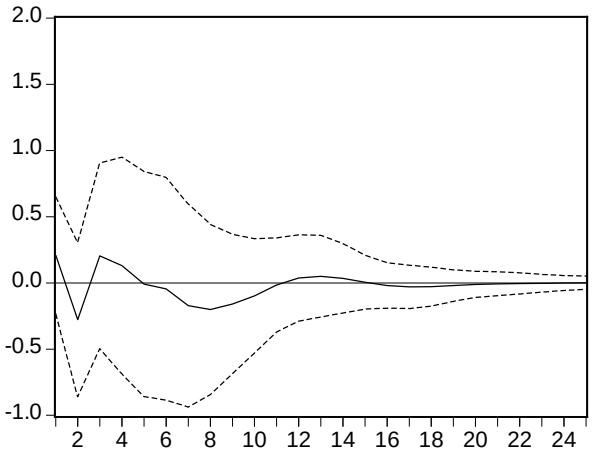


Figure 4b: Impulse reponse pattern of the inflation to a shock in… (after 2003)

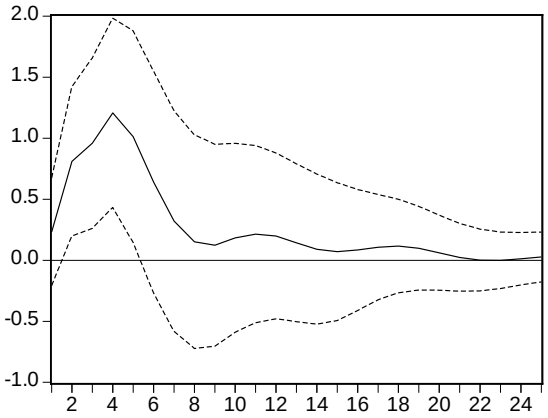
Inflation in India



The monetary base



Remittances



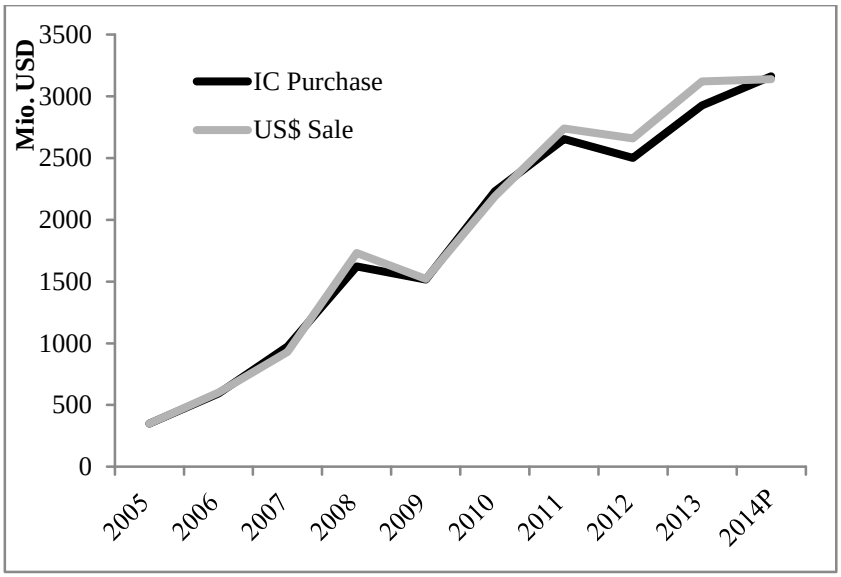
4. Exchange rate policy in Nepal

In this section, we investigate whether the policy response to remittances inflows in Nepal is indeed reminiscent of the simplified balance sheet analysis of a central bank with an only partially liberalized capital account and fixed exchange rate in section (2.3).

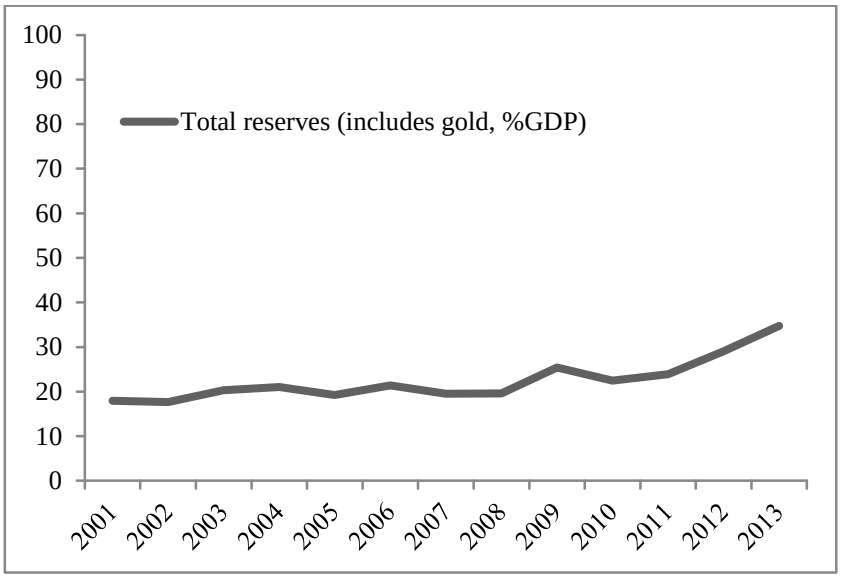
As first step, consider figure 6, which displays an increasing trend of Indian currency (IC) purchases, as well as US$ sales of the NRB. This upward trend resembles the upward trend of remittances flowing into the country and the effort of the NRB to neutralize the inflows impact on inflation and the exchange rate. The IC purchased by the NRB is provided to customers (indirectly via the banking system) who want to exchange Nepalese Rupees for Indian Rupees. As the NRB provides this IC to the markets, the NRB total balance sheet stays fairly constant (displays only a moderate increase).

As a consequence of a steady flow of US$ sales and IC purchases, the total reserve holding of the NRB, relative to GDP stay fairly constant as well, despite a continuous inflow of remittances, recently reaching a share of 25 % of GDP annually. Considering these large inflows, a cumulative increases of the NRB reserves from 20 % to about 30 % of GDP, as displayed in figure 6 (b) seems quite low.

Figure 6: Foreign Exchange Market Interventions and Reserve Holdings



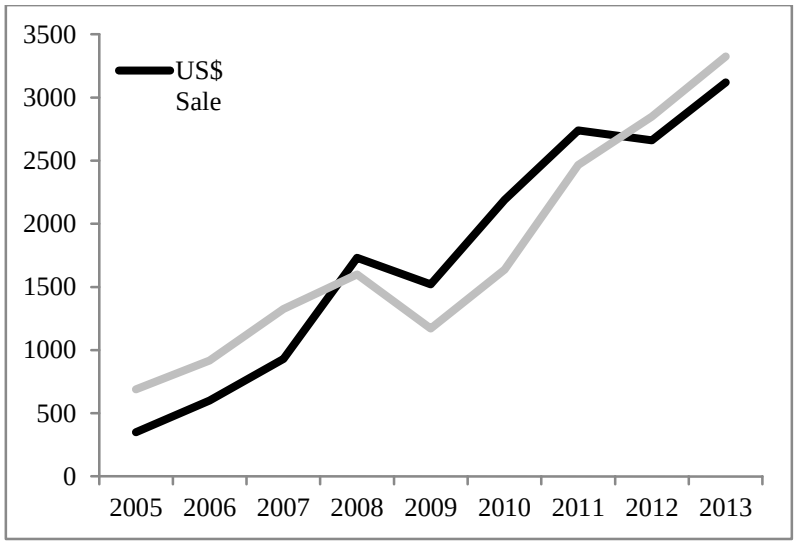
(B)



Data sources: See data appendix.

The next question is what happened with the Indian currency that the NRB had provided to its customers? Figure 8 shows that the pattern is US$ sales (which is nearly identical to the NRB's IC purchases) is very similar to the net imports of Nepal from India. Both have the same time trend, magnitude and even cyclical pattern. Cumulatively, the US$ sales have been 15.84bn US$, while the net trade deficit of Nepal with India has been 15.98bn US$. Expressed as a percentage of GDP, this is 11.83 annual (a number that has started at 4 % in 2005 and has reached 17 % in 2013).

Figure 8: Net Trade Deficits with India



Notes: Data in mio. USD. Data sources: See data appendix.

5. The inflow of remittances is underutilized

The patterns documented above fit to the initial survey evidence from the NSLS, which indicated that most of remittances are used for daily consumption. Households appear to use the income to purchase goods and services in India. However, remittances appears to be underutilized in several dimensions:

Firstly, an additional dollar entering Nepal can be thought of as Keynesian stimulus to the economy. While the direct impact leads to additional consumtion (of Indian goods) in Nepal, a large part of the Keynesian multiplier is directed to India. There is additional daily consumption (as indicated in Figure 2), but only little "second round effects", where this consumption leads to an increase of income for someone else, further consumption etc.

Secondly, an additional dollar entering the economy is leading to little capacity extension. In the standard Keynesian model, an additional dollar would partly be used for consumption, but partly also for investment purposes. This investment creates an additional long term effect by building up a capital stock. Such a capital stock is not beeing built up by private households in Nepal, because they need to be worried that inflation will eliminate much of their gains. It is neither built up by the central bank – acting as a sovereign wealth fund for the nation – because the central bank uses the FX revenues to stabilize the exchange rate.

Finally, and most importantly, the current arrangement prevents a build up of private household wealth in foreign currency. If domestic lending to non-traded sectors was liberalized, private savings in foreign currency could finance investment goods in form of FX loans to firms. This would allow for capacity extention and a higher long term growth path, although at the expense of higher risk of financial crisis that other developing economies have experienced (see Tornell and Westermann (2005)).

Furthermore, there are large fixed costs to finding a job abroad. The migrants need to finance obtaining a Visa for the foreign country as well as the travel cost to commute from Nepal to distant

countries. Figure 9 shows – using again the Nepal Standards of Living Survey – that remittance receiving households borrow 21 % of their total borrowing for the purpose of traveling. Non-remittance receiving households on the other hand borrow only 5 % for the purpose of travelling. Thus, the financial development resulting from remittances – documented for instance in Maskay, Steinkamp and Westermann (2014) – not only finance investment that may lead to growth, but also finances the fixed costs that where the starting point of migration.

It is important to point out that this need not to be misunderstood as an argument against such migration! However, it illustrates that alternative financial and monetary policies may need to be considered to reap the full benefits of migration. It seems that a financially close (or at most partially open) economy cannot absorb FX income in large amounts and over an extended period of time, while keeping a fixed exchange rate at the same time.

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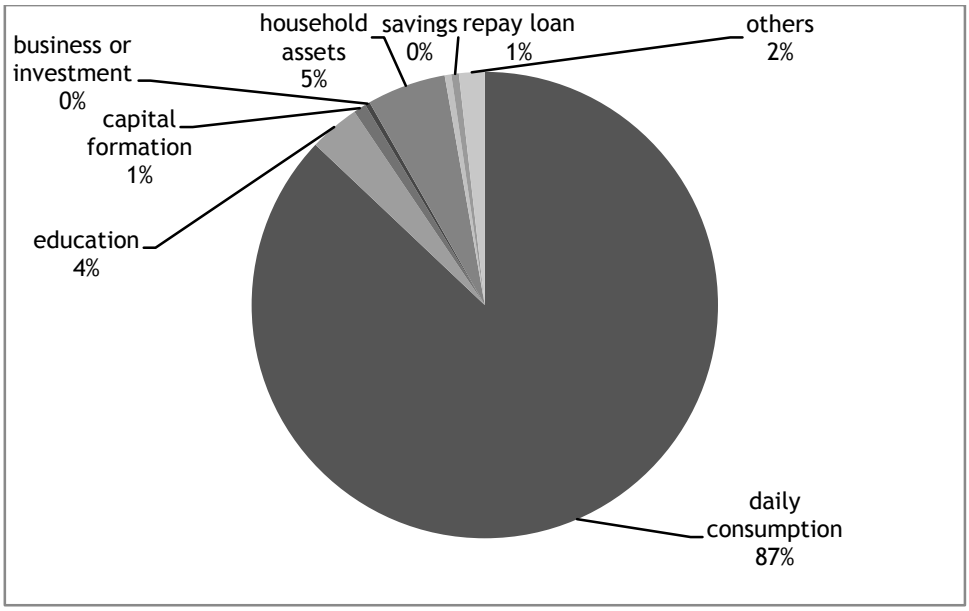
Data Appendix 1

Table A1: Variable definitions and data sources

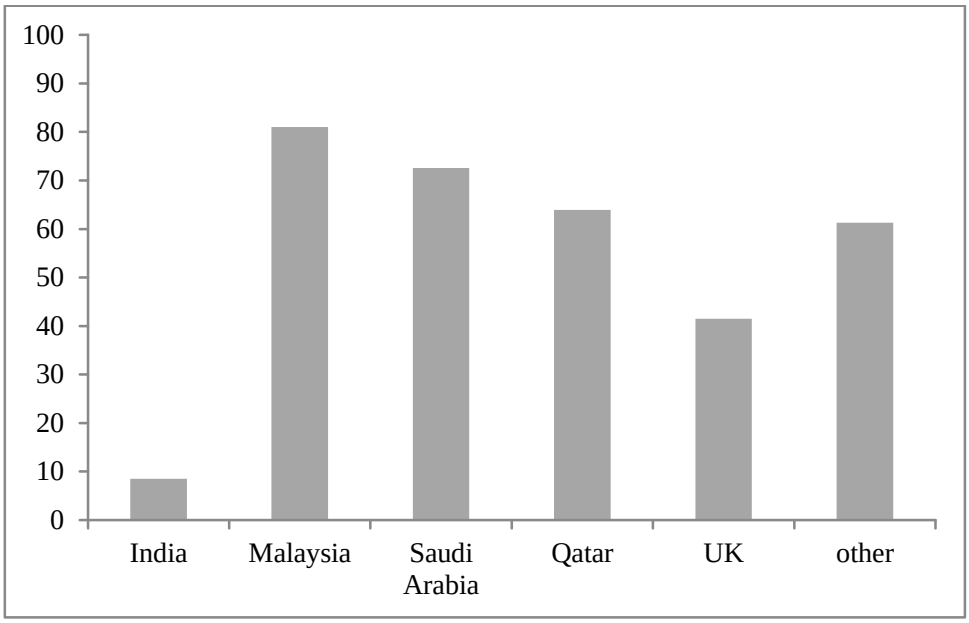
Variable	Description	Source
Remittances	Personal remittances received	Nepal Rastra Bank, Quarterly Bulletin April 2014 (Table 77) & July 2012 (Table 64)
GDP	Nominal GDP	Government of Nepal (Central Bureau of Statistics), Table 2 "Gross Domestic Product"
Net Imports from India	Net Imports = Imports of goods and services from India minus Exports of goods and services to India	International Monetary Fund, Directions of Trade Statistics
Official Reserve Assets	Official Reserve Assets of Nepal (incl. gold)	International Monetary Fund, International Financial Statistics, concept code: RAFA
Inflation	Percentage change in consumer prices	International Monetary Fund, International Financial Statistics
Monetary Base	Sum of circulating currency and central bank money	International Monetary Fund, Central Bank Survey
Nepal Rastra Bank (NRB) Total Assets	Total gross assets of Nepal Rastra Bank	International Monetary Fund, Central Bank Survey, concept code: FAAG
IC Purchases	Purchases of Indian Currency by the NRB	NRB Quarterly Economic Bulletin, 2004-2014
USD Sales	Sales of USD by the NRB	NRB Quarterly Economic Bulletin, 2004-2014
Total Reserves (convertible, inconvertible)	Total Reserves of the NRB either as total or split into convertible and non-convertible reserve assets	NRB Quarterly Economic Bulletin, 2004-2014

Figure 1: Households 'most important use of remittances'



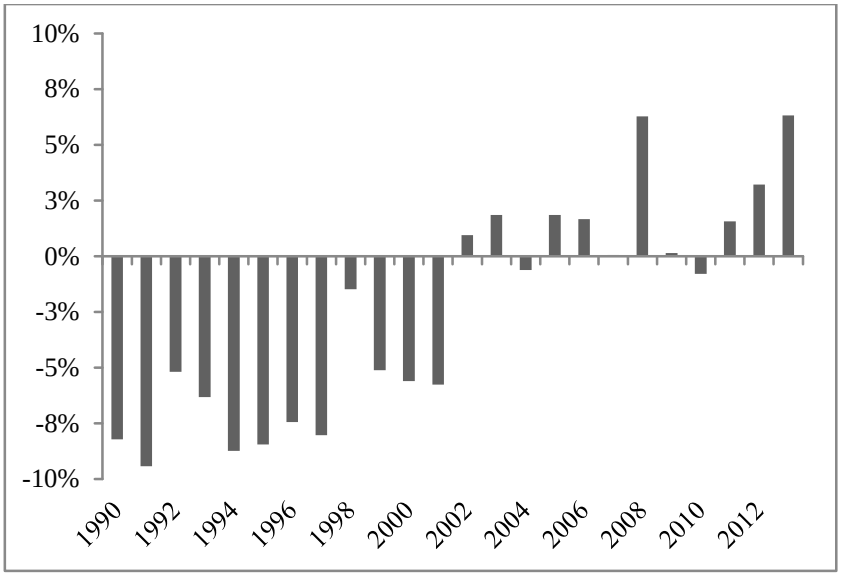
Data source: NLSS III, 2010/2011.

Figure 2: Share of remittances transferred via financial institutions



Data source: NLSS III, 2010/2011.

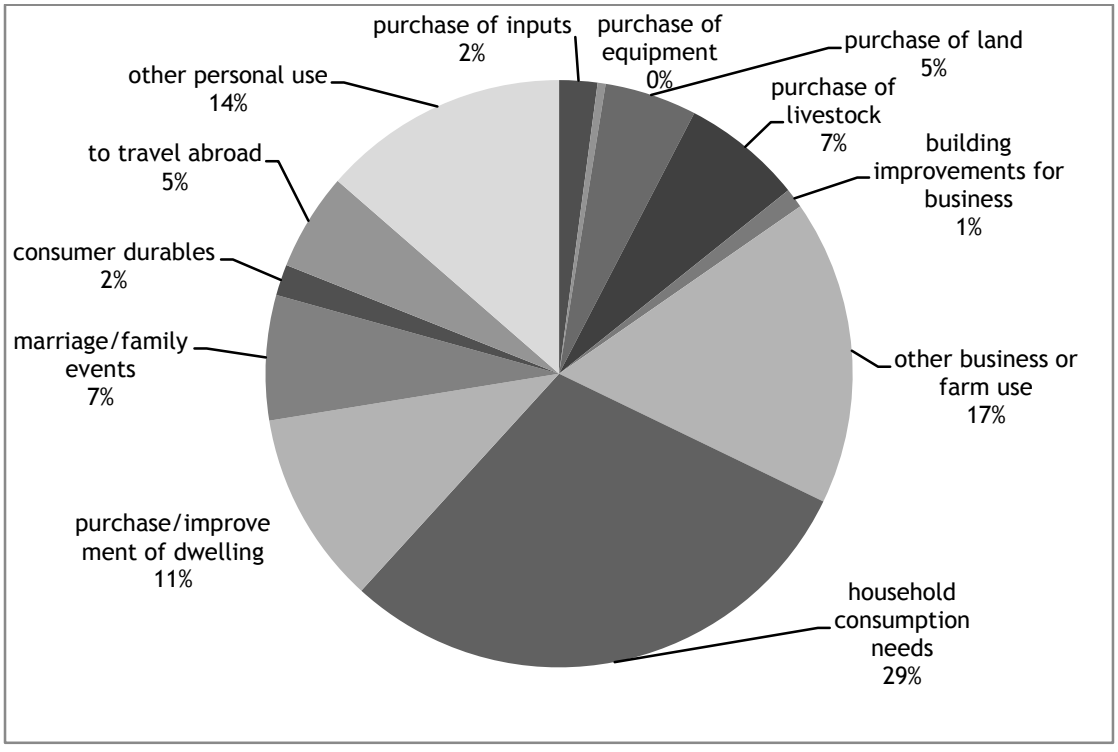
Figure XY: Current Account Balance



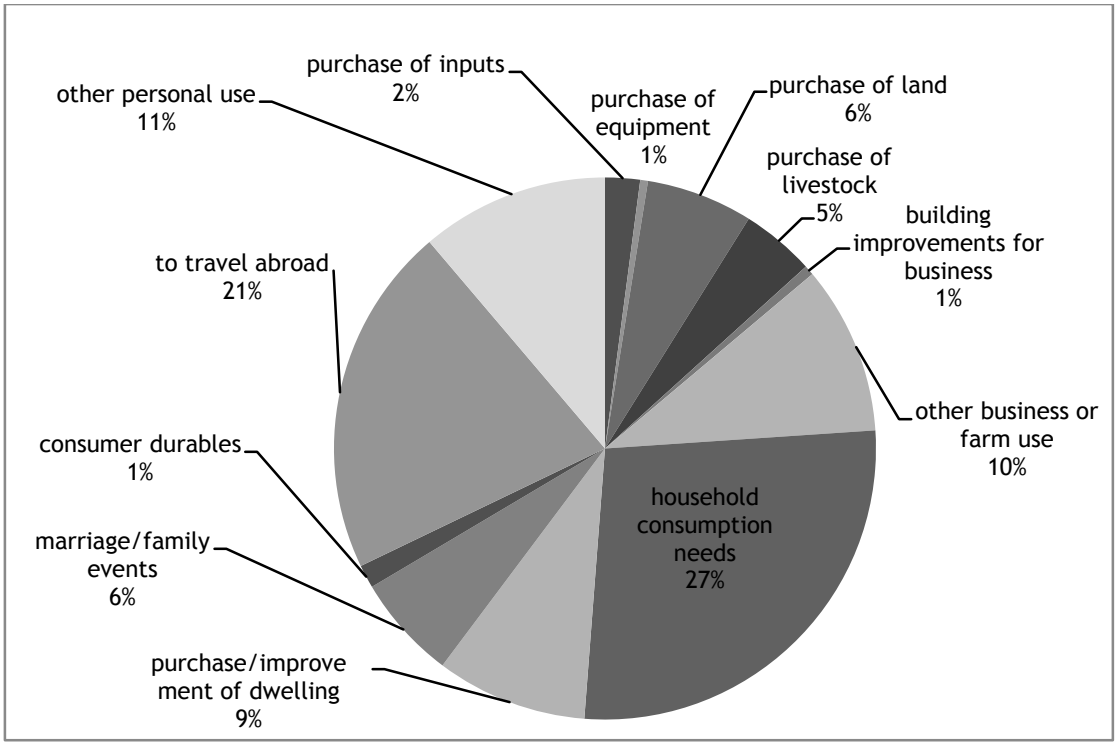
Notes: Data as percent of nominal GDP. Data sources: See data appendix.

Figure 9: Purpose of Borrowing

Non-remittance Households



Non-remittance Households



Data source: NLSS III, 2010/2011.

Paper No. 3

Linkages between Real Sector and Financial Sector in Nepal: A Vector Error Correction Model

Prem Prasad Acharya *

Abstract

The financial development is considered as a pre-requisite condition for the overall economic development of the nation and rousing to economists. This paper investigates the short run and long run causality between monetary variables (M1, CPI, NFA, DC) and real sector variables (GDP, TE, TI) of Nepal using some of the econometric techniques like Johansen's co-integration analysis and the Vector Error Correction Model (VECM). The study employs the data from 1975 to 2014. The results of the investigation aver that there exists short run and long run causality between monetary and real sector variables. The impulse responses of exports and domestic credits show that these variables have positive impacts on the economic growth which is consistent with the theoretical frameworks. The impulse responses of GDP to domestic credit seemed insignificant in the short run and started to be significant in the long run gradually. On the contrary to this, the impulse response of GDP and domestic credit to export seemed negatively responsive. So, giving proper focus on the macroeconomic policies and strategies which reduces the nebulous situations of economy and promote the allocation of resources, production activities, and competitiveness to increase the domestic credits and exports will probably promote economic development of the nation.

Key Words: Linkages, Speed of Adjustment, VECM,

JEL Classification: C52, E51

I. INTRODUCTION

The development of the financial sector is considered as the pre-requisite condition for the development of a nation and this issue is rousing to economists and researchers. A well-developed financial sector can improve the efficiency of allocation of capital resources and also promote savings. Financial development could expand investors' opportunities and increase resource allocation to productive sectors. Financial development can spur economic growth through two channels: capital accumulation and technological innovation. As a result of the growth of an economy, the demand for financial services rises. Therefore, economic development can also in turn foster development in the financial system (Wongpiyabovorn, 2014).

A close mutual relationship exists between the financial sector and real economy. Capital can trigger economic growth. On the other hand, financial wealth cannot sustain itselfindefinitely without an adequate "real economy" foundation (Peetz & Genreith, 2011). Financial intermediaries aid investment and economic growth by mobilizing savings. They provide lenders financial

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instruments of high quality and low risk, and buy the liabilities of borrowers at lower liquidity, lower yield and a larger principal (Kularatne, NA).

The development of the financial sector is crucial to drive the development of the economy. Therefore, it is important for developing countries to keep abreast of the development and changes in other countries as well as improving its own economic performance. With the growing integration and complications of the worldwide financial system, the challenge for the developing countries financial system is to cope with the changing market. Attractive investment incentives, a productive workforce and political stability are strong points for the nation, as they can lead to sustained growth in the inflow of investments into the economy. Moreover, the country on which financial systems are well set and cost-effectiveness are abundant to operate business in the long run are suitable for investment and hence economic development. (Taha R.et.al.2009).

An efficient and robust financial structure plays a vital role in the advancement of economic sector. A well-structured, efficient, systematized and sustainable financial system is a pre-requisite for real sector growth. Sound and robust financial structure of a country plays a vital role in the development of an economy through proper and efficient use of financial resources- that a banking system has. Banking institutions plays the role of financial intermediary as they collect savings of the community and then efficiently channelize it to entrepreneurs for productive use. Thus, financial sector developments promote and strengthen competition and innovative activates in the economy that ultimately enhance efficiency. A sound financial system is considered a key to economic development (Rehman & Cheema, 2013).

Financial intermediation is the process through which financial institutions transfer financial resources from surplus units of the economy to deficit ones. However, for financial institutions to discharge this role effectively, they have to be developed in terms of liquidity, variety of financial assets and efficiency in credit allocation (Abubakar & Gani, 2013).

Nepal is a developing country with a primitive situation of financial development and the low economic growth. The average growth rate of Nepal over the last ten years is 4.0 percent (Economic Survey, 2013). So, what is the existing situation of monetary variables and their influences in economic development? What course of action is essential for the smooth functioning of the economy with the lubrication of financial sector ?The answers of these questions have the great importance. In this scenario this study investigates short run and long run causalities of the monetary and real sector variables to foster the economic development of Nepal. The main objectives of this study are (a) to analyze the short run and long run causality of monetary variables like M1,CPI, DC and NFA along with the real sector variables like GDP, TE and TI on economic growth. (b) to analyze the impulse responses of gross domestic product, domestic credit and exports (c) to recommend the further analytical frameworks for the research which are of great importance on economic policy implications. This paper uses some of the selected variables only and uses some basic econometric techniques like Johansen's Co-integration test and Vector Error Correction Model to trace out the pith which are the limitations of the study.

The rest of the paper is organized as: second chapter presents some reviews of literatures, third chapter presents the methodology and model specification, chapter four presents the empirical findings and finally chapter five concludes the paper with some recommendations

REVIEW OF LITERATURE

The inter-relationships between real and monetary variables is of great importance and researchers are giving proper focus in this area. Among them the studies of Abubakar and Ghani (2013), Samsi,et.al.(2012), Kiszito (2013), Akinbobola (2012), Mello.L.D & Pisu.M.(2009), Rehman,A.& Ceema,A.R.(2013) are reviewed as literatures.

Abubakar and Ghani (2013) made a study related to the interlink ages between financial indicators and real sector indicators of Nigeria using the vector error correction model. The findings of the study revealed that in the long-run, liquid liabilities of commercial banks and trade openness exert significant positive influence on economic growth, conversely credit to the private sector, interest rate spread and government expenditure exert significant negative influence. The findings implied that, credit to the private sector is marked by the identified problems and government borrowing and high interest rates are crowding out investment and growth.

Samsi.et.al. (2012) explored the dynamic interaction between the real sector and the financial sector in Malaysia. They used the error-correction model to examine the significant role of financial variables on real output in the long-run as well as in the short run. The findings of the study suggest that there exists the long term relationship between the real sector and the financial sector. Based on the study they concluded that for the sustainability of output growth, strengthening and establishing a well-developed banking sector is essential.

Kiszito (2013) discovered from the study that though the long run relationship exists between money market and economic growth in Nigeria, but the current state of the Nigerian money market does not have significant impact on economic growth. Econometrics techniques like OLS, Augmented Dickey Fuller Test, Johansen Co-integration tests and Vector Error Correction models were performed in the study to see the unit root and co-integration of the data as well as the long run and short run causality. The study concludes that the government should create the appropriate macroeconomic policies, legal framework and sustain the current reforms with a view to developing the market so as to promote productive activities, investment opportunities and hence the economic growth.

Akinbobola (2012) analyzed the dynamics of money supply, exchange rate and inflation in Nigeria using the vector error correction approach. The empirical results of the study confirms that in the long run, money supply and exchange rate have significant inverse effects on inflationary pressure, while real output growth and foreign price changes have direct effects on inflationary pressure. There exists a causal linkage between inflation, money supply and exchange rate in Nigeria.

Mello.L.D & Pisu.M.(2009) tested the existence of bank lending channel in the transmission of monetary policy in Brazil using vector error correction model. The main finding of the test is loan supply is negatively related to the interbank deposit certificate rate in the long term and short term dynamics show that loan demand is equilibrium correcting.

Rehman, A. & Ceema, A.R. (2013) empirically examines the long run and casual relationships between financial intermediation and real sector growth in Pakistan. The study tries to dig out the answer of the question like does financial development follows a supply leading, demand following or feedback hypotheses. The results show a single co-integration relationship among the variables of financial intermediation and real sector growth. The demand following hypothesis (i.e.Causality runs from real sector growth to financial intermediation) is supported through variable of private

credit in Pakistan. The conclusion of which is there exists causal relationship between the real and monetary variables.

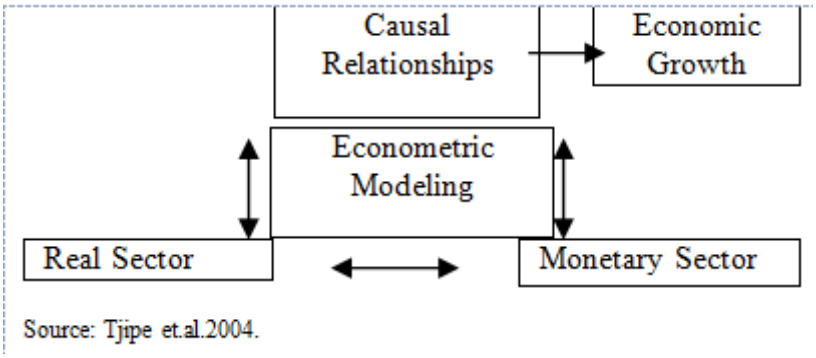
III. METHODOLOGICAL FRAMEWORK

3.1 Data and Test

To analyze the association ship among the variables of real and financial sector the sample data are taken from 1975 to 2014 with 40 sample points published by central bank and Ministry of Finance of Nepal.

After taking the data stationary test is done through the graph and diagnostic test is performed with the help of Augmented Dickey Fuller Test. In addition to this Ljung Box Test is also performed to test the presence of autocorrelation. The level and log data suffer from the unit root revealing that the data are not stationary. So, the further step to manipulate data in log difference form shows absence of unit root (Table 1). This concludes that the data can be used in the modeling process after log difference.

Similarly, the Johansen Co-integration test is performed to the level data whether the variables are co-integrated or not. The test reveals that there exist six co integrating equations. As the variables are co integrated we can use the vector error correction model to specify the short run and long run causality of the variables. The schematic representation of the model is given as follows:



Source: Tjipe et.al.2004.

The theoretical framework of the model is based upon the reduced form of NAMEX (Tjipeet.all 2004) in which different four sectors are considered: Real Sector, Fiscal Sector, Monetary Sector and the Price Sector. Among them only two sectors are taken in this study i.e. real and monetary with the real variables GDP, TE and TI andthe monetary variables M1, CPI, NFA and the DC. The interlink ages of these variables are analyzed in the study.

3.2 Model Specification

It is obvious that national output is the complex function of different activities done within the economy plus net exports. In this study a model of GDP is defined as a function of different monetary and real sector variables and this can be represented as:

$$GDP_t = f(GDP_{t-1}, M1, P, DC, NFA, TE, TI) \quad \ldots\ldots\ldots\ldots\ldots \quad (1)$$

Where GDP is nominal gross domestic product which is considered as the total output of an economy, M1 is the money supply which reflects the money available in the transaction channels, P is the price level measured by CPI which is considered as a proxy variable for the measurement of the influence of changes in the price level, DC is the domestic credit that is created by the banking sector and considered as the key channel for the mobilization of resources, NFA is the net foreign assets that is accumulated in the banking systems, TE is the total exports and TI is the total imports.

The vector error correction model based on the study of Abubakar and Ghani(2013) is specified as follows.

$$\Delta \ln(GDP)\, t = \beta 0 + \sum_{i=1}^{6} \beta 1 \Delta \ln(GDP)\, t-1 + \sum_{i=1}^{6} \beta 2 \Delta \ln(M1)\, t-1 + \sum_{i=1}^{6} \beta 3 \Delta \ln(CPI)\, t - 1 \sum_{i=1}^{6} \beta 4 \Delta \ln(DC)\, t-1 + \sum_{i=1}^{6} \beta 5 \Delta \ln(NFA)\, t-1 + \sum_{i=1}^{6} \beta 6 \Delta \ln(TE)\, t-1 \sum_{i=1}^{6} \beta 7 \Delta \ln(TI)\, t-1 + \delta ECT\, t-1 + \epsilon$$

..... (2)

Where βs are the coefficients of respective variablesΔ is the difference operator of logged variables.

3.3 Impulse Response Analysis

Once the VECM has been estimated, short run dynamics can be examined by considering the impulse response functions (IRF). These functions show the response of each variable in the system to a shock in any of the other variables. The IRF should be calculated from the Moving Average Representation of the VECM. In this study the impulse response of GDP, domestic credit and exports are observed using the Cholesky IRF with the help of software eviews. The rationale of choosing these three variables is to analyze the link between monetary and real sector with one variable of each

IV. EMPIRICAL RESULTS

The variables are treated as the unit root test through the Augmented Dickey Fuller Test at level, at log and log difference. The variables bear the unit root at level and log which indicate the presence of non-stationary of the data. When the data are treated the unit root test through ADF in log difference the unit root remained absent which data are employed in modeling process (Table No. 1).

Unit Root Test

Table No. 1: Unit Root Test

Variables	ADF Test					
	Level		Log		Log Diff.	
	T Statistics	P-values	T Statistics	P-values	T Statistics	P-values
GDP	4.2458	1.0000	-0.2373	0.9248	-4.3780	0.0013
M1	0.3888	0.9792	1.2495	0.6430	-5.9539	0.0000
CPI	3.0110	1.0000	0.4197	0.8958	-4.7834	0.0004
DC	4.9501	1.0000	-1.7936	0.3781	-6.0991	0.0000
NFA	0.9002	0.9941	-0.0342	0.9495	-5.7361	0.0000
TE	1.6733	0.9994	-0.9990	0.7442	-5.3264	0.0001
TI	4.0204	1.0000	-0.3492	0.9079	-5.0970	0.0002

Source : Test Performed by Author

Co-integration test

The variables are tested whether they are co-integrated or not through the method of Johansen Co-integration Test. As the null hypothesis having the co-integrated equation of none to at most 5 are rejected and at most 6 is accepted. This indicates that there are at most 6 co-integrated equations existing in the model. The result of which is that the variables have the long run association ship. As the variables are co-integrated or having the long run association ship we can use the vector error correction model (Table No.2).

Table No. 2: Johansen Co-integration Test

Unrestricted Co integration Rank Test (Trace)

Hypothesized No. of CE(S)	Eigen value	Trace Statistic	0.05 Critical Value	Porb.**
None*	0.839776	24.8.2786	125.6154	0.0000
At Most 1*	0.767855	178.6937	95.75366	0.0000
At Most 2*	0.716419	123.1987	69.81889	0.0000
At Most 3*	0.543488	75.3089	47.85613	0.0000

At Most 4*	0.483034	45.51153	29.79707	0.0004
At Most 5*	0.386305	20.43993	15.49471	0.0083
At Most 6	0.048424	1.88614	3.841466	0.1696

Source : Test Performed by Author

Speed of adjustment

The coefficient of the integrated model in vector error correction model is known as speed of adjustment and represented by the first coefficient i.e. C1. It must be significant and the sign must be negative to have the long run relationship between the variables. The sign of which is negative and also significant. This shows the long run association ships between the monetary and real sector variables to influence GDP. The conclusion of which are the monetary variables are being contributor for the economic growth of Nepal along the real sector variables in the long run (Table No.3).

Table No. 3: Speed of Adjustment

Name of the coefficient	Value	Std. Error	t-Statistic	Prob.**
C(1)	-0.45011	0.100579	-4.475173	0.0004

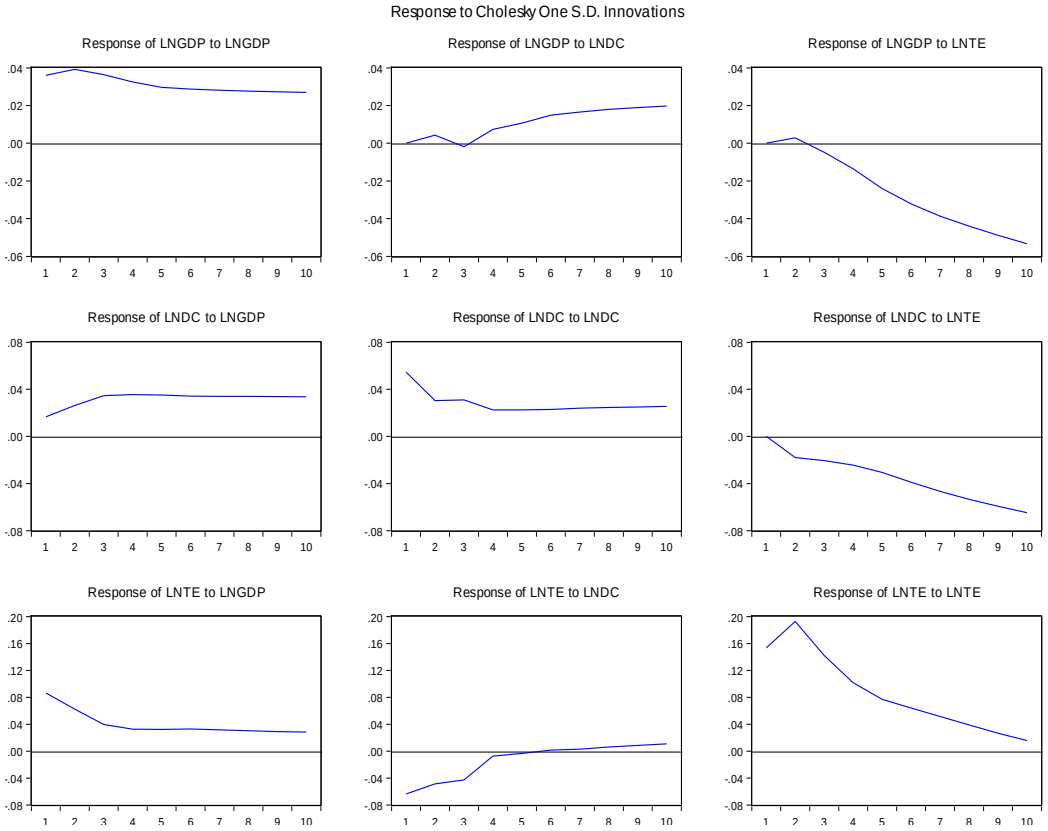
Source : Solution of System Equation

The short run causality can be analyzed through the joint effects of the variables and Wald Test can be performed for the test of joint effect of the variables. The coefficients of the variables D(LNGDP),D(LNM1),D(LNCPI), D(LNDC), D(LNNFA), D(LNTE) and D(LNTI) are tested by the Wald Test whether they have the short run causality to influence GDP or not ? All the respective influences of other variables as dependent variables are ignored in the model as the model performed by them seem statistically insignificant. In the Wald Test variables like D(LNGDP), D(LNM1), D(LNDC), D(LNNFA) and D(LNTE) have the short run causality running from them to GDP. The variables like D(LNCPI) and D(LNTI) have no short run causality or influence on GDP (Table No.4).

The statistical significance of the model shows that the R-squared 0.9284 i.e.92.84 % and adjusted R-squared of 8.89 %. F-statistic is significant as p-value is 0.00. Similarly, the J-B value is 0.105445 with the p-value of 0.9486. This shows that the residuals or the error terms are normally distributed. Breusch-Godfrey Serial Correlation LM Test indicates the Obs*R-squared value of 2.51 and corresponding Chi-square p-value of 0.2848 i.e.28.48 % and indicates no serial correlation in the model. Similarly, Breusch-Pagan Godfrey test of heteroskedasticity reveals the Obs*R-Squared value 21.76 and corresponding Prob. Chi-squared 41.32 % indicating the absence of heteroskedasticity in the model. The overall statistical inference concludes that the model best describes the causalities of the variables (Table No.5).

Impulse response analysis

The shocks of a particular variable can generate variations both in itself and in other variables, the orthogonal-zed methodology can be employed to observe the impulse responses. The general representation of this procedure can be found in the seminal works of Bernanke (1986). Some researcher argue that differencing the variables to make them stationary leads to the loss of a significant portion of information related to the co-movements in the data. Many other researchers, however, do not agree with this argument (Gunes, na). Since the data employed in the model contain unit root and do not have the feature of stationary in level we make them log differenced to have stationary feature. In this situation the stationary series are used to obtain the impulse responses. In this scenario only two variables, one monetary and one domestic, are taken to observe the impulse responses which are depicted in the figure given.



In the figure impulse response of different variables is depicted. In the first row of the figure the impulse response of GDP to itself and domestic credit along with total exports is depicted. The impulse response of GDP to itself is high and significant. Initially, the impulse response of GDP to domestic credit is zero and increases in a nominal way and then again decreases up to negative. The impulse response further increased significantly in the long run. The impulse response of GDP to exports is zero initially and starts to be negative in the long run, the speed of which is very significant. In the second row of the figure the impulse response of domestic credit to GDP, with it and exports is shown. Here the impulse response of domestic credit to GDP increased initially and then becomes constant. Similarly, the impulse response of domestic credit to itself is high initially and then decreases and remains more or less constant. The impulse response of domestic credit to export is totally negative. In the third row of the figure the impulse response of exports to GDP, domestic credit and itself is shown. The impulse response of exports to GDP is high and decreases in some extent and then becomes constant. Similarly, the impulse response of exports

to domestic credit is initially negative and gradually comes to the positive points but it is revolving around zero. The impulse response of exports itself is high and decreased in a regular way in the long run.

V. CONCLUSIONS AND RECOMMENDATIONS

The variables having the property co-integration can be analyzed through the vector error correction model. The long run and short run causality of the variables to influence the real sector variable can be viewed through the speed of adjustment and the Wald Test. The variables GDP, M1, CPI, DC, NFA, TE and TI are employed for the analysis in this study. Among these variables M1, CPI, DC and NFA are the monetary variables whereas the GDP, TE and TI are the real sector variables. The Johansen's Co-integration tests revels that the variables are co integrated and can be utilized in VECM. While going through the VECM it is found that all the monetary and real sector variables have the influence in GDP or have the causality in the long run. In the short run, all the monetary variables except CPI and all the real sector variables except TI have the causality to run from them to GDP. The statistical tests show that the model best describes the phenomenon of consideration. This concludes that the monetary sector of Nepal is really contributing real sector of the economy.

The monetary variables along with the real sector variables are contributing the economic development of the nation in the long run. In the short run also their influences are remarkable. More distinctly the impulse responses observed through the stationary series of data related to exports and domestic credit reveal the positive impacts in economic growth. This concludes that the economic development of the nation can be accelerated with the increase in domestic credit and exports.

As the monetary variables are contributing the GDP, the developmental plans and policies should address the situation which promote the monetary or the financial situation of the nation. This will ultimately promote the financial environment of the nation and promote the climate of healthy financial sector for the high and sustainable economic development.

The analysis of causality of the monetary and real sector variables in the long run and in the short reveals that there exist special type of association ship among the variables and more remarkably the exports and domestic credit seemed significant in the short run. These variables should be analyzed to observe the exact extent of influence in the economic development in different scenarios.

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Appendix I

Table No. 4: Short Run Coefficients of The model and their Causality (Wald Test Results)

Coefficients	Variables	Null Hypothesis	Chi-Square Value	DF	Prob.	Remarks
C(7),C(8)	LNGDP	H0: C(7)=C(8)=0	32.04294	2	0.0000	The null hypothesis is rejected which indicates that there is a short run causality running from GDP to GDP.
C(9),C(10)	LNM1	H0: C(9)=C(10)=0	32.5941	2	0.0000	Rejection of null hypothesis and indicates

						the short run causality running from M1 to GDP.
C(11),C(12)	LNCPI	H0: C(11)=C(12)=0	2.713211	2	0.2575	The null hypothesis cannot be rejected and this indicates that coefficients are combinely zero and no short run causality running from CPI to GDP.
C(13),C(14)	LNDC	H0: C(13)=C(14)=0	45.1448	2	0.0000	Rejection of null hypothesis and indicates the existence of short run causality running from DC to GDP.
C(15),C(16)	LNNFA	H0: C(15)=C(16)=0	24.75098	2	0.0000	Rejection of null hypothesis and indicates the existence of short run causality running from NFA to GDP.
C(17),C(18)	LNTE	H0: C(17)=C(18)=0	76.87327	2	0.0000	Rejection of null hypothesis and indicates the existence of short run causality running from TE to GDP.
C(19),C(20)	LNTI	H0: C(19)=C(20)=0	4.243767	2	0.1198	The null hypothesis cannot be rejected and this indicates that coefficients are combinely zero and no short run causality running from TI to GDP.

Source : Test in System Equations

Appendix II

Table No. 5 : Statistical Result of the Model

Test Statistic of the Model	Values	Remarks

R-Squared	0.928442	The model best describes the phenomenon.
Adjusted R-Squared	0.838994	The model best describes the phenomenon.
F-Statistic	10.37970 (Prob.=0.000)	The overall model is best fit.
D-W Test	2.295374	No auto-correlation.
Histogram Normality Test (Jarque-Bera Test)	0.105445 (Prob.=0.948643)	Residuals are Normally distributed.
Serial Correlation Test (Breusch-Godfrey Serial Correlation LM Test) Obs* R-squared, Porb. Chi-square	2.511844 (Prob.=0.2848)	The model is not suffering from serial autocorrelation.
Heteroskedasticity Test (Breusch-Pagan Godfrey Test) Prob. Chi-Squared of Obs * R-Squared	2.76453 (Prob.=0.4132)	No heteroskedasticity exists in the model.

Source : Test Performed by Author

Appendix III

Dependent Variable: D(LNGDP)		
Method: Least Squares		
Date: 01/19/15 Time: 09:50		
Sample (adjusted): 1978 2014		
Included observations: 37 after adjustments		
D(LNGDP) = C(1)*(LNGDP(-1) - 0.81305841136*LNTI(-1) -		
3.49504354252) + C(2)*(LNM1(-1) - 0.885094885381*LNTI(-1) -		
0.795465181977) + C(3)*(LNCPI(-1) - 0.519365441501*LNTI(-1) +		
1.70438208223) + C(4)*(LNDC(-1) - 1.06090227033*LNTI(-1) +		

0.227637240435) + C(5)*(LNNFA(-1) - 1.05071926354*LNTI(-1) +

1.04995333508) + C(6)*(LNTE(-1) - 0.730022811118*LNTI(-1) -

1.6912434251) + C(7)*D(LNGDP(-1)) + C(8)*D(LNGDP(-2)) + C(9)

*D(LNM1(-1)) + C(10)*D(LNM1(-2)) + C(11)*D(LNCPI(-1)) + C(12)

*D(LNCPI(-2)) + C(13)*D(LNDC(-1)) + C(14)*D(LNDC(-2)) + C(15)

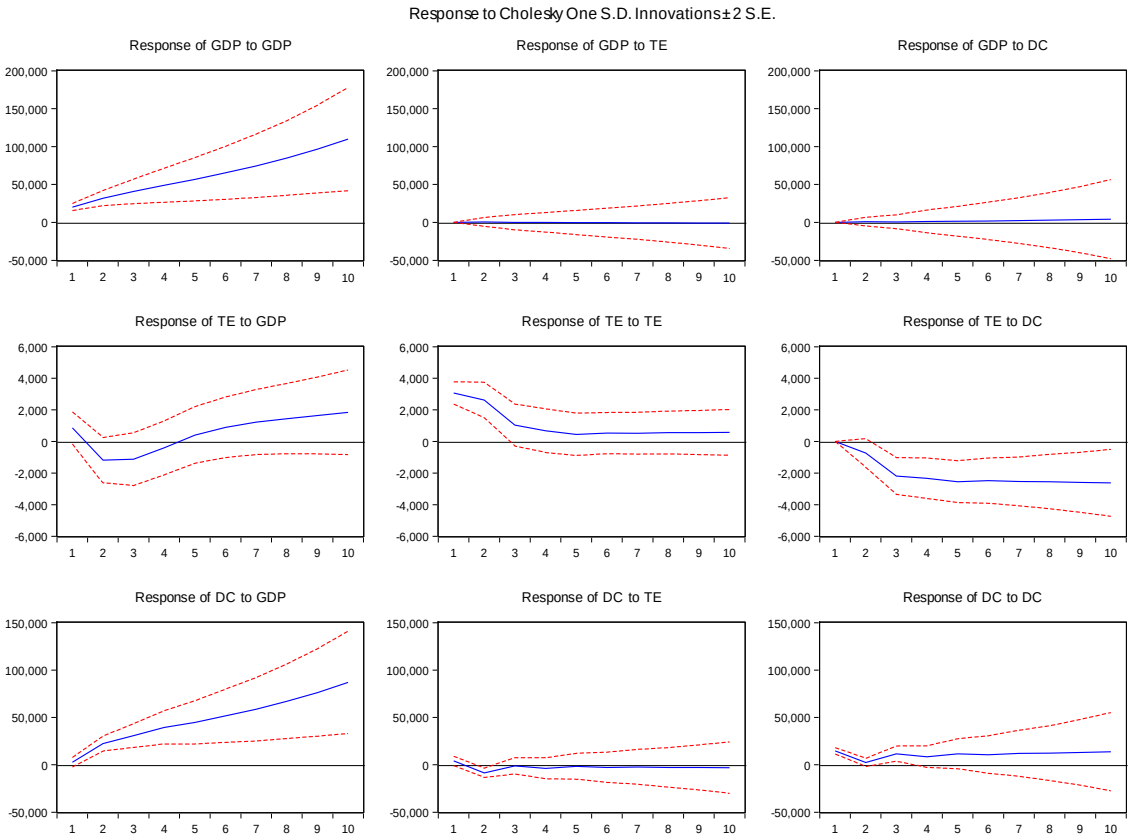
*D(LNNFA(-1)) + C(16)*D(LNNFA(-2)) + C(17)*D(LNTE(-1)) + C(18)

*D(LNTE(-2)) + C(19)*D(LNTI(-1)) + C(20)*D(LNTI(-2)) + C(21)

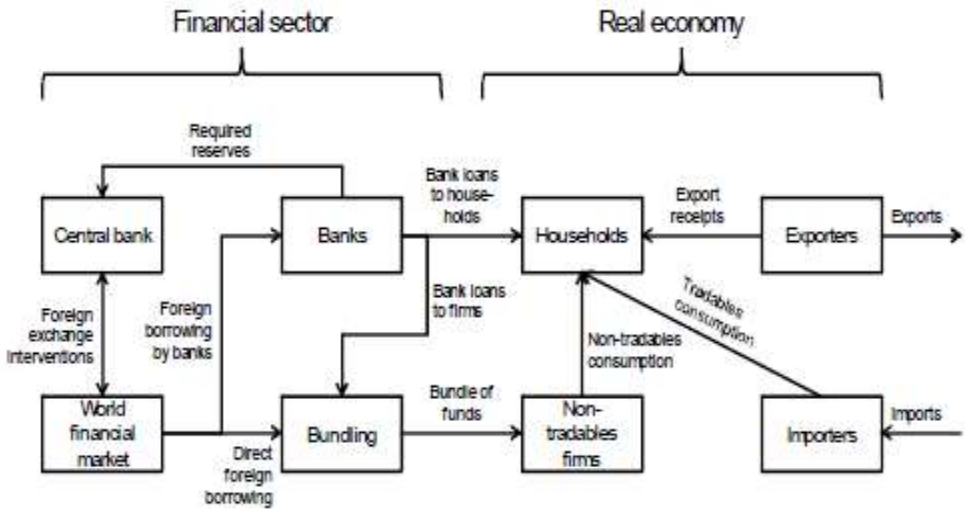
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.450107	0.100579	-4.475173	0.0004
C(2)	0.988983	0.131258	7.534663	0.0000
C(3)	0.228002	0.209856	1.086466	0.2934
C(4)	-0.404660	0.089062	-4.543575	0.0003
C(5)	-0.153011	0.025323	-6.042476	0.0000
C(6)	-0.116021	0.025992	-4.463720	0.0004
C(7)	-0.947815	0.167480	-5.659260	0.0000
C(8)	-0.332095	0.150001	-2.213949	0.0417
C(9)	-0.466823	0.125914	-3.707469	0.0019
C(10)	0.231487	0.085864	2.695986	0.0159
C(11)	0.121514	0.155542	0.781230	0.4461
C(12)	0.229945	0.139900	1.643640	0.1198
C(13)	0.535381	0.091070	5.878765	0.0000

C(14)	0.067313	0.088275	0.762534	0.4568
C(15)	0.139236	0.030177	4.613988	0.0003
C(16)	-0.007265	0.026437	-0.274815	0.7870
C(17)	0.236927	0.027350	8.662694	0.0000
C(18)	0.144128	0.033464	4.306906	0.0005
C(19)	0.044411	0.063060	0.704273	0.4914
C(20)	-0.061330	0.052938	-1.158531	0.2636
C(21)	0.124008	0.020990	5.907925	0.0000
R-squared	0.928442	Mean dependent var		0.127431
Adjusted R-squared	0.838994	S.D. dependent var		0.039673
S.E. of regression	0.015919	Akaike info criterion		-5.145787
Sum squared resid	0.004055	Schwarz criterion		-4.231482
Log likelihood	116.1971	Hannan-Quinn criter.		-4.823452
F-statistic	10.37970	Durbin-Watson stat		2.295374
Prob(F-statistic)	0.000009			

Appendix III



Framework for the linkages between Real Sector and Financial Sector.



A Review on Trends and Patterns of FDI Inflowand Its Impact on Indian Economy

Dr. B. Ravi Kumar*

Dr. Ch. Rama Krishna**

Introduction

One of the most prominent and striking feature of today's globalised world is the exponential growth of FDI in both developed and developing countries. In the last two decades the pace of FDI flows are rising faster than almost all other indicators of economic activity worldwide. Developing countries, in particular, considered FDI as the safest type of external finance as it not only supplement domestic savings, foreign reserves but promotes growth even more through spillovers of technology, skills, increased innovative capacity, and domestic competition. Now a day, FDI has become an instrument of international economic integration.

The 2010 survey of the Japan Bank for International Cooperation released in December 2010, conducted among Japanese investors, continues to rank India as the second most promising country for overseas business operations.

A report released in February 2010 by Leeds University Business School, commissioned by UK Trade & Investment (UKTI), ranks India among the top three countries where British companies can do better business during 2012-14.

According to Ernst and Young's 2010 European Attractiveness Survey, India is ranked as the 4th most attractive foreign direct investment (FDI) destination in 2010. However, it is ranked the 2nd most attractive destination following China in the next three years.

Moreover, according to the Asian Investment Intentions survey released by the Asia Pacific Foundation in Canada, more and more Canadian firms are now focusing on India as an investment destination. From 8 percent in 2005, the percentage of Canadian companies showing interest in India has gone up to 13.4 percent in 2010.

India attracted FDI equity inflows of US$ 2,014 million in December 2010. The cumulative amount of FDI equity inflows from April 2000 to December 2010 stood at US$ 186.79 billion, according to the data released by the Department of Industrial Policy and Promotion (DIPP).

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The services sector comprising financial and non-financial services attracted 21 percent of the total FDI equity inflow into India, with FDI worth US$ 1,327 million during the same period. Automobile industry was the third highest sector attracting FDI worth US$ 1,066 million followed by power sector which garnered US$ 1,028 million during the financial year April-December 2010. The Housing and Real Estate sector received FDI worth US$ 1,024 million.

During April-December 2010, Mauritius has led investors into India with US$ 5,746 million worth of FDI comprising 42 percent of the total FDI equity inflows into the country. The FDI equity inflows in Mauritius followed by Singapore at US$ 1,449 million and the US with US$ 1,055 million, according to data released by DIPP.

FDI: Foreign Direct Investment for TOP 20 host economies in worldwide for the financial year 2012 and 2013, among all developing and transition economics are five and developed 4economies are fifteen. Aggregately Regio0nal Comprehensive Economic Partnership (RCEP) increased year to year and FDI by transitional corporations (TNC). In developing countries the FDI"s reached $454 billion.6 developing and transition economics ranked among the 20 largest investors in the world in 2013. The share of APEC countries in global in flows increased 37% before the crisis to 54% in 2013.

United States Oil and Gas industry, the role of foreign capital is growing day to day. Among worldwide poorest developing economies less dependent on natural resources and outstanding funds of private equity. Firms increased further to a record level. Pharmaceutical TNCs have been non-core business segments. International production continued to expand in 2013. FDI inflows to East Asia countries rise by 2% and in South East Asia raised by 7%. FDI"s have highest share in African countries.

FDI Definition:

In the Indian context till the end of March 1991, FDI was defined to include investment in:

Indian companies which were subsidiaries of foreign companies.

Indian companies in which 40 percent or more of the equity capital was held out side India in one country.

Indian companies in which 25 percent or more of the equity capital was held by a single investor abroad.

As a part of its efforts to bring about uniformity in the reporting of international transactions by various member countries, the IMF has provided certain guidelines which enable inter-country comparisons. Reflecting this with effect from March 31, 1992 the objective criterion for identifying direct investment has been modified and is fixed at 10 percent ownership of ordinary share capital or voting rights. Direct investment also includes preference shares, debentures and deposits, if any, of those individual investors who hold 10 percent or more of equity capital. In addition to this, direct investment also includes net foreign liabilities of the branches of the foreign companies operating in India.

A committee was constituted by the Department of Industrial Policy and Promotion (DIPP) in May 2002 to bring the reporting system of FDI data in India into alignment with international best

practices. Accordingly, the RBI has recently revised data on FDI flows from the year 2001 onwards by adopting a new definition of FDI. The revised definition includes three categories of capital flows under FDI; equity capital, reinvested earnings and other direct capital. Previously the data on FDI reported in the BOP statistics used only equity capital.

Types of FDI:

Inward Foreign Direct Investment: This refers to long term capital inflows into a country other than aid, portfolio investment or a repayable debt. It is done by an entity outside the host country in the home country.

Outward Foreign Direct Investment: This refers to a long term capital outflow from a country other than aid, portfolio investment or a repayable debt. It is done by an entity outside the host country in the home country.

Horizontal Foreign Direct Investment: This refers to a multi-plant firm producing the same line of goods from plants located in different countries.

Vertical Foreign Direct Investment: If the production process is divided into upstream (parts and components) and downstream (assembly) stages, and only the latter stage is transferred abroad, then the newly established assembly plant's demand for parts and components can be met by exports from home-country suppliers. This is what Lipsey and Weiss (1981, 1984) and other researchers describe as "Vertical FDI", whose aim is to exploit scale economies at different stages of production arising from vertically integrated production relationships.

Greenfield Foreign Direct Investment: Greenfield FDI is a form of investment where the MNC constructs new facilities in the host country.

Brownfield Foreign Direct Investment: Brownfield FDI implies that the MNC or an affiliate of the MNC merges with or acquires an already existing firm in the host country resulting in a new MNC affiliate.

Review of Literature:

A lot of research has already been done across the globe analyzing the various aspects of FDI. These studies can be broadly classified into two categories:

Macro View

The studies done in this group focus on FDI as a particular form of capital across national borders from home to the host countries as measured in the BOP. The variables of interest in these studies are the flows of financial capital, the value of stock capital that is accumulated by the investing firms and the flows of incomes from these investments.

Micro View

Studies under this group try to explain the motivation for investment in controlled foreign operations from the view point of the investor. The emphasis here is on examining the consequences of the operations of the MNC's to the home and the host countries. These

consequences arise from their trade employment, production, and their flows of stocks of intellectual capital unmeasured by the capital flows and the stocks in the BOP.

Most of the currently held perceptions of foreign investments role take a macro view. Such a positive view gained currency mainly after the Latin America crisis in the early eighties and the South-East Asian crisis in the late nineties and accordingly the structural importance of FDI has been restored back in comparison to foreign financial flows. The crux of the policy, therefore, is how the benefits of such investments are distributed over the foreign firms and the host country. However, in a micro perspective, a different question is asked- what does FDI do to the working of the domestic markets and their effect on productivity and output.

Studies from the Global Perspective:

Mihir Desai, Foley and Antras (2007) in their study try to provide an integrated explanation for MNC activity and the means by which it is financed. They are of the view that the ways in which the firms try to obtain external finance can create many frictions for the firm, which leads, further to multinational activity. However, the desire to exploit technology is not affected by the financing decisions. They try to relate the level of financial development of an economy to MNC activity and they find that the propensity to do FDI, the share of affiliate assets financed by the parent firm and the share of affiliate equity owned by the parent are higher in countries with weak financial developments, but the scale of MNC activity is lower in such settings. They conclude that in India MNC activity is likely to be limited by concerns over managerial opportunism and weak investor protection and the ability of the Indian MNC's to employ their internal capital markets opportunistically will help dictate their overseas and domestic success.

Foley at.al (2005) in their study tries to evaluate the evidence of the impact of outbound FDI on the domestic investment rates. They find that OECD countries with high rates of outbound FDI in the eighties and nineties exhibited lower domestic investment than other countries, which suggests that FDI and domestic investment are substitutes for each other. However, in the US, in the years in which US MNC's had greater foreign capital expenditures, coincided with greater domestic capital spending by the same firms, implying that foreign and domestic capital are complements in production by the MNCs. This effect is consistent with cross sectional evidence that firms whose foreign operations expand simultaneously expand their domestic operations and suggest that interpretation of the OECD cross-sectional evidence may be confounded by omitted variables.

Lee Bransteeter et.al(2007) in their study try to theoretically and empirically analyze the effect of strengthening IPRs on the level and composition of industrial development in the developing countries. They develop a North-South product cycle model in which northern innovation, southern imitation and FDI are all endogenous variables. The model predicts that IPR reform in the south leads to increased FDI from the north as the northern firms shift production to the southern affiliates. This FDI accelerates southern industrial development. Also as the production shifts to the South, the northern resources will be reallocated to R&D, driving an increase in the global rate of innovation. Testing the model's predictions the study finds that MNCs expand the scale of activities in reforming countries after the IPR reforms.

Studies from the Indian Perspective

Chandra Mohan (2005) in his study on FDI in India is of the view that Indian has not been able to attract a good level of FDI and he argues that the current level of FDI appears respectful due to more liberal definition of FDI which was actually adopted to make our comparison with the Chinese FDI more comfortable. He says that the Government must not consider foreign investments sacrosanct. Instead he advises the Government to indulge in more proactive strategies to seek more FDI for which it must help in removing the procedural hassles at the state level. Also the government should make the investment climate more conducive along with a proper regulatory approach for the flagship investors which would encourage the risk-averse small manufacturing enterprises to turn out in larger numbers.

Bary Rose Worth, Anand Virmani and Susan Collins (2007) study empirically India's economic growth experience during 1960-2004 focusing on the post 1973 acceleration. The analysis focuses on the unusual dimensions of India's experience: the concentration of growth in the service production and the modest level of human and physical capital accumulation. They find that India will need to broaden its current expansion to provide manufactured goods to the world market and jobs for its large pool of low skilled workers. Increased public saving as well as rise in foreign saving, particularly FDI could augment the rising household saving and support the increased investment necessary to sustain rapid growth.

Commenting on FDI in India, P.L. Beena et.al (2004)agree to the fact that India has come a long way since 1991 as regards the quantum of FDI inflows is concerned, though there is a view that the MNCs are discouraged from investing in India by bureaucratic hurdles and uncertainty of the economic reforms. However, they feel that very little discussion has taken on the experience of the MNCs and the relationship between their performance and experience with the operating environment and the extent of spillovers in the form of technology transfers. The importance of the former is that the satisfaction of the expectations of the MNCs that are already operational within India is an important precondition for growth in FDI inflow. Transfer of technology and know how on the other hand is at least likely to have an impact on India's future growth and the quantum of FDI inflow. They argue that to the extent that India's future growth will depend on the global competitiveness of its firms, the importance of such spillovers can be paramount.

In order to provide foreign investors a latest picture of investment environment in India, Peng Hu (2006) in his study analyses various determinants that influence FDI inflows to India including economic growth, domestic demand, currency stability, government policy and labour force availability against other countries that are attracting FDI inflows. Analyzing the new findings it is interesting to note that India has some competitive advantage in attracting FDI inflows, like a large pool of high quality labour force which is an absolute advantage of India against other developing countries like China and Mexico, to attract FDI inflows. In consequence this study argues that India is an ideal investment destination for foreign investors.

Kulwinder Singh (2005) has analyzed FDI flows from 1991-2005. A sectoral analysis in his study reveals that while FDI shows a gradual increase and has become a staple of success in India, the progress is hollow. The telecommunications and power sector are the reasons for the success of infrastructure. He comments that FDI has become a game of numbers where the justification for the growth and progress is the money that flows in and not the specific problems plaguing the individual sub sectors. He finds that in the comparative studies the notion of infrastructure has

gone a definitional change. FDI in sectors is held up primarily by telecommunications and power and is not evenly distributed.

Objectives of the Study:

To depict the trends and patterns of FDI inflow and its impact of Indian economy

To know about various types of FDI

To present the FDI inflows in selected Asian developing countries

To illustrate the country wise distribution of FDI share of top investing countries.

Significance of the Study:

India's experience with its first generation economic reforms and the country's economic growth performance were considered safe havens for FDI which led to second generation of economic reforms in India in first decade of this century. There is a considerable change in the attitude of both the developing and developed countries towards FDI. They both consider FDI as the most suitable form of external finance. Increase in competition for FDI inflows particularly among the developing nations. Therefore the study is appropriate in understanding the inflows of FDI and its impact of Indian economy.

Statement of the Problem

The current study tries to evaluate the impact of FDI inflow in India at the comprehensive level. Thus, this study is an attempt to talk about the trends and patterns of FDI, and its impact on Indian economy.

Data Collection

The present study is entirely based on secondary data. The requisite data was collected from various sources i.e. Asian Development Bank's Reports, various Bulletins of Reserve Bank of India, publications from Ministry of Commerce, Economic and Social Survey of Asia and the Pacific, Govt. of India, Asian Development Outlook, United Nations, Country Reports on Economic Policy and Trade Practice- Bureau of Economic and Business Affairs, U.S. Department of State and from websites of World Bank, IMF, WTO, RBI, UNCTAD etc.

FDI Inflows in selected Asian developing countries (1990-2004) (US $ billions)

Country	1990	2004
China	3.48 (1.72)	60.63 (8.16)
Hong Kong	3.27 (1.62)	34.03 (4.58)
India 0.23(0.11)		5.77 (0.77)
Indonesia	1.09 (0.54)	1.89 (0.25)

Country	1990	2004
Korea	0.759 (0.37)	8.98 (1.2)
Malaysia	2.61 (1.29)	4.62 (0.62)
Phillippines 0.55(0.27) 0.68(0.09)		
Singapore	5.57 (2.76)	19.82 (2.67)
Srilanka 0.43(0.02) 0.23 (0.03)		
Thailand	2.57 (1.27)	5.86 (0.78)
Developing Economies	35.89 (17.80)	283.03 (38.13)
World 201.59 742.13		

Source: DIP &P, Ministry of Commerce, 2005

Measures of Integration of the Indian Economy with the World Economy (percent total)

Measures of Integration	1994	2004
Share in GDP of Exports of Goods and Services	10	18
Share in GDP of Imports of Goods and Services	10	20
Share in World Merchandise Exports	0.6	0.8
Share in World Merchandise Imports	0.6	1.1
Country Share in World Exports of Commercial Services	0.6	1.9
Country Share in World Imports of Commercial Services	0.8	2.0

Sources: World Bank 2008 and WTO, 2005.

'Global value chains: Investment and trade for development said. "Finding of the UNCTAD is that India today is one of the most attractions of FDI Investment. India today has one of the largest markets. Though growth slowed down but it is still growing at 5 per cent.

"It has a pool of talented manpower, favorable demographics. Services FDI is likely to grow with new sectors opening like aviation, retail FDI", Mr. Kumar said.

India experienced its slowest growth in a decade in 2012 and also struggled with risks related to high inflation. As a result, investor confidence was affected, and FDI inflows to India declined significantly, the report said.

"But... the country's FDI prospects are improving. Inflows to the services sector are likely to grow... and flows to manufacturing are expected to increase as a number of countries, including Japan and Korea establish country and industry specific industrial zones in the Delhi-Mumbai industrial corridor", the report said.

FDI inflows to South Asia declined by 24 percent to $34 billion in 2012 mainly because of decrease recorded by India and other major countries in the region, it said.

Inflows to Pakistan fell by 36 per cent to $847 million, Sri Lanka down by 21 per cent to $776 million and Bangladesh by 13 per cent to $1 billion.

The report further said that FDI outflows from South Asia dropped by 29 per cent in 2012 to $9.2 billion.

Outflows from India, the region's dominant FDI source, decreased to $8.6 billion, due to a shrinking in the value of cross border M&A's by Indian companies, it said.

Total value of cross-border M&As undertaken by Indian companies in 2012 dropped by nearly three fifths to about $2.65 billion.

The report also said that countries such as Bangladesh, India, Pakistan and Sri Lanka in the region have emerged as important players in manufacturing and export of ready-made garments.

It said Bangladesh, India, Pakistan and Sri Lanka have become important players in global apparel exports and the first two ranks fourth and fifth globally, after China, the EU and Turkey. Their significance has been further enhanced recently.

"Overall, prospects for FDI inflows to South Asia are improving, mostly owing to an expected rise in investments in India," it added.

Sectorial Analysis 0f FDI Inflows

Ranks	Sector	Amount of FDI inflows					
		Apr B-Marc	Apr f-MarD	Apr-DecF	Apr –DecF	Cumulative Inflows (AugTM 1-Dec E)	Percentage with inflow
1	Electrical Equipments (incl. computer software & electronics)	3,075 (644)	2,449 (532)	3,281 (721)	3,796 (841)	21,006 (4,886)	16.50

Ranks	Sector	Amount of FDI inflows					
		Apr B-Marc	Apr f-MarD	Apr-DecF	Apr – DecF	Cumulative Inflows (AugTM 1-Dec E)	Percentage with inflow
2	Transportation and Industry	2,173 (455)	1,417 (308)	815 (179)	830 (187)	13,162 (3,143)	10.34
3	Services Sector (financial & non-financial)	1,551 (326)	1,235 (269)	2,106 (469)	2,035 (462)	12,274 (2,972)	9.64
4	Telecommunication(radio paging, cellular mobile, basic telephone services)	1,058 (223)	532 (116)	588 (129)	886 (198)	12,199 (2,890)	9.58
5	Fuels(Power + Oil Refinery)	551 (118)	521 (113)	759 (166)	150 (34)	10,711 (2,521)	8.41
6	Chemicals (non-fertilizers)	611 (129)	94 (20)	909 (198)	856 (194)	7,456 (1,890)	5.86
7	Food Processing Industries	177 (37)	511 (111)	174 (38)	158 (36)	4,678 (1,173)	3.67
8	Drugs & Pharmaceuticals	192 (40)	502 (109)	1,343 (292)	499 (114)	4,051 (949)	3.18
9	Cement and Gypsum Products	101 (21)	44 (10)	1 (0)	1,970 (452)	3,231 (747)	2.54
10	Metallurgical Industries	222 (47)	146 (32)	881 (192)	560 (126)	2,695 (627)	2.12

Foreign Direct Investment (FDI) in India is expected to rise by 15 per cent in 2013 on account of policy initiatives being undertaken by the government to boost investment and growth, said a UN economist.

"India's prospects are very encouraging and positive. Investor confidence approach is very robust in India. It is expected to see 15 per cent increase in FDI in 2013", said Nagesh Kumar, chief economist at UN-ESCAP, while releasing UNCTAD's World Investment Report 2013.

However, FDI inflows to India dropped by 29 percent to $ 26 billion in 2012, the report subtitled as

Regional (Country Wise) Distribution of FDI Share of Top Investing Countries' FDI Inflows in Rs.Crores (US$ Million)

Ranks	**Country**	**Aug% 0-Mar B**	**Apr B-Mar C**	**Apr f – Mar D**	**Apr … - Mar E**	**Apr … - Oct F**	**Cumulative Inflows (AugTM 1 –Oct E)**	**Percentage with inflow**
1.	Mauritius	27,446 (6,632)	3,766 (788)	2,609 (567)	5,141 (1,127)	5,033 (1,144)	43,995 (10,358)	35.95
2.	U.S.A.	12,248 (3,188)	1,504 (319)	1,658 (360)	3,055 (668)	1,498 (340)	19,963 (4,876)	16.31
3.	Japan	5,099 (1,299)	1,971 (412)	360 (78)	575 (126)	410 (93)	8,416 (2,008)	6.88
4.	Netherlands	3,856 (986)	836 (176)	2,247 (489)	1,217 (267)	70 (39)	8,325 (1,956)	6.80
5.	U.K.	4,263 (1,106)	1,617 (340)	769 (167)	458 (101)	845 (192)	7,952 (1,906)	6.50
6.	Germany	3,455 (908)	684 (144)	373 (81)	663 (145)	170 (39)	5,346 (1,317)	4.37
7.	Singapore	1,997 (515)	180 (38)	172 (37)	822 (184)	660 (150)	3,829 (925)	3.13
8.	France	1,947 (492)	534 (112)	176 (38)	537 (117)	36 (8)	3,229 (768)	2.64

Ranks	Country	Aug% 0-Mar B	Apr B-Mar C	Apr f – Mar D	Apr … - Mar E	Apr … - Oct F	Cumulative Inflows (AugTM 1 –Oct E)	Percentage with inflow
9.	South Korea	2,189 (594)	188 (39)	110 (24)	157 (35)	251 (57)	2,894 (749)	2.37
10.	Switzerland	1,200 (325)	437 (93)	207 (45)	353 (77)	171 (39)	2,367 (579)	1.93
Total FDI inflows *		92,611 (23,829)	14,392 (3,134)	12,117 (2,634)	17,138 (3,754)	11,397 (2,590)	1,48,195 (35,942)	

Source: DIP & P, Ministry of Commerce and advances pending issue of shares * includes inflows under RBI NRI Schemes, stock swapped.

Summary and Conclusion

The growth patterns and changing nature of Indian Inward Foreign Direct Investment, with an emphasis on the post liberalization period, since FDI, along with trade, has been an important mechanism which has brought about a greater integration of the Indian economy with world economy. The changing patterns reflect the growing investor confidence in the country.

India is growing at an average growth rate of close to 6 percent a year since 1980, with some evidence that growth is accelerating and can be sustained at 8 percent a year in coming decades. With population of 1.1 billion in 2003, India presents a huge and fast growing domestic market for a range of goods and services, and thus export opportunities for producers in the rest of the world. Large and growing market opportunities in India are widely seen, as evidenced by the large flows of foreign direct investment, attractive both for production for the domestic market, and also to use exports to the rest of the world.

Inward FDI has boomed in post-reform India. The Indian government policy towards FDI has changed over time in tune with the changing needs in different phases of development. The changing policy framework has affected the trends and patterns of FDI inflows received by the country. At the same time, the composition and type of FDI has changed considerably. Even though manufacturing industries have attracted rising FDI, the services sector accounted for a steeply rising share of FDI stocks in India since the mid-nineties. Thus, although the magnitude of FDI inflows has increased, in the absence of policy direction the bulk of them have gone into services and soft technology consumer goods industries bringing the share of manufacturing and technology intensive among them down. In terms of investing countries, it can be noted that there is a high degree of concentration with more than 50 percent of the investment coming from Mauritius, U.S and Japan. Also, while FDI in India continues to be local "market seeking" in the first place, its world-market orientation has clearly increased in the aftermath of economic reforms. Thus while the growth of FDI inflows to Indian seem to be fairly satisfactory; India's share in the

global FDI regime is still minuscule. This calls for further liberalization of norms for investment by present and prospective investors. It underlines the need for efficient and adequate infrastructure, availability of skilled and semiskilled labour force, business friendly public administration and moderate tax rates.

Opening up the Indian economy and the resulting FDI flows have really created new opportunities for India's development and boosted the performances of local firms as well as the globalization of some of them. Such a trend has undeniably raised Indian's stature among developing countries.

However, the potential of the country to catch up the levels of the leading economies in the coming decades, often touched on, is not quite guaranteed. India has an extremely hard job to perpetuate its advantages, to achieve further productivity gains and to ensure that all segments of its population participate in the income growth.

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Paper No. 5

Equilibrium Exchange Rate Estimation for Taka – A Cointegration Analysis

Luthfe Ara Begum*

Abstract

Exchange rate is one of the key macroeconomic variables and efficient management of exchange rate is very crucial for continued performance of external sector competitiveness and openness. Like the experiences of many other countries considering gradual openness and increasingly integrated pace of Bangladesh economy into the global economy exchange rate policy has important role in macroeconomic management process. The estimation of equilibrium exchange rate gives a benchmark for assessing the actual development of the real exchange rate. During the financial crisis of 2008-09 when US dollar was losing its value, most of the currencies were appreciated, but Bangladesh's Taka against US dollar was stable. In recent years, foreign exchange reserve is piling up as results of robust remittance inflows and higher export growth along with slower import growth. BD Taka is gaining value against US dollar. Though exchange rate of neighboring trade competitive countries (like India and Pakistan) are gradually depreciating against US dollar. In these circumstances, Bangladesh Bank continues to buy dollar from the foreign exchange market to maintain external competitiveness. This paper is an attempt to know the equilibrium exchange rate of Taka to measure exchange rate misalignment. To estimate the equilibrium real exchange rate we use macroeconomic balance approach, which calculates the real exchange rate that is consistent with internal and external balance. Using Johansen (1995) cointegration method we were able to find a long run equilibrium relationship between exchange rate and fundamentals, which comprises of tot, openness, consgdp, remaid, dsex. Estimation of all of the macro fundamental variables entered in the cointegrating vector generates correct sign. The estimated result showed that taka was overvalued by almost 16.14 percent in FY14. Interbank exchange rates were kept lower than REER based exchange rate almost throughout the year in FY14. However, the differential between the two rates have been widened despite the demand side policy intervention of BB.

JEL Classification: F31 and F41

Keywords: Exchange rate policy, Equilibrium exchange rate, Misalignment

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1. Introduction

Exchange rate is one of the key macroeconomic variables. Like monetary policy, exchange rate policy is under the purview of the monetary authority. Bangladesh's exchange rate policy can be classified into three regimes since independence. During the period 1972-1979, BD followed fix pegged exchange rate regime. From 1979-2003 BD followed a flexible pegged exchange rate regime. During this period a new industrial policy had been introduced and the openness of the economy increased substantially. The current account was made convertible and the capital account was made partially convertible. Since May 2003 floating (managed) exchange rate policy has been in place. Though Bangladesh follows floating exchange rate regime, Bangladesh Bank keep an eye on the external value of taka and sometimes intervenes for smoothing the excessive volatility of taka. Like the experiences of many other countries considering gradual openness and increasingly integrated pace of Bangladesh economy into the global economy exchange rate policy has important role in macroeconomic management process (Isard 2007). Now-a-days, the central bank policy maker often faces a question regarding equilibrium exchange rate and or stability relating longer run period. This question is reasonable considering the observed fluctuation in exchange rates and BB's continued intervention in the foreign exchange market. The movements of the real exchange rates have important implications for economic activities. If the exchange rate is undervalued it will have inflationary effects on the economy and can create macroeconomic imbalances. On the other hand, overvalued currency creates balance of payment pressure, thus external sector imbalances. Overvalued currency had also created currency crisis in many countries (such as South East Asia, 1997; Mexico 1994; Kubota 2011)

The estimation of equilibrium exchange rate gives a benchmark for assessing the actual development of the real exchange rate. Real exchange rate (RER) misalignment, the deviation of RER from what it should be at the equilibrium level in the steady state, could be used as a signal to detect a coming crisis. The literature on real exchange rate provides a large number of empirical studies on the equilibrium real exchange rate in developing countries. A few numbers of studies on equilibrium real exchange rate were done for Bangladesh Taka. Those studies were based on data collected upto 90s' and showed overvalued exchange rate prevailed for most of the period.

During the financial crisis of 2008-09 when US dollar was losing its value, most of the currencies were appreciated, but Bangladesh's Taka against US dollar was stable. In recent years, foreign exchange reserve is piling up as the results of robust remittance inflows and higher export growth along with slower import growth. BD Taka is gaining value against US dollar. Though exchange rate of neighboring trade competitive countries (like India and Pakistan) are gradually depreciating against US dollar Bangladesh's Taka is appreciating. Obviously Bangladesh is losing competitiveness in international trade. In these circumstances, Bangladesh Bank continues to buy dollar from the foreign exchange market to stabilize the exchange rate.

It is now important to know the equilibrium exchange rate of Taka to measure the misalignment for taking appropriate policies to avoid any crisis or macroeconomic imbalance. This paper is an attempt to estimate the equilibrium real exchange rate of Taka. A number of empirical models based on economic fundamentals try to estimate equilibrium exchange rate. One of the important models is the macroeconomic balance approach, which calculates the real exchange rate that is consistent with internal and external balance. This methodology has been popularized by Williamson (1994), who referred to the exchange rate computed in this manner as the Fundamental Equilibrium Exchange Rate (FEER). In this paper we use the internal-external balance model to calculate the equilibrium real exchange rate.

The remainder of the paper is organized as follows. Section II presents review of literature; Section III reviews evolution of exchange rate policy in Bangladesh ; Theory and measurement of RER are shown in section IV; Section V formulate empirical model to estimate equilibrium exchange rate for Bangladesh Taka; Section VI analyze methodology and collection of data; Section VII explains estimated results; an attempts to measure degree of exchange rate misalignment is presented in section VIII and finally some concluding remarks is made in section IX .

2. Literature Review

Chun E Sun (1998), , in a research paper (Chonnam National University) estimated equilibrium Korean won/dollar real exchange rate using multivariate cointegration method of Johansen based on behavioral effective exchange rate (BEER) over the sample period 1986Q1 to 2003Q4. The study was able to find a long run equilibrium relationship between real exchange rate and a set of fundamental variables. Variance decomposition analysis demonstrated that the net foreign assets (NFA), productivity differential, measure of openness and house price index plays an important role in explaining the behavior of real exchange rate. The won was overvalued and undervalued for the period 1986-87 and 1988-89 respectively. From early 1991 to till currency crisis in 1997 the won was consistently overvalued.

Baffes, et all (1999) in their working paper used internal and external balance approach for estimating both the equilibrium real exchange rate and degree of misalignment. They illustrated the methodology using annual data for Cote d'Ivoire and Burkina Faso. They used government consumption to GDP ratio as a proxy for government spending for nontradable and total investment to GDP ratio as a proxy for government spending for tradable. The ratio of trade openness was used as a proxy for stance of trade policy. A crucial parameter in the estimation of the short run dynamic model is the coefficient of error correction term which measures the speed of adjustment of the RER to its equilibrium level. The adjustment speed for Cote d'Ivoire is somewhat higher (-0.30) than that of Burkina Faso (-0.54). This finding suggests that smaller economies are more adaptive to shocks than the large ones.

Hossain (2000) estimates short run and long run model of real exchange rate of BD Taka using Edwards's model of the equilibrium real exchange rate within the general equilibrium framework. Estimating regression of short run equilibrium exchange rate he found that terms of trade, economic growth, and foreign capital inflows lead to an appreciation of the real exchange rate, while increase in investment leads to depreciation is effective in bringing about a short run depreciation of real exchange rate. The cost of exchange rate misalignment is poor economic performance through various channels. This study showed that a real exchange rate misalignment lowers the growth rate of output.

Rahman and Basher (2001) estimate long run equilibrium real exchange rate based on Monteil (1999) analytical model of equilibrium real exchange rate. It observed that trade liberalization and increase in debt service burden result in real depreciation of currency, while increase in capital inflow, improvement in terms of trade and increase in government consumption of non-tradable result in a real appreciation of currency. Nominal devaluation partly retained its effectiveness in having a real devaluation in the short run. The study revealed that currency was overvalued during the late seventies and eights, during nineties currency was broadly in equilibrium due to implementation of trade liberalization and economic reforms, pursued a policy of mini-devaluation as signaled by BBs' REER index and stable macroeconomic performances relative to previous decades.

Sahminan (2005) in a working paper estimated equilibrium real exchange rate of the Indonesian Rupiah using quarterly data from 1993Q1 to 2005Q2. The study showed that beside other variables terms of trade, inflation differential and interest rate differential are significant factors in determining the long run equilibrium real exchange rate of Rupiah. The model showed that the exchange rate of the Rupiah overvalued substantially relative to equilibrium real exchange rate in the period shortly before the crisis.

Hossain and Ahmed (2009) investigated the exchange rate policy in Bangladesh for the period 2000-08. They found that BD follows a dirty float de facto exchange rate regime by occasional intervention in the foreign exchange market to keep the exchange rate within certain limits. But due to thin foreign exchange market and high pass- through depreciation affects output through a balance sheet effect. They showed BB may affect exchange rate by tightening/loosening (through interest rate) monetary policy. Since the interest rate channel of monetary policy transmission is almost ineffective, its leads to sterilized interventions that ultimately contributes to exchange rate shocks. They found net foreign assets have significant effect on the REER appreciation while terms of trade, real interest rate differential and government budget deficit are significant to REER depreciation. Although BD maintained average competitiveness throughout the period with depreciating REER, currency remained somewhat overvalued. They found that REER remained overvalued on an average 3 percent, which is very close to its equilibrium as warranted by economic fundamentals.

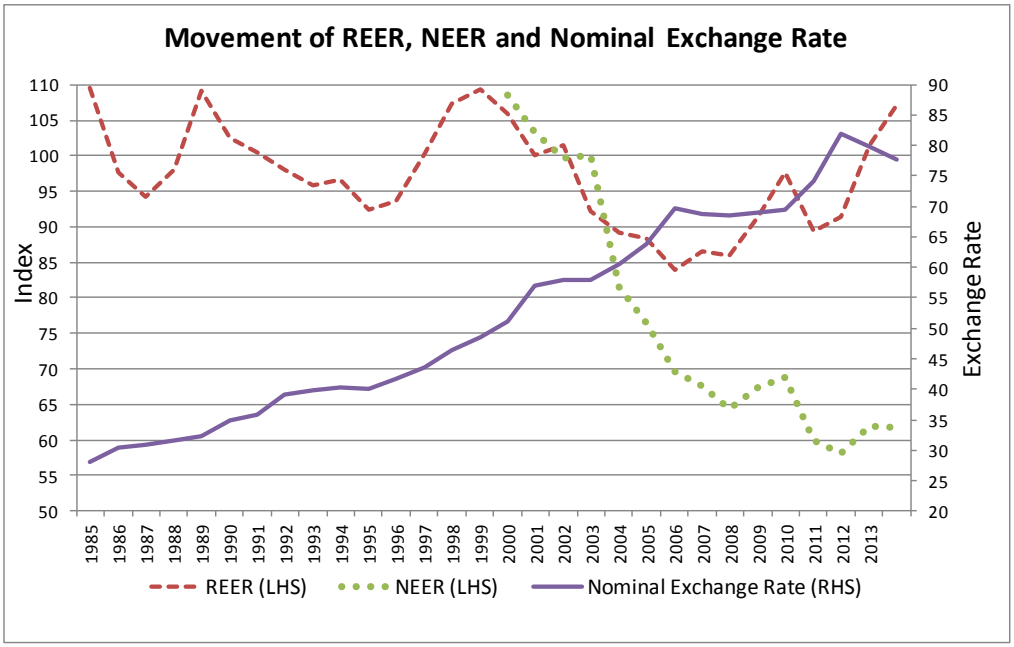
Hangsasuta (2011) in a research paper investigated the way in which RER misalignment relates Thai economy in financial crisis, capital control and export/import. The equilibrium RER is estimated using the BEER approach for data from year 1993Q1 to 2010Q4. The estimated result revealed that overvaluation prevailed in the period before 1997 Asian currency crisis and before US subprime crisis in 2008.

Khondker, et all (2012) made an attempt to examine the effect of exchange rate changes on BD's aggregate output (GDP) using the three market Keynesian Model. The study showed a long run relationship between GDP and a vector of variable including terms of trade, government expenditure, credit to private sector and RER. Despite a steady rise in the nominal exchange rate, BD's real external competitiveness as measured by the real exchange rate has hardly changed since 1980s. Nominal devaluation have largely accounted for cancelling out the differential inflation rates of BD vis-à-vis trading partners. The movement in the real exchange rate does affect the overall output, and the effect is borne out even if other variables are controlled.

3. Evolution of Exchange Rate Policy in Bangladesh since Independence

Following the independence of Bangladesh, on 3 January 1972 the exchange rate of newly created currency (Taka) was fixed with the British Pound sterling at the rate of £1=t18.9677. During the early years of independence government adopted expansionary monetary and fiscal policies. These accelerated inflation to the level of about 50 percent per annum during the period of 1972-75. The incompatibility between expansionary monetary and fiscal policy and a fixed exchange rate system made the taka grossly overvalued. In May 1975 taka was devalued by about 85 percent, though the size of the devaluation was large, it was lagged adjustment of the exchange rate to high inflation over the past three years (Hossain,2000). In 1979 the government pegged the taka to a basket of currencies to its major trading partners with the Pound sterling as the intervening

currency. This attempt did not make any difference to the real exchange rate of the taka. The taka remained overvalued with the US dollar, this created sustained large trade deficit. In 1983, pound sterling was replaced by the US dollar as the intervening currency. Throughout 80's government continued expansionary monetary and fiscal policy. Inflation remained at high roughly about 12 percent per annum and trade deficits were at about 13 percent of output (Hossain, 2000). In 1985, Bangladesh Bank introduced calculation of Real Effective Exchange Rate (REER) Index to measure international trade competitiveness. Based on the REER, nominal exchange rate continued to depreciate, but not to the extent that could have made the tradable goods sector competitive. The government undertook IMF-World Bank structural adjustment program but in selective areas.(Despite, depreciation of nominal exchange rate by almost 40 percent, real exchange rate appreciated by 5 percent during 1983- 1990).



Source: Bangladesh Bank

During 90's structural adjustment program continued. Some improvements were made in the area of monetary and fiscal policy under this program. Few measures were taken to streamline the exchange rate arrangements. On 1 January 1992, the government unified the exchange rate regime by abolishing the secondary exchange market and made an improvement in current transactions by removing some exchange controls. In April 1994, the government made the current account convertible. Interbank foreign exchange market also developed. The removal of exchange controls increased inflows of workers' remittances through the official channels. This lowered the level of current account deficit and boosted foreign exchange reserve. Monetization of reserve raised the prices of nontradables and thus appreciated the exchange rate. Mini devaluation of exchange rate was continued based on REER Index. In 90's inflation also decelerated to an annual average 5 percent. Exchange rate regime gradually shifts from fixed peg to flexible peg. The band width of exchange rate was made wider, so that the exchange rate could move more in line with market forces. In May 2003, in a balanced macroeconomic condition floating exchange rate policy was put in place, where exchange rate are free to determine by market forces. But Bangladesh Bank could intervene if necessary to avoid excessive volatility in the exchange rate.

4. The Long Run Equilibrium Real Exchange Rate: Theory and Measurement

4.1 Real Exchange Rate (RER)

Exchange rate is one of the core macroeconomic variables. In macroeconomic perspective, especially in open economies, exchange rate is rather significant. The exchange rate is defined as "the price of one currency in terms of another"(Mishkin,2004). The real exchange rate (RER) is the nominal exchange rate adjusted for the inflation differential among countries. It could be interpreted as the purchasing power of two currencies relative to one another. The RER is used to represent a country's' competitiveness in international trade. According to Montiel " The decentralization that characterizes market economies implies that decisions about what and how much produce, as well as about what and how much to consume, are made by individual agents, and relative prices are the signals and incentives that guide the decisions of these agent. In doing so, relative prices play a key role in allocating economic resources among competing uses".

RER = NER. Pf/Pd

Where, NER is nominal exchange rate, Pf foreign price level, Pd domestic price level.

Another definition of real exchange rate is prices of tradable to nontradable, RER=PT/PN

For small country PT = E PT f , Therefore RER = E PT f / PN

This definition of real exchange rate provides a measure of incentives that guide domestic resource allocation across tradable and nontradable goods sectors. It is also interpreted as an index for international competitiveness of tradable goods sector.

4.2 Concept of long Run Equilibrium Real Exchange Rate

Like other economic variable real exchange rate is in equilibrium if there is no tendency for it to change. Precisely, because the real exchange rate is an important part of the macroeconomic adjustment mechanism, it will tend to change whenever the economy is subjected to new shocks. Thus the equilibrium real exchange rate must refer to the value to which the real exchange rate would tend in the absence of new shocks. Equilibrium exchange rate is unobservable, but it is function of a set of sustainable values of policy and exogenous variables.

The real exchange rate at any moment is determined by the reduced form relationship:

e = F(X1, X2)

where, X1 represents the sustainable values of a set of real exogenous and policy variables, and X2 represents the current values of a set of predetermined macroeconomic variables (such as nominal wage, net international creditor position and capital stock in the traded and nontraded goods sector), whose values are fixed at any moment but change gradually overtime. Therefore, e is a short run equilibrium exchange rate. When the macroeconomic variables in X2 stop changing i.e, when they reach at a long run equilibrium X*2, we have

e* = F(X1, X2*)

Where e*is the long run equilibrium real exchange rate. It depends on the sustainable values of the exogenous and policy variables.

4.3 Measuring Equilibrium Exchange Rate

With the objective of capturing other factors, beyond just monetary variable in determining movements of equilibrium exchange rate, the concept of fundamental equilibrium exchange rate (FEER) was developed by Williamsons (1994). A number of basic features of FEER are worth highlighting. Williamsons (1994) defined FEER as a real effective exchange rate that simultaneously secures internal and external balances for a given number of countries at the same time. Internal balance is reached when the economy is at full employment output and operating in a low inflation environment. External balance is characterized as a sustainable balance of payment position over a medium-term horizon, ensuring desired net flows of resources and external debt sustainability. A minimum criterion for external balance is that the current account balance has to be sustainable. The FEER approach focuses more on "economic fundamentals.

In this study we used a simplified model of internal and external balance, which is well covered by Montiel (1999) to illustrate the real exchange rate and sets of factors that determines real exchange rate.

Internal balance holds when the markets for labor and nontraded goods clear. This occur when

$$YN(e) = cN + gN = (1-\theta)ec + gN \qquad (1)$$

YN is the supply of nontraded goods under full employment cN is total private spending (measured in traded goods), θ is the share of this spending devoted to traded goods, and gN is government spending on nontraded goods. Equation 1 is shown as the schedule IB in Chart- 1.

To define external balance, we begin with the current account surplus, which is given by

$$f = b + z + rf = yt(e) - (\theta + \tau)c + z + rf \qquad (2)$$

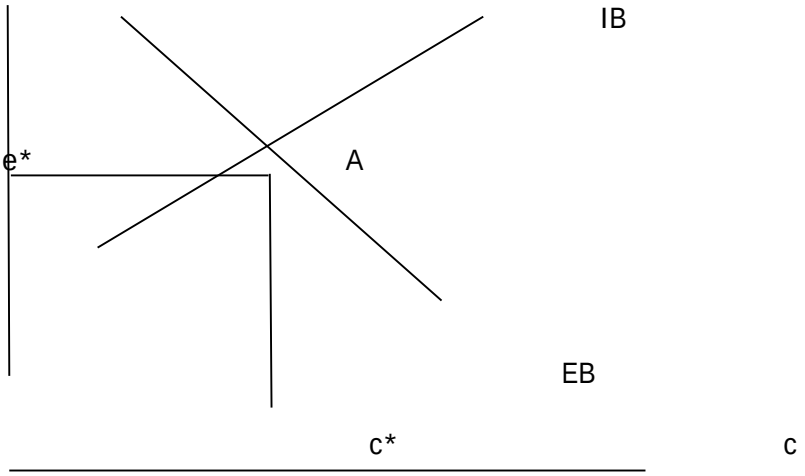
Where f is total net foreign assets, b is the trade balance, z is net foreign aid received by the

Government and r is the real yield on foreign assets, measured in traded goods. The trade balance is the difference between domestic production of traded goods, yT, and the sum of government (g) and private spending on these goods. Equation 2 is shown as the schedule EB in Chart- 1.

External balance holds when the country's net creditor position in world financial markets has reached steady state equilibrium. The equilibrium real exchange rate, is given by the intersection of the IB and EB curves, which occurs at point A in the Chart 1. The intersection of these loci determines the long run equilibrium value of the real exchange rate as well as private expenditure.

Chart 1- Internal Balance, External Balance and the Determination of the Long run equilibrium real Exchange Rate

e



Montiel (1999) identifies six sets of factors that determine real exchange rate. The first-

is the changes in fiscal policy. The increase in government spending on traded goods creates an incipient trade deficit, which requires a real depreciation to maintain external balance. In contrast, changes in government spending on nontraded goods affect the internal balance locus IB. The increased demand for nontraded goods requires an increase in their relative price to maintain equilibrium in the nontraded goods market, the real appreciation required to clear the market for nontraded goods would create an unsustainable deficit in the current account. Consequently, adjustment to the shock requires appreciation of real exchange rate. Second- Changes in the value of international transfer represent an addition to household incomes equal to transfer as well as external balance condition. There are no direct effects on the internal balance, so the real exchange rate undergoes an equilibrium real appreciation. Third- Changes in international financial condition- capital inflows and transfer-have in common impact that they influence towards an expansion of absorption relative to income in the short run. The two phenomena differ in two important respects. First, the volume of capital inflows is an endogenous variable that can result from a variety of changes in domestic and external economic conditions. The change in the long run real exchange rate associated with a particular episode of capital inflow depends on the source of the shock that triggers the inflow. Second, unlike transfer, capital inflows create an obligation of repayment in the long run which impact on supply-demand gap on foreign currency. These also affect the long run equilibrium exchange rate. Fourth-the Balassa-Samuelson effect that refers to productivity differential to the tradable and non tradable goods sectors. Exchange rate appreciates if relative productivity in the tradable sector increases because it creates excess demand in the non tradable sector as well as it improves trade balance. Fifth-Changes in the terms of trade results in contraction in the output of nontraded goods and resources shift into the production of exportable. As in the case of favorable productivity shock, the incipient improvement in the trade balance requires a real appreciation to keep the trade balance at a sustainable level. Sixth-Commercial policy could have important effect on equilibrium real exchange rate. Trade liberalization lowers support to import competing industries and reduce export subsidy thus channeled resources to nontraded goods sector which results in exchange rate depreciation.

5. Empirical Model for Equilibrium Real Exchange Rate of Bangladesh Taka

The theory developed in the previous section delivers a long run relationship between the real exchange rate and a set of macroeconomic fundamentals. The equilibrium real exchange rate is

then defined as the steady state real exchange rate conditional on a vector of permanent values for the fundamentals. Liner relationship of long run equilibrium real exchange rate (log transformation) is expressed as:

$$lnet^* = \beta Ftp$$

Where et*is the equilibrium real exchange rate, Ftp is the vector of permanent or sustainable values of fundamentals, β is the vector of long run parameter of interest. The steady state is dynamically stable. The stochastic term (wt) in the equation is stationary variable with a zero mean.

$$lnet^* = \beta Ftp + wt$$

To estimate the long run equilibrium real exchange rate for Bangladesh selection of variables of fundamentals on the basis of availability and feasibility are describe as follows-

Data on government spending on tradable and nontradable are not available. Government consumption mostly includes nontradable (salary, payment and allowances). We have taken consumption-GDP as a proxy for spending on nontradable goods. Investment mostly contains importable goods (machineries, raw materials and intermediate goods); we have taken investment-GDP ratio as a proxy for government spending on tradable. To measure the effect of international transfer we use foreign remittance inflow and foreign aid. Such inflows directly increase household income thus appreciate real exchange rate by increasing prices of nontradable goods. Third, our capital account transaction is restricted till now. So, real interest rate differential has almost negligible impact or role for capital flows. Furthermore, portfolio investment and foreign direct investment (FDI) is not yet very significant. Very recently, we have permitted commercial borrowing from abroad in a limited scale. Therefore, considering very limited inflows of foreign financial resources with almost restricted outflows of financial resources due to the policy of inconvertible capital account policy, we did not take any variable for international financial condition. Fourth- we ignore productivity differential between tradable and nontradable goods to measure the impact of Balassa-Samuelson effect for lack of availability of data. Fifth- terms of trade measured as a ratio of export price index to import price index. Sixth-there is no composite index to measure trade policy. So to capture the impact of trade liberalization we use openness, which is a ratio of import plus export to GDP. Finally, debt service to export earnings ratio also used to see the impact of debt service burden on equilibrium real exchange rate.

Thus, the Real exchange rate model for Bangladesh is

$$RER = F(tot, open, remaid, consgdp, invgdp, dsex)$$

Where, tot stand for terms of trade, open for trade openness, remaid is for remittance plus foreign aid, consgdp for consumption to gdp ratio, invgdp for investment to gdp ratio, and dsex for debt service to total export earnings ratio.

6. Methodology and Data

To estimate equilibrium real exchange rate (RER) we have taken time series for the explanatory variables. The span of the time series used in the model is from 1979 to 2014. We have taken data from 1979 because since then a somewhat market driven exchange rate mechanism has been

put in place by fixing the exchange rate of Taka pegged with a basket of currencies of its major trading partners. The variables of consgdp, invgdp, and dsex are collected from economic review publish by Ministry of Finance. Time series for remaid, tot and openness are collected from Economic Trends of Bangladesh Bank. Producer Price Index (PPI) of USA used to calculate RER index is collected from IFS. Real exchange rate (RER) is defined as the nominal exchange rate adjusted with price differential (home country price and foreign price). All variables are taken in log linear form.

To get some idea on the dynamics of the variables used in the model, we plot each of the variables for the period 1979-2014 in levels and its first differences (annex). It is revealed from the chart that all of the variables have upward; downward or both trends in level. If we take

Table 1: Unit Root Test

Variables	Level (PP test Statistics)		First difference (PP test Statistics		Order of
	with trend	without trend	with trend	without trend	Integration
LRER	-2.08	-2.08	-4.73	-4.73	I(1)
	(0.53)	(0.25)	(0.00)	(0.00)	
LTOT	-2.61	-2.67	-4.76	-5	I(1)
	(0.28)	(0.09)	(0.00)	(0.00)	
LREMAID	-1.84	-1.88	-5.2	-5.28	I(1)
	(0.66)	(0.33)	(0.00)	(0.00)	
LOPEN	-2.18	-1.05	-6.68	-6.76	I(1)
	(0.48)	(0.72)	(0.00)	(0.00)	
LDSEX	-2.24	0.38	-6.58	-6.16	I(1)
	(0.45)	(0.97)	(0.00)	(0.00)	
LCONSGDP	-1.09		-5.41	-5.85	I(1)
	(0.24)		(0.00)	(0.00)	
LINVGDP	-1.82	-0.34	-5.29	-5.19	I(1)
	(0.67)	(0.91)	(0.00)	(0.00)	

Figures in the parenthesis indicate probability, * Has UR as per model C (without constant & trend)

All variables have unit root at level, but stationary at first difference.

the first difference of the variables these oscillate around the mean value. To test the nature of the series, whether they follow unit root, we have conducted Phillips Perron (PP) test as presented in Table-1. We use PP test because it is serial correlation and heteroskedasticity adjusted thus gives a good result for unit root test. The PP tests statistics have shown that all variables have unit root at level but stationary at first difference i.e. integrated of order one (I). Since the variables are I(1), these may be cointegrated. To see whether the variables are cointegrated we have conduct Johansen (1988) cointegration test. Table-2 shows cointegration results. Max-eighen value statistics and Trace statistics have confirmed that Model-1 and Model-2 have one long run co-integration relation. Therefore, these variables have two long run relations. Thus, we have explored the following two alternative models of long run equilibrium real exchange rate.

Model1: lrer = ltot lremaid lopen lconsgdp ldsex

Model2: lrer = ltot lremaid lopen linvgdp @trend

Table2: Cointegration test

Model 1					
Null Hypothesis	Alternative Hypothesis	Test Statistics	5-percent Critical Value	Prob.	Conclusion
Trace Test					
r = 0	r> 0	115.45	95.75	0.0011	One
r ≤ 1	r> 1	68.02	69.82	0.069	Cointegration
r ≤ 2	r> 3	41.77	47.86	0.1652	Relation
Maximum Eigenvalue Test					
r = 0	r> 0	47.43	40.08	0.0063	One
r =1	r=2	26.24	33.88	0.3059	Cointegration
r = 2	r=3	23.85	27.58	0.1399	Relation
Model 2					
Null Hypothesis	Alternative Hypothesis	Test Statistics	5-percent Critical Value	Prob.	Conclusion
Trace Test					
r = 0	r> 0	118.12	117.71	0.0471	One
r ≤ 1	r> 1	80.85	88.8	0.1634	Cointegration
r ≤ 2	r> 3	53.78	63.87	0.2623	Relation
Maximum Eigenvalue Test					
r = 0	r> 0	37.27	44.49	0.2457	No
r = 1	r=2	27.06	38.33	0.5222	Cointegration
r = 2	r= 3	25.29	32.11	0.2694	Relation

7. Estimated results

Table-3 shows the estimated long run parameters of explanatory variables and its short run error correction. Column 2 and column 3 show estimated results for model1 and model 2 respectively. In model 1 all of the long run parameters of explanatory variables are consistent with theory. The effects of the shock of terms of trade (ltot) are theoretically ambiguous. However, keeping consistency with most of the literature, the results here indicate that an improvement in the terms of trade appreciates the real exchange rate, suggesting that the spending effects of this variable dominate substitution effects. Estimated elasticity of ltot is 0.51 i.e. 1 percent increase in tot will decrease exchange rate by 0.51 percent and it is statistically significant. An increase in foreign transfer (as proxied by remittance plus foreign aid i.e lremaid) appreciate exchange rate by increasing the demand for nontradable which is consistent with the theory but it is statistically insignificant. The elasticity of lremaid is 0.02 i.e, 1 percent increase in lremaid will decrease exchange rate by 0.02 percent. Increased government spending on consumption which proxies for government spending on nontraded goods is consistent with theory and highly significant. Increase in government consumption will increase demand for nontradable. To bring equilibrium in the nontradable goods market price of nontradable will increase thus appreciate the real exchange rate. The elasticity of lconsgdp is 1.63 i.e, 1 percent increase in government consumption will appreciate exchange rate by 1.63 percent. Furthermore, coefficient of openness (lopen) and debt service (ldsex) are positive, these are also consistent with the theory; however these estimated coefficients are statistically insignificant. Trade liberalization increase export and import but import volume is higher than export volume. Increase in openness will create excess demand for foreign currency thus will increase the exchange rate. Elasticity of openness is 0.12 i.e, 1 percent increase in openness depreciate exchange rate by 0.12 percent. Debt service burden also depreciate exchange rate. A permanent increase in debt service ratio will create pressure on current account balance, thus required to depreciate the exchange rate. The elasticity of debt

service ratio is 0.03 i.e. 1 percent increase in debt service will increase exchange rate by 0.03 percent. In model 2 coefficients of long run variables are also consistent but two variables ltot and lopen are statistically significant.

Table 3: Vector Error Correction Estimates.

Variables	Model1	Model2
Dependent	LRER	LRER
Constant	13.15	6.17
Trend		0.05
Explanatory Variables		
LTOT	-0.51	-1.69
	(5.27)	(5.75)
LREMAID	-0.02	0.06
	(0.29)	(0.27)
LOPEN	0.12	-2.6
	(-1.09)	(5.09)
LDSEX	0.03	-0.43
	(-0.34)	(1.81)
LCONSGDP	-1.63	-
	(7.65)	
LINVGDP	-	0.53
		(-2.12)
Error correction		
D(LRER)	-0.119	-0.182
	(-0.87)	(-2.38)
D(LTOT)	-0.5	-0.262
	(-2.39)	(-2.45)
D(LREMAID)	0.352	-0.039
	(1.52)	(-0.33)
D(LOPEN)	-0.29	-0.169
	(-1.35)	(-1.64)
D(LDSEX)	-0.25	-0.033
	(-0.61)	(0.17)
D(LCONSGDP)	-0.31	-
	(-3.86)	
D(LINVGDP)		0.074
		(0.68)
AIC	-2.8292	-2.556
SBC	-2.47	-2.197
F-Statistics	0.82	1.38
Loglikelihood	56.1	51.47
Figures in the parenthesis indicates t-statistics		

In model 1, short run effects of the fundamentals are appreciable in size but only two variables ltot and lconsgdp are in the same direction as the long run effects and statistically significant. Any deviation from long run equilibrium is corrected in short run by two variables ltot and lconsgdp. In model 2 only ltot is in the same direction as the long run effects and statistically significant. RER itself makes the error correction in the short run.

Model selection criteria AIC and SBC show that model 1 perform better than model 2.

Hence, we will analyze long run equilibrium real exchange rate behavior and misalignment with the actual RER on the basis of model 1.

8. Measuring Exchange rate Misalignment

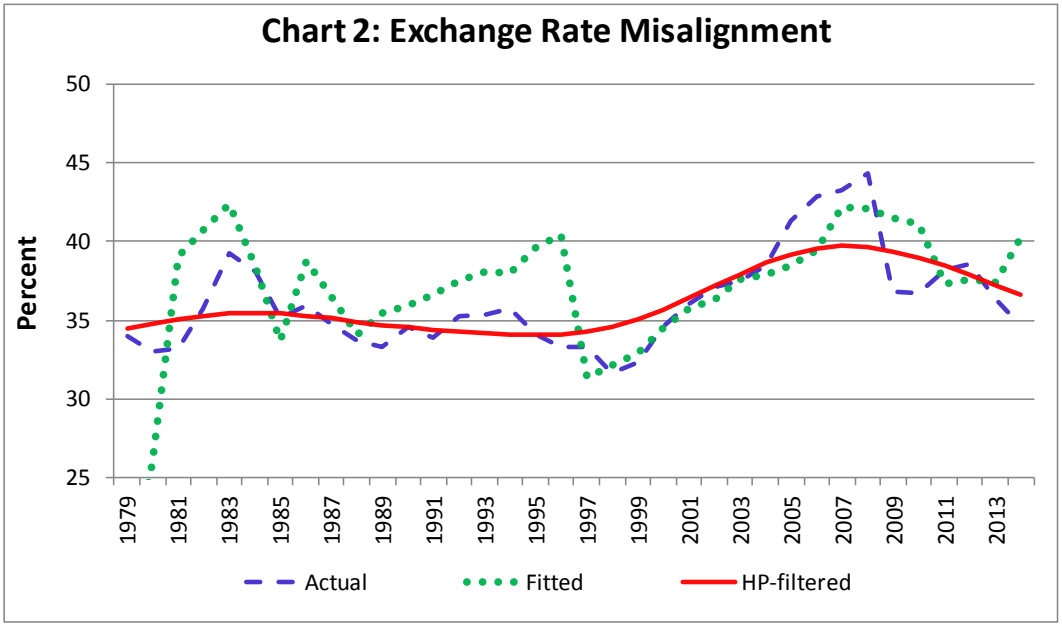
Exchange rate misalignment measures as the percentage difference between observed and equilibrium real exchange rate (Kubota 2013). Using the estimated parameters of the long run fundamentals we obtained the fitted or long run equilibrium real exchange rate (Table-4). From

chart-2 the gap between these two series provides a measure of real exchange rate misalignment. The last column of the table shows the misalignment (overvaluation/undervaluation).The chart shows that fitted value of the real exchange rate is a good reflection of the well known currency overvaluation (undervaluation) phases in the macroeconomic history of Bangladesh. Taka was overvalued throughout the decades 80's upto mid 90's for expansionary monetary and fiscal policies. Misalignments were high and volatile in 80's due to high inflation and changes in economic policies (such as trade liberalization; Barajas 2010). During 1995 and 1996 taka were appreciated in the range of 16 percent to 21 percent due to sudden rise in foreign exchange reserve in substantial amount and foreign investment in the capital market for withdrawal of lock in provision in capital market. From late 90's misalignment were reduced as an effect of reform measures toward the market economy, such as unification of exchange rate, removal of some exchange control, development of interbank foreign exchange market and current account made convertible for Taka. Since then mini depreciation of taka were made to adjust the price differential for maintaining stable real exchange rate. During this period, under flexible peg exchange rate regime exchange rates were fluctuated within a band, gradually band width were making wider towards the market based determination of exchange rate. From 2000 actual and fitted values of real exchange rates became closer.

Table 4: Actual, Fitted and Overvaluation/Undervaluation of RER

year	Actual	Fitted	HP-filtered	3-Year MA	over/under valuation
1979	33.96	17.88	34.50		-47.35
1980	32.99	25.90	34.76		-21.50
1981	33.19	39.07	35.02	27.61	17.70
1982	35.72	40.77	35.25	35.25	14.14
1983	39.23	42.38	35.41	40.74	8.03
1984	38.05	38.34	35.47	40.50	0.76
1985	35.19	33.73	35.42	38.15	-4.15
1986	35.91	38.81	35.29	36.96	8.08
1987	34.80	36.55	35.11	36.37	5.03
1988	33.71	34.04	34.91	36.47	0.98
1989	33.26	35.45	34.71	35.35	6.59
1990	34.52	35.94	34.54	35.14	4.11
1991	33.87	36.64	34.39	36.01	8.17
1992	35.23	37.54	34.27	36.71	6.56
1993	35.39	38.13	34.17	37.44	7.73
1994	35.70	37.98	34.10	37.88	6.37
1995	34.10	39.63	34.07	38.58	16.19
1996	33.26	40.41	34.12	39.34	21.50
1997	33.27	31.37	34.29	37.14	-5.70
1998	31.65	32.07	34.60	34.62	1.34
1999	32.32	32.90	35.07	32.12	1.81
2000	34.58	34.44	35.68	33.14	-0.42
2001	36.06	35.78	36.40	34.37	-0.78
2002	37.06	36.36	37.17	35.53	-1.89
2003	37.47	37.63	37.93	36.59	0.43
2004	38.43	37.85	38.63	37.28	-1.52
2005	41.29	38.51	39.21	38.00	-6.72
2006	42.93	39.43	39.60	38.60	-8.14
2007	43.22	42.18	39.76	40.04	-2.42
2008	44.34	42.11	39.69	41.24	-5.04
2009	36.86	41.47	39.40	41.92	12.49
2010	36.68	41.10	38.97	41.56	12.05
2011	38.21	37.28	38.45	39.95	-2.44
2012	38.53	37.58	37.87	38.65	-2.47
2013	36.35	37.40	37.23	37.42	2.90
2014	34.65	40.25	36.58	38.41	16.14

Note: Overvaluation/undervaluation are calculated as percentage change of actual value from fitted value.



After floated in May 2003, exchange rate remained stable upto April 2004. Thereafter, exchange rate had begun to devalue. From mid 2004 to late 2008 taka were undervalued. As financial crisis started, exchange rate of taka appreciated as a result of price differential and US dollar became weaker against the other currencies. From late 2010 due to robust remittance inflows, moderate export growth with lower import growth reserve is being piled up. Which creates excess demand for domestic currency as a result BD Taka has started to appreciate. Moreover, our main trading partner countries (India, Pakistan) depreciated their currencies against US dollar, Thus bilateral exchange rate of Taka also appreciating. To keep external value of taka competitive Bangladesh Bank continues to buy US dollar from the foreign exchange market. In FY13 and FY14 BB bought USD 4.54 billion and USD 5.15 billion respectively from the foreign exchange market. Despite the effort of central bank in bringing balance between the supply and demand of foreign exchange estimated value of misalignment shows 16.14% (taka was overvalued) in FY14.

8. Conclusion

In this paper we have estimated an internal-external balance approach based measure of the equilibrium real exchange rate for Bangladesh Taka against US Dollar. Using Johansen (1995) cointegration method we are able to find a long run equilibrium relationship between exchange rate and the relevant macroeconomic fundamentals, which comprises of tot, openness, consgdp, remaid, invgdp, dsex. All of the variables entered the cointegrating vector with the correct sign. The estimated results of this study are almost consistent with the results of other study (Kubota 2013, Limi 2006) on equilibrium exchange rate of Taka.

The study reveals that Taka was overvalued most of the time during eighties and nineties due to expansionary monetary and fiscal policy which created a space of incompatibility with fixed/flexible exchange rate regimes. Since late nineties currency became close to equilibrium rate as macroeconomic condition improved and inflation declined substantially. During this period, mini devaluation was made based on REER index calculated by Bangladesh Bank. According to the study immediately after adoption of floating exchange rate regime currency became undervalued

and had been continued until 2008. In recent years, due to piling up of foreign exchange reserve Taka started to be overvalued. Our model based estimation value of scale of misalignment is 16.14 percent in FY14 which is consistent with the Bangladeshs' actual recent experience. This result is also consistent with the REER based exchange rate calculated by BB. During this period it is noticed that for long time interbank exchange rates are lower than REER based exchange rate and gap between these two are being widen gadually. Thus it can be concluded that BB's policy is working in the right direction. However lack of adequate sterilization process creates inflationary situation, which further appreciate the exchange rate. To check this immediate inflationary effect of sterilization BB also introduced BB-bill; this sterilization instrument proved to be inadequate and thus the policy effort could not be able to control inflation successfully.

Developed financial sector is a necessity for effective monetary policy transmission channel. BB should work hard in making the financial sector more competitive in order to ensure smooth transmission of monetary policy through the interest rate channel and enjoy the "low inflation benefit" of non-sterilized intervention. Moreover, to make actual exchange rate aligned to equilibrium rate monetary and fiscal policies must be consistent with exchange rate policy.

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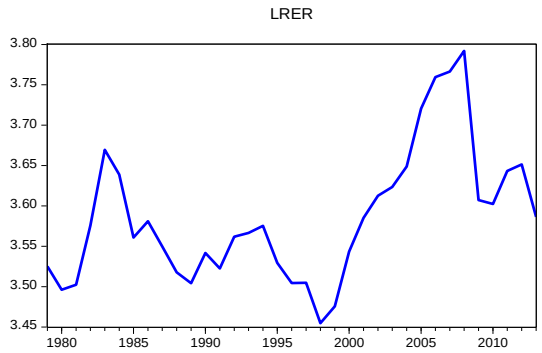
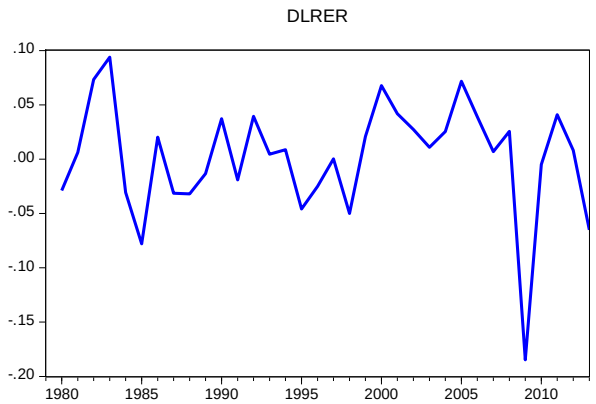
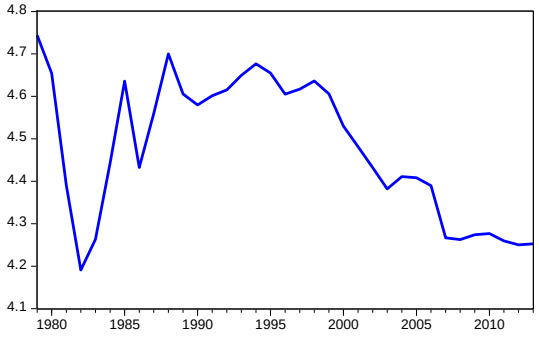
Annexure

Dynamics of variables and its first differences





LTOT



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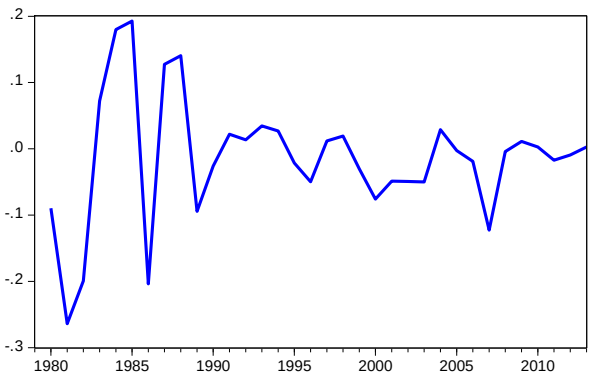

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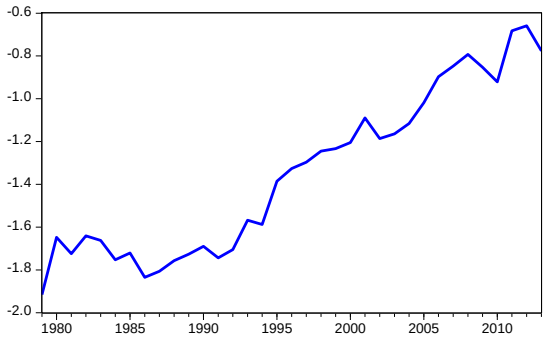

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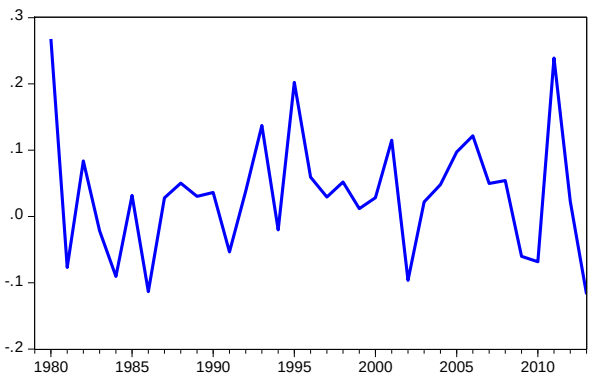

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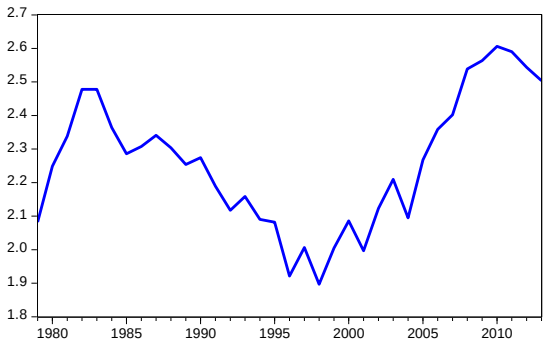

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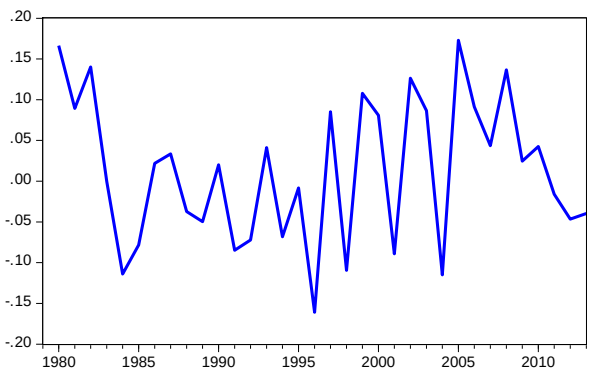

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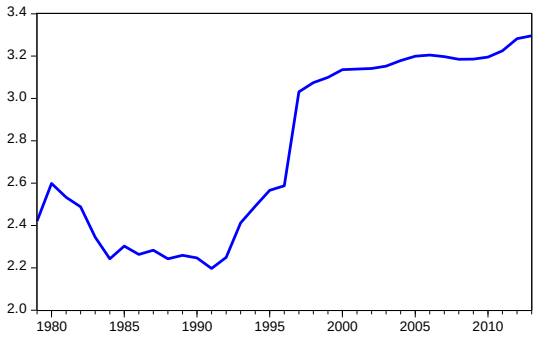

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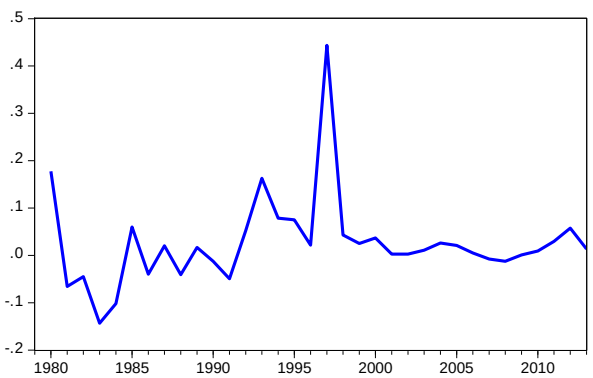

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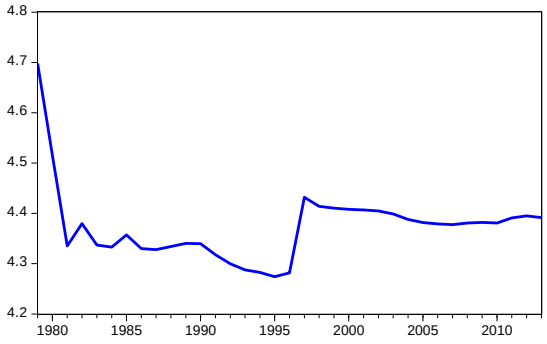

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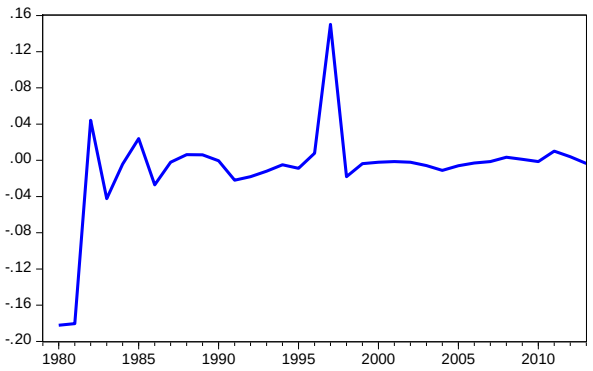

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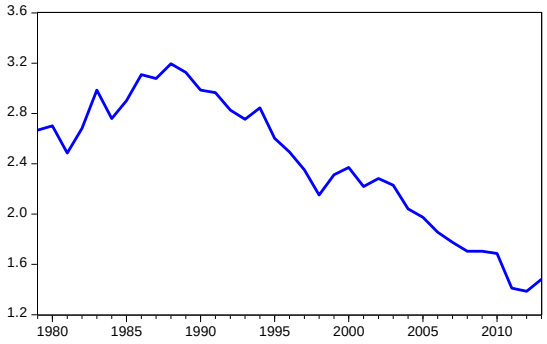

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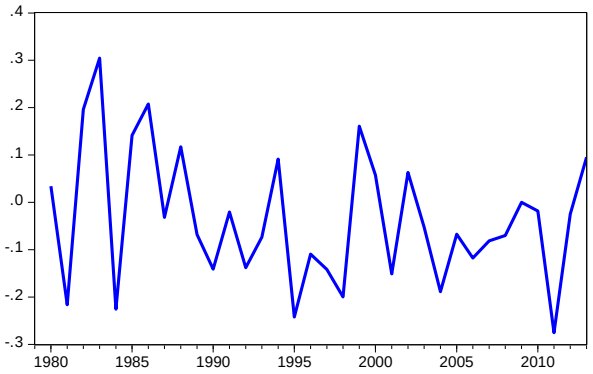

Paper No. 6

The Impact of Exchange Rate Variation on Inflation in South Asian Countries

Md Omor Faruq*

Abstract

This paper examines the impact of exchange rate variation on inflation in south Asian countries for the sample of 1981 to 2012 in a panel data framework rather than time series. The main purpose of this study is to examine whether exchange rate pass-through and/or volatility of exchange rate cause inflation in South Asian countries, and what are the policy implications for these South Asian countries. This study first estimate inflation model for full sample (for 60 countries) and then estimate the inflation model for sub-sample of four South Asian countries (Bangladesh, India, Pakistan and Sri Lanka). For estimation of full sample this paper uses fixed effect model and GMM estimation technics. And in case of sub-sample (South Asian case) this paper uses random effect model and GMM estimation technics. When using full sample (for 60 countries), it is found that change in exchange rate have significant impact on inflation but exchange rate volatility have no impact on inflation. However, in case of South Asian countries both the exchange rate pass-through and volatility of exchange rate has significant impact on inflation. So, the policy makers of these four South Asian countries should take necessary steps for controlling inflation due to the volatility of exchange rate.

JEL classification: C13, C23, C33, F41.

Key words: Exchange Rate, Inflation, Volatility.

Introduction

The current states of South Asian Countries have the highest rate of inflation in comparison to other regions of the world. Moreover, both the inflation and exchange rates are also volatile and unstable. There are several reasons which fuel the high price of inflation in this region. Some of them are; domestic and external demand, government intervention to the market, inappropriate fiscal and monetary policy and adverse supply shock due to the internal political conflict and stock of goods by high profit seeking firms and businesses. South Asia is home to over one-fifth of the world's population, and is the most populous and densely populated geographical region of the world. To a certain extent, South Asia is considered one of the poorest regions of the world. It is well known that the incident of high inflation hampered the purchasing power of the poor and fixed income groups. Moreover, most South Asian countries have deficit in their current account balances. Additionally, increases in oil or food prices in the world market widen the deficit of the current account balance. This widening deficit affects the exchange rate, therefore making it more volatile. The volatile exchange rate may affect inflation, exports, imports and the overall balance of payment situation. As the incidence of inflation is greatly affected the poor and fixed income groups, hence, the volatility of exchange rate and inflation is a growing concern in this region. This

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Study investigates "whether exchange rate pass-through and/or volatility of exchange rate cause inflation in South Asian countries or not?" Also, what are the policy implications of macroeconomics for these South Asian countries?

There are a vast number of studies on exchange rate movements to inflation, but most of them have investigated an individual country by using a time series data framework. Hossain (2002) investigated the exchange rate response to inflation in Bangladesh from 1972 to 1999. Hyder & Shah (2004) assessed the extent to which the movements in exchange rate affect domestic wholesale and consumer prices in Pakistan by analyzing data from January 1988 to September 2003 using a VAR approach. Sohrabji (2011) examined the relation between exchange rates and prices in India over three periods, 1975-1986, 1992-1998 and 1999-2010, and Duma (2008) investigated pass-through of external shocks (exchange rate, oil price, and import price shocks) to inflation in Sri Lanka. These studies only focused on the individual countries, not on the whole of South Asia. Perceptibly, there is less attention given to the South Asia region in this area of research. That' why, this study attempts to focus on South Asia by using a panel data framework for the time period of 1981 to 2012.

This study attempts to make a contribution to the literature in three ways. First, this study uses a panel data framework for the time period of 1981 to 2012 because time

Series analysis on an individual country often lacks sufficient observations. Secondly, it calculates exchange rate volatility for each country using daily exchange rate data. Thirdly, this study provides empirical evidence that exchange rate volatility have positive impacts on inflation in South Asia.

This study first estimates the inflation model for the full sample (by using 1812 observations for 60 countries) and then estimates the inflation model for a sub-sample of four South Asian countries (Bangladesh, India, Pakistan and Sri Lanka). For the estimation of the full sample, this study uses the fixed effect model and dynamic panel model. In the case of South Asia, this study uses the random effect and dynamic panel model. This study found that a change in the exchange rate had a significant impact on inflation but exchange rate volatility had no impact on inflation when using the full sample. On the other hand, in the case of South Asian countries, both the change in exchange rate and volatility of exchange rate has significant impact on inflation.

Hypotheses for this study are as follows:

(a) The level of exchange rate has a positive and significant effect on inflation.

(b) Exchange rate volatility also has a positive and significant effect on inflation.

(c) Exchange rate regime plays an important role for inflation.

The remainder of this thesis is as follows; Chapter Two presents a literature review, then

Chapter Three describes the exchange rate movements and inflation situation in South Asian Countries: Some stylized facts and chapter four is deal with exchange rate history and exchange rate system in South Asian countries. Theory and Empirical Analysis are explained in Chapter Five. Chapter Six contains the empirical results and Chapter seven presents the conclusion & policy recommendations.

Literature Review

There are two popular views regarding the relation of exchange rate movements and inflation: the structuralist view and the monetarist view.

Structuralists argue that the prices of tradable goods rise directly and the prices of non-tradable goods may also rise depending on the labor markets conditions and on institutional arrangements such as wage indexation when there is depreciation. Even if the price of non-tradable goods does not raise in response to wage increases but remains sticky downward, may raise the general price level or its growth rate (Agenor, 1991), (Aghevli, 1991),(Montiel, 1997), (Krugman P. and Taylor, 1987).

The Monetarist view is very different from that of the structuralists. They view inflation always and everywhere as a monetary phenomenon and argue that for sustained economic growth, macroeconomic stability is considered as a source of inflation as it affects income distribution significantly. An anticipated currency devaluation may increase the excess money supply and thereby inflation by lowering the demand for domestic currency (Hossain, 2002).

The exchange rate variation on inflation means that changes in imports prices are translated into domestic prices. There is vast literature on this occurrence (Dornbusch, 1987; Fischer, 1989; Klein, 1990; Freenstra and Kendal, 1994; Amitrano et al., 1997 and Campa and Goldberg, 2002) and the importance given to this issue has increased after the advent of Inflation Targeting. Many authors, such as Goldfajn and Werlang (2000), Calvo and Reinhart (2002), Schmidt-Hebbel and Tapia (2002) and Schmidt-Hebbel and Werner (2002) have shown that the pass-through is higher for emerging than for developed economies.

It is often believed that exchange rate depreciation is closely linked with price inflation. "Traditional monetary theory regards excessive money creation as a common source of instability in both the exchange rate and price level. In the presence of large monetary shocks, price inflation and exchange rate depreciation should, therefore, be closely linked" (Mishkin, 2008).

It is widely recognized in macroeconomic literature that, exchange rate variation on inflation is determined mainly by the level of inflation, the output gap and the credibility of the monetary authority.

The output gap affects pass-through by reducing the firm's power to increase prices, as increasing sales firms find it easier to pass-through in cost of final prices (Goldfajn and Werlang, 2000)

Taylor (2000), states that, "the lower pass-through should not be taken as exogenous to the inflationary environment (p.1390)." "Generally, low inflation regime lowers the

Pass-through by way of weakening the expected future effect of the shocks (via its reaction to price deviations from the target path). Also, low inflation economies could be matter to less variable monetary shocks. The lower variability of monetary shocks would weakening the information content of the exchange rates in expecting monetary shocks and this effect suggests another reason for the pass through to be smaller under a low inflation regime" (Choudhri and Hakura , 2001).

Campa and Goldberg, (2002) found that counties with less exchange rate and inflation variability also have lower rate of pass through of exchange rate into import prices.

Mishkin Frederic S.,(2008) argued that, the correlation between consumer price inflation and the rate of nominal exchange rate depreciation can indeed be high in an unstable monetary environment in which nominal shocks fuel both high inflation and exchange rate depreciation.

"If exchange rate pass-through is low it tends to permit a more independent monetary policy. On the one hand, on the time when business cycle are in downward phases, monetary authorities would be less controlled to dampen exchange rate induced inflation and would have more room for countercyclical policies. Moreover, when there are strong demand pressures, a low pass-through helps to contain inflation" (Razafimahefa, 2012).

There have two impacts of goods prices on inflation; first, the shocks of goods prices have an immediate that means direct effect on prices, second, a change in goods prices through exchange rates has an indirect effect on inflation (Furlong and Ingenito, 1996).

Country size may be another important factor in ranking pass-through elasticities of countries (Campa and Goldbeg, 2002). It is also explained by Dornbusch (1987), that exchange rate pass-through may be higher if the exporters are large in number relative to the presence of local competitors. One approximation to this point is that pass-through elasticities might be inversely related to a country's real GDP. An alternative approach would be to also consider measures of sector-specific openness for countries.

There are various theoretical models which analyze the links between exchange rate and inflation, and the pass-through reflects the interaction of micro and macro phenomena. On the micro side, producers like to maximize expected profits by fully reflecting the changes in the exchange rate into sales prices. When the structure of the domestic economy is close to a monopoly or to imperfect competition this case will likely to be occurred. Obstfeld and Rogoff (1995) called this "producer currency pricing". However, in the case of more competitive markets, producers may need to bear a part of the exchange rate changes by reducing mark-ups to keep market share. This behavior is defined by Krugman (1987) as a "pricing to market". In the case where prices are sticky or rigid because of imperfect market mechanisms or administrative constraints, a phenomenon of "local currency pricing" keep it up. Also, if consumers like to maximize their utility by "flying from quality", that is consuming locally produced goods instead of imported ones, the degree of the overall pass-through might be reduced. On the macro side, most recent studies utilize the framework of new open macroeconomics or new Keynesian models to establish the effects of exchange rate changes on inflation (Choi and Cook, 2008).

Asia Economic Monitor (2011) found that an increase in food and energy prices has had an upward pressure on inflation in emerging market economies like Southeast Asian countries.

De Gregorio (2012) found the same findings like Asia Monitor. De Gregorio (2012) recommends that in emerging market economics that are dependent on food and energy imports, an increase in goods prices predictably has an upward pressure on inflation rates.

Theory and Empirical Analysis:

Theoretical Model

This study motivated the empirical investigation from the theoretical model in Goldberg & Knetter (1997) . They analyze the related strands of literature on goods price and exchange rates by "the law of one price". The summery of the theoretical model are as follows.

Suppose P is denoted the home currency price in country A, P* the home currency price in country B, and e is the exchange rate of A's currency per unit of B's. If the law of one currency holds for some good i, then:

1= E ..... (1)

If the law of one currency price held for all countries for some product we would characterize this as an integrated world market. If the law of one price held for all products between two countries then the absolute purchasing power parity theory (PPP) of exchange rates would hold between two countries:

P= E ..... (2)

Where P and P* are price levels in countries A and B.

Because the assumptions of costless transportation, and resale are likely to hold in practice, and the absolute version of the law of one price and PPP are often modified. Let costs of transportation or resale preclude price equalization, but that the frictions give rise to a stable price differential across two markets. In this case, we have

Pi = αE and ..... (3)

P = αEP* ..... (4)

Where α is the real exchange rate. If α remains constant overtime, then common currency prices for a particular product changes in the same way overtime in two countries, and the relative LOP (Law of one price) and PPP holds.

Rogoff (1996) provides an excellent review of theory and evidence on PPP. We concentrate here on studies of the LOP.

Consider the following generic regression model which will be used to discuss the research on prices and exchanges rates:

$$Pt = \alpha + \delta Xt + \gamma Et + \Psi Zt + \varepsilon t \quad \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Where all variables are in logs and p is price for a particular product, X is the primary control variable, E is the exchange rate, Z denotes other control variables in the model, ε is the error term, and t denotes the time period.

Empirical Model

It is shown in the previous section that an increase in expected future volatility and an increase in current volatility cause inflation in previous section. It is generally said that inflation is always a monetary phenomenon. In fact, traditional monetarists support the strict view that non-monetary factors are extraneous in determining inflation. According to the traditional monetarists view, inflation results from monetary growth (M2), and demand and supply have no roles in clarifying inflation. Kuttner (1990) expressed the opposite view of the pure monetarist. He noted that in the long run, although some measures of money (possibly M2) may be the main determinant of inflation, not only money matters in determining inflation over all horizons.

Moreover, a number of empirical studies show that the sources of inflation are quite diverse in developing countries and include the following:

First, exchange rate variation potentially affects inflation. A previous study found that (for example, Goldfajn and Valdes, 1999) for future depreciations real exchange rate depreciation is an important element.

Second, output gap also affects inflation. A deviation of an economy's actual output from its potential level as a result of an excess demand in an overheated economy will lead to an inflation. On the other hand, a positive supply shock results in a lower inflationary pressure (Callen and Chang, 1999).

Third, inflationary environment also determined the willingness of firms to increase price in the presence of increasing cost.

Fourth, the degree of openness of a country to the rest of the world should also affect the inflation. Blejer and Leiderman (1981) claimed that in an open economy, there is a strong presumption that domestic relative price volatility will be influenced by foreign relative price volatility.

Fifth, fiscal balances also affect the inflation. This approach links inflation to public sector deficits. Lim and Papi (1997) found that public sector deficits play a central role in the inflationary process.

Sixth, exchange rate regime also plays an important role for determining inflation.

According to the above discussion, the following model is built to explain inflation due to exchange rate variation:

Model:

$$Lncpiit = \beta 0 + \beta 1 lnexit + \beta 2 exvolit + \beta 3 lngdpgapit + \beta 4 M2it + \beta 5 lncpii,t-1 + \beta 6 tradeopenit$$

$$+ \beta 7 fiscalbalit + \beta 8 exregimeit + \alpha it + uit$$

The model basically follows the literature on exchange rate variation on inflation at the macroeconomic level. The idea is straightforward: today's inflation is determined by the past inflation, output gap, exchange rate depreciation, exchange rate volatility, broad money growth, fiscal deficit and trade openness.

Methodology

This study estimates the impact of exchange rate variation on inflation in a dynamic panel data model. This study does not attempt to use time series analysis because it lacks sufficient observations of four South Asian countries.

To minimize the measurement error we calculate GDP gap by using the Hodrick-Prescott filter method (the deviation of actual GDP from an estimated trend).

First, we estimate the model by using fixed effect model and random effect model for calculating the Hausman test. The result of the Hausman test determines whether the model is fixed effect model or random effect model.

Second, we estimate a dynamic panel model using Generalized Moments of Method (GMM). Since a dynamic model includes lags of the dependent variable as explanatory variables standard econometric techniques such as OLS, IV, etc. do not yield efficient estimates of the parameters (Sevestre, 2002). In this case, the GMM method delivers a solution to the problems of simultaneity bias, reverse causality and omitted variable bias (Kpodar, 2007), as well as yielding estimates of unobserved country-specific effects and dummy coefficients for which the usual methods ("within" or "difference") would be unsuitable given the dynamic nature of the regression (see Calderon et al. 2006).

As lagged inflation is dependent variable of inflation here, lagged inflation may be correlated with error term. That is why here we use system GMM estimation.

Empirical Results

Table-1: Estimation Result of FE Model for All Countries

Dependent variable lncpi	(1)	(2)
	FE	FE
lnex	0.100***	0.027**
	(0.010)	(0.013)
exvol	-0.000	-0.000
	(0.000)	(0.000)
lngdpgap	0.017**	0.019**
	(0.008)	(0.008)
tradopen	0.149***	0.151***

	(0.039)	(0.038)
exregime	-0.003	-0.014***
	(0.004)	(0.004)
m2	0.001***	0.001***
	(0.000)	(0.000)
lncpi1	0.847***	0.809***
	(0.009)	(0.011)
lnexregime		0.009***
		(0.001)
Constant	0.018	0.200
	(0.187)	(0.185)
Observations	1,812	1,812
R-squared	0.970	0.971
Number of id	60	60

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 1 shows the estimation results of the fixed effect model for all countries.Based on the random effect and fixed effect model, the Hausman test was carried out, and the results of the Hausman test show that our model is fixed effect model.

Two types of specification are shown in the Table- 1. First, estimation results depict that lnex (exchange rate pass-through), m2 (broad money) and lncpi1 (previous inflation) and tradopen (trade openness) are significant at the 1% level of significance and all of them are correctly signed except tradopen variable. Though the exchange rate regime can play an important role for pass-through inflation but here exchange rate regime variable (exregime) is not significant. Moreover, exvol (exchange rate volatility) also has no impact on inflation. The second estimation in table-1 shows the conditioned regression. Here, also, all variables except exvol are statistically significant.

In addition , the conditioned variable lnexregime (lnex*exregime) is highly significant that meaning that the exchange rate regime has significant impact on inflation which is relevant to other empirical studies such as Dosse Toulaboe & Rory Terry (2013). These authors also found that the

rate of inflation is unambiguously positively linked to real exchange rate depreciation regardless of exchange rate arrangements.

Table 2 shows the GMM estimation. From this table we see that lagged inflation is highly significant which tells that the lack of monetary stability and credibility of the exchange rate system provides an environment which highlighted uncertainty and generates a high coefficient for the lagged price changed. GMM estimation in Table 2 shows almost the same specification like as the fixed effect model in Table 1.

Table-2: Estimation Result of GMM for all countries

Dependent variable lncpi	**(1)**	**(2)**
	GMM	GMM
L.lncpi	0.906***	0.884***
	(0.008)	(0.010)
lnex	0.022***	-0.041**
	(0.006)	(0.017)
exvol	-0.000	-0.000
	(0.000)	(0.000)
lngdpgap	0.016***	0.023***
	(0.002)	(0.002)
tradopen	0.044**	0.049***
	(0.019)	(0.019)
m2	0.001***	0.001***
	(0.000)	(0.000)
exregime	0.001	-0.007*
	(0.003)	(0.003)
lnexregime		0.006***
		(0.002)
Observations	1,812	1,812
Number of id	60	60

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Other variables, for instance lnex, lngdpgap and m2 are highly significant on the first estimation in Table 2. The second estimation also shows the same specification.

The lnex variable is still significant at 5% level and also interaction term also significant at 1% level. Exregime, m2 and lncpi1 are significant at 1% level but exregime variable is not correctly signed.

Table -3: Estimation Result of RE Model for South Asian Countries

Dependent variable lncpi	(1)	(2)	(3)
	RE	RE	RE
lnex	0.008	0.008	-0.049*
	(0.006)	(0.006)	(0.029)
exvol	0.009***	-0.005	0.008***
	(0.003)	(0.016)	(0.003)
lngdpgap	0.000	0.000	0.001
	(0.002)	(0.002)	(0.002)
tradeopen1	-0.035	-0.041	-0.041
	(0.036)	(0.037)	(0.036)
fiscalbal	0.001	0.001	-0.000
	(0.002)	(0.002)	(0.002)
exregime	0.011***	0.005	-0.061*
	(0.004)	(0.009)	(0.037)
m2	0.001	0.001	0.000
	(0.000)	(0.000)	(0.000)
lncpi1	0.982***	0.982***	0.981***
	(0.003)	(0.004)	(0.003)
exvolregime		0.005	
		(0.005)	
lnexregime			0.019**
			(0.010)
Constant	0.078*	0.097**	0.283**
	(0.041)	(0.047)	(0.112)
Observations	124	124	124
Number of id	4	4	4

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3 shows the random effect model estimation for the South Asian case. On the basis of random effect and fixed effect model, the Hausman test was carried out. The results of the Hausman testshow that our model is random effect model. In the south Asian case, the exchange rate pass-through (lnex), lngdpgap, trade openness and fiscal balance variables are not significant but exvol (exchange rate volatility) and exchange rate regime (exregime) are significant. Also lagged inflation is highly significant with a large coefficient.

In Table 3, columns two and three show the estimation result of the interaction term exvolregime (exvol*regime) and lnexregime (lnex*regime). All estimation results show that exvol is more significant than exchange rate change in South Asian countries.

Table 4 shows the estimation result of GMM for South Asian Countries. In this case, exchange rate regime (exregime), previous inflation (lncpi1), lngdp gap and exchange rate volatility (exvol) are

highly significant. Broad money growth (m2) and fiscal balance are significant at 5% level. Trade openness is not significant at all though it is correctly signed.

Columns two and three of Table 4 also show the estimation result with interaction. According to the result, only exvol, exregime and lag inflation (lncpi1) are statistically significant at 1% level. From the estimation result, it is clear that, the pass through is very low. The exregime variable is significant which means exchange rate regime can play important role for inflation. The lncpi1 variable is highly significant that means, previous inflation and or inflation environment also play an important role for inflation.

Table-4: Estimation Result of GMM for South Asian Countries

Dependent variable lncpi	**(1)**	**(2)**	**(3)**
	GMM	GMM	GMM
L.lncpi	0.983***	0.983***	0.983***
	(0.002)	(0.002)	(0.002)
lnex	0.008**	0.008**	0.019**
	(0.004)	(0.004)	(0.008)
exvol	0.009***	0.011	0.009***
	(0.002)	(0.009)	(0.002)
lngdpgap	0.003***	0.003***	0.002
	(0.001)	(0.001)	(0.001)
tradeopen1	-0.019	-0.019	-0.026
	(0.022)	(0.022)	(0.023)
m2	0.001**	0.001**	0.001**
	(0.000)	(0.000)	(0.000)
fiscalbal	0.002**	0.002*	0.002*
	(0.001)	(0.001)	(0.001)
exregime	0.011***	0.012**	0.025***
	(0.002)	(0.005)	(0.009)
exvolregime		-0.001	
		(0.003)	
lnexregime			-0.004
			(0.002)
Observations	124	124	124
Number of id	4	4	4

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

From Table 4 it is clear that both the change in exchange rate and exchange rate volatility are responsible for inflation in South Asian countries. However, it is somehow different from the all country sample. In case of all country sample exchange rate volatility has no role for inflation only change in exchange rate has some role for inflation.

Now it is clear from the estimation results that nominal exchange rate depreciation increase domestic price level both in the all country sample and the South Asian case. All estimation results show that the coefficient of exchange rate variable is low which indicates the lower pass –through. This may be because of exchange rate depreciation or fluctuation of the exchange rate not much more related to inflation and may inflation environment or adverse supply shock is responsible for inflation.

Moreover, the nominal exchange rate depreciation increase the domestic price of internationally – traded goods and put upward pressure on the general domestic price level. Additionally, the impact of nominal currency depreciation on domestic inflation depends on the degree of openness of the country and the response of foreign suppliers and local distributors to the devaluation.

Futhermore, exchange rate volatility also has a significant effect on inflation in the South Asian country case. There are several possible reasons here. Firstly, excessive volatility of exchange rate creates uncertainty in the exports and imports of a country. When uncertainty enters the producers/exporter's objective function, the profit risk-averse firms' is declining because of uncertainty. When products are invoiced in the home currency, the exporters will face a quantity risk because the quantity demanded will be uncertain and in this case firm contracting supply. Due to bottlenecks of supply will causes price hike in this region? Secondly, firms will also face uncertainty regarding cost of production. When exchange rates are volatile firm are unwilling to import factor inputs which reduces the supply and increases the prices. Thirdly, financial institutions may be weak and not well-developed in this region (except India), so that financial institutions cannot take proper steps for the fluctuation of exchange rate which ultimately affects the inflation.

Lagged inflation rate is highly significant which points to an important role for expectations in deriving inflation. This could reflect either low credibility of the monetary policy and/or uncertainty concerning economic development and geopolitical changes in this region.

Inflation expectations remain high in this region, because higher prices will cause workers to demand higher wages, causing a wage price spiral. Therefore, expectation of inflation is important; if people expect high inflation, it tends to be self-serving.

Exchange rate regime plays a significant role in inflation in the South Asian countries. Except India, the other three South Asian countries (Bangladesh, Pakistan and Sri Lanka) introduced flexible exchange rate system from the last decade. Intuitively, under a flexible exchange rate regime, countries experience volatile terms of trade will also experiencing volatile exchange rates; whereas under flexible exchange rate regimes, the consequence of a sharp increase in commodity price (such as the oil price) will be reflected in higher inflation. As a result, inflation will be more volatile, and hence, the underlying exchange rate will become more volatile as well.

Conclusion & Policy Recommendation

This study investigated the impact of exchange rate variation on inflation in four South Asian Countries and found that both the change in exchange rate and volatility of exchange rate causes inflation in these countries. It was also found that not only exchange rate changes or volatility but other reasons such as exchange rate regime inflation environment (lag inflation) are liable to cause higher inflation in this region.

As inflation is an important and key variable it influences macro-economic variables of any country. The current state of South Asia's inflation is highly unstable and vulnerable, so control of inflation should receive more priority than growth in South Asia. Both fiscal and monetary policy tools should be applied simultaneously to encompass price hikes.

The monetary authority should take the necessary steps with an aim to minimize wide ranging fluctuations in the exchange rate that may encourage speculative activities and weaken the stability of the economy. To achieve this goal, exchange rate policy should be such that if tries to maintain the right balance between necessary flexibility to guarantees the competitiveness and desirable stability to increase confidence in domestic currency and basic requirements should be fulfilled that provides support to the currency value over time.

Among South Asian Countries, Sri Lanka suffers from high inflation as well as large current and fiscal account deficits. The hike in energy prices is the main cause of high inflation and Sri Lanka should tighten its monetary policy. India is the largest economy in South Asia which has a moderate rate of inflation. Sri Lanka and Pakistan experience high rates of inflation due to oil price hike in International Market. In Bangladesh and Pakistan, the supply side of the commodity market is disrupted by internal political unrest. Thus, there is a need on the part of South Asian countries to address supply side bottlenecks in the commodity markets.

Bangladesh has a favourable current account position for which it can afford to keep its currency slightly stronger. The monetary policy should be more contractionary even if it reduces economic growth of the country. Sri Lanka and Pakistan should adopt the same contractionary policy because of rising current account deficit.

The South Asian Countries should adopt proper monetary and fiscal policy to control inflation rate within 4 percent per year.

Inflation expectations remain high with some moderation. Forward-looking monetary policy would have to take into account the trends in agents' inflation expectations, which is a major determinant of future inflation.

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Paper No. 7

Does Islamic Financial Services Industry Improves Financial Inclusion in Developing Economies: Evidence from Muslim Countries

Muhamed Zulkhibri*

Abstract

The paper examines the interlinkage between financial inclusion and Islamic financial services industry in Muslim countries using qualitative analysis and case study. The finding shows that despite the financial sector growth in many of Muslim countries over the past decades, many individuals and firms are still financial excluded. Analysis of the usage and access of financial services by adults and firms also shows that most of Muslim countries lag behind other emerging economies in both aspects, with only 27 percent of financial inclusion. Cost, distance, documentation, trust and religious belief requirements are among important obstacles. On the other hand, not surprisingly, the outreach of Islamic microfinance is very limited, small by international standards, and of a limited coverage, which accounts for a small fraction of microfinance supply, about 0.5 percent of global microfinance and lack of cost-efficient service model. However, the study suggests that Islamic distributive instruments such as Zakah, Sadaqa, Awqaf, and Qard-al-Hassan, can play a role in bringing more than 40 million financially excluded population because of religious reasons into the formal financial system, but it is still a long-way to enhance financial inclusion in Muslim countries.

JEL Classification: G20; G21; G28.

Keywords: Financial Markets; Financial Inclusion; Institutions and Growth.

1. Introduction

Financial inclusion has become an important global agenda and emerging priority for policymakers and regulators in financial sector development in ensuring sustainable long-term economic growth. This significant development reflects the importance and global recognition of financial inclusion attach to socioeconomic development and financially inclusive growth. The Group of Twenty (G20) Summit in 2010 has recognised financial inclusion as one of the core pillars of the global development agenda. Financial inclusion has also become an integral part of many development institutions and multilateral development banks (MDBs) in efforts to promote inclusive growth.

Financial inclusion (FI), within the broader context of inclusive development is viewed as an important means to tackle poverty and inequality and to address the millennium development goals (MDGs). Financial inclusion is define as a process that 'ensures the ease of access, availability and usage of formal financial services.1 It is a state, which all member of the societies have access to a full set of financial services at affordable price and convenient manner. Inclusive financial sector development makes two complementary contributions to poverty alleviation: financial sector development is a driver of economic growth, which indirectly reduces poverty and inequality; and

appropriate, affordable, financial services for poor people can improve their welfare. In advanced economies, financial inclusion is more about the knowledge of fair and transparent financial products, while in emerging economies, it is a question of both access to financial products and focus on financial literacy.

1. Sarma, Mandira and Jesim Pais. 2008. Index of Financial Inclusion. ICRIER Working Paper No. 215.
2. On the effects of bank branch expansion, see Burgess and Pande (2005) for India and Bruhn and Love (2009, 2012) for Mexico.

Despites the debate amongst specialists around the term of financial inclusion, there is no widely approved definition of financial inclusion, but the challenges associated with measuring financial inclusion are now being better met. On the other hand, there is still lack of clear understanding about the specific ways in which financial inclusion promotes income equality and reduces poverty (Demirgüç-Kunt and Klapper, 2012), though recent studies in individual developing countries are beginning to offer more important clues.2 The benefits of financial inclusion (above and beyond of financial depth) is relatively strong in the area of savings (Dupas and Robinson 2009; Ashraf et al. 2010). It is also strong for payments services, although the impact of payments access on increased savings appears relatively small in some studies (Mbiti and Weil 2011). Regarding access to credit, some studies suggest positive effects (Burgess and Pande 2005; Banerjee et al. 2010; Karlan and Zinman 2010), while others provide cautionary evidence on the pitfalls of microcredit (Roodman 2011) and the drawbacks of consumer credit (Bar-Gill and Warren 2008).

The objective of the paper is to provide an assessment on the interlinkage between financial inclusion and Islamic financial services industry in Muslim countries. The paper aims to answer three key questions: i) what are the stylized facts about financial inclusion and the role of Islamic financial services in Muslim countries; ii) what are the financial inclusion frameworks and initiatives employed by Muslim countries and the policy needed for Muslim countries in advancing the state of financial inclusion; and iii) does the existence of Islamic financial services industry improves financial inclusion.

This paper is set out as follows: Section 2 provides the stylized facts of financial inclusion, poverty and Islamic finance in Muslim countries. Section 3 describes the recent development of financial inclusion strategy in selected Muslim countries namely Bangladesh, Indonesia, and Nigeria. Section 4 draws key lessons from Islamic financial industry in effort to promote and enhance financial inclusion. Finally, Section 5 offers concluding remarks for Muslim countries in improving the state of financial inclusion.

2. Financial Inclusion and Islamic Finance: A Stylized Facts

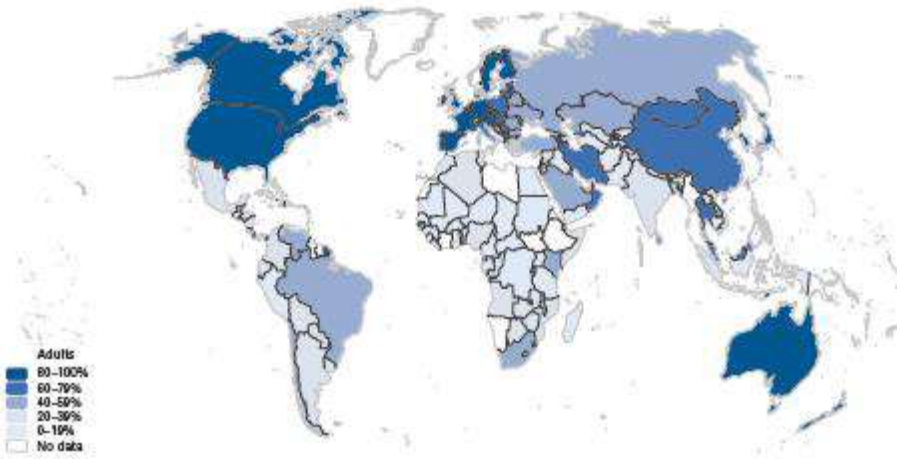
Many studies in economic development and poverty reduction suggest that financial inclusion matters. For instance, many empirical evidence suggests that improved access to finance not only pro-growth, reduces income inequality and poverty, but it is also pro-poor (Beck, et al. 2008, 2009). On the conceptual level, a range of theoretical model has been used to demonstrate that lack of access to finance can lead to poverty traps and inequality (Banerjee and Newman, 1993; Galor and Zeira, 1993; Aghion and Bolton, 1997). More recently, applied general equilibrium models provides new insights into the microeconomic underpinnings of the relationships among financial inclusion, poverty reduction, income inequality, and economic development (Buera, et al. 2012).

In the literature, there has recently been a boom in new research due to improved availability of data. The recent availability of new datasets to measure inclusion such as the Global Findex database offers a new opportunity to distinguish between use of financial services versus access for individuals, and therefore to probe deeper into the subject of financial inclusion. For instance, using a new micro dataset, Demirguc-Kunt and Klapper (2012) find that the likelihood of owning an account is higher among richer, older, urban, educated, employed, married individuals, with greater trust in banks. Furthermore, expanding financial inclusion can potentially reduce informality in an economy with related benefits such as an increased tax base.

2.1 The State of Financial Inclusion in Muslim Countries

Figure 1 exhibits that financial inclusion varies widely across regions, individual characteristics and income groups. Globally, 50 percent of adults have an account at a formal financial institution (World Bank, 2014). 2.5 billion of adults reported do not have access to formal financial system though not all the unbanked need financial services. Globally, adults reported having saved at a formal financial institution accounted for 22 percent, while 9 percent having borrowed a new loan from a bank, microfinance institution or credit union.

Figure 1. Global Trends in Financial Inclusion (2012)

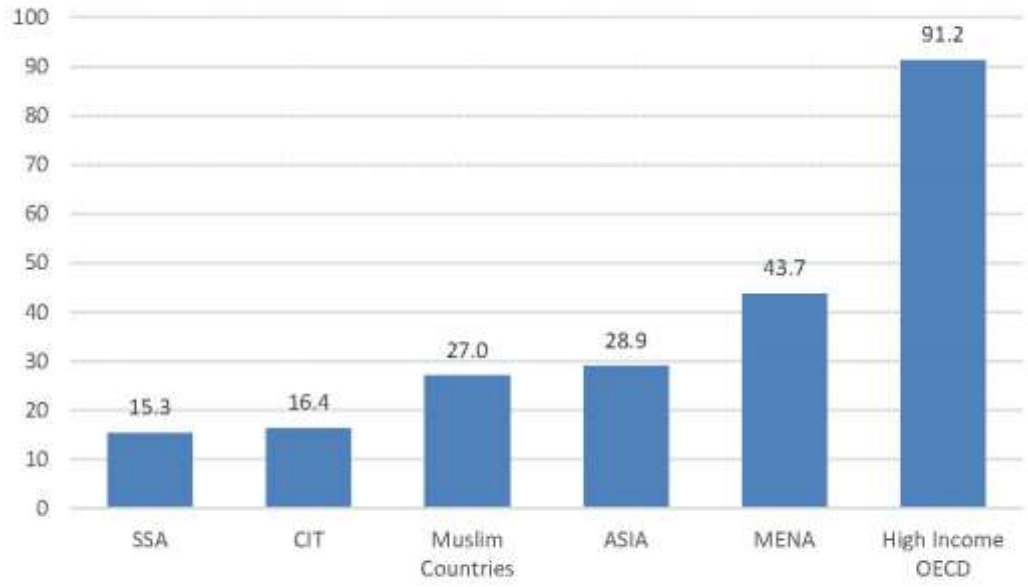


Source: Global Financial Inclusion (Global Findex) Database 2013, World Bank

In the Muslim countries, low number of bank accounts (only 27 percent) can be explained by absence and uneven access to financial services and instruments that are Shari'ah- compliant.3 The lowest numbers of adults (above the age of 15+) have accounts in formal financial institutions is in Sub-Sahara Africa (SSA), with only 15.3 percent of (Figure 2). There is sufficient evidence that, if carried out correctly, enhancing access to and the use of various financial services can help both eradicate poverty and its severity (Beck, et al. 2007). Many of the poor in Muslim countries without the access to financial services will continue to be trapped in poverty for the foreseeable future.

Figure 2. Financial Inclusion* in Muslim Countries by Region (in %)

Figure 2. Financial Inclusion* in Muslim Countries by Region (in %)



Note: *Account at a formal financial institution (% age 15+)
Source: Global Financial Inclusion (Global Findex) Database, World Bank

See Appendix 2 for the state of financial inclusion in Muslim countries by region.

Indicators of financial use show a positive but imperfect correlation with indicators of financial depth such as credit to the private sector over GDP (Figure 3). This correlation shows that access really is a distinct dimension. The positive but imperfect correlations between financial depth and financial services implies that depth of financial systems alone is not sufficient to delivering access to all. The correlations also suggest that there might be room to improve the level of financial inclusion through financial policy reforms (World Bank, 2008). Greater financial depth is likely to be associated with greater access for both firms and households, making them better able to take advantage of investment opportunities, smooth their consumption, and insure themselves (Beck, et al. 2008).

Figure 3. Correlation between Account Penetration and Financial Depth

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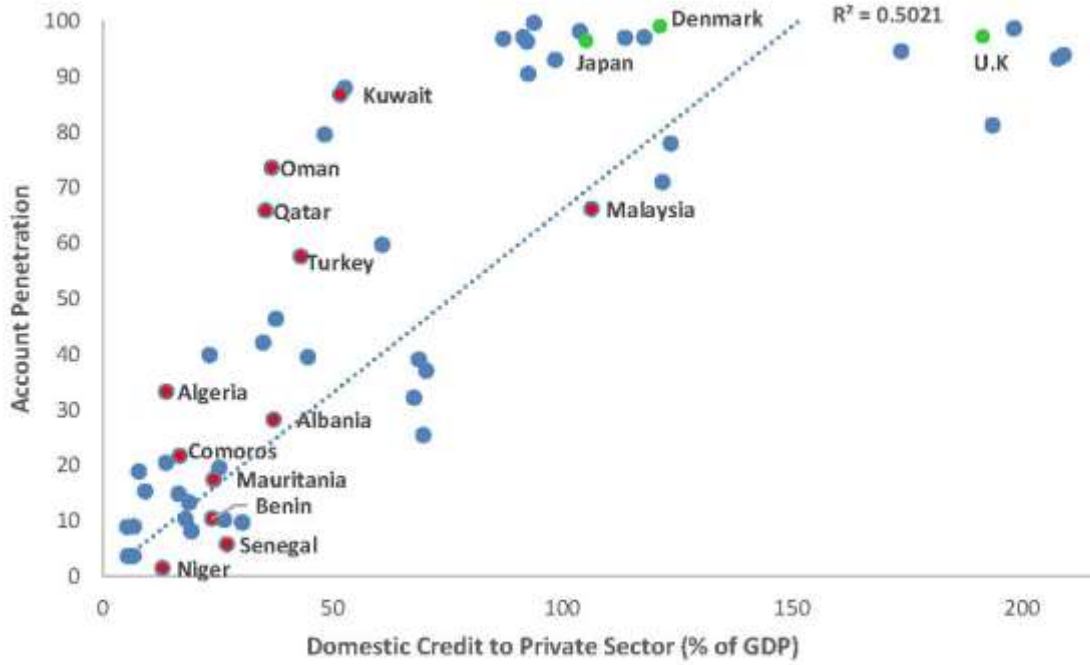


Source: Global Financial Inclusion (Global Findex) Database, World Bank

Figure 4 shows that financial inclusion is positively and significantly correlated with access points measured as commercial bank branches per 100,000 people. One of the main obstacle to financial inclusion is the great distance between the communities and a bank branch especially in rural areas. However, bringing financial services to rural consumers is one of the major challenge on the financial inclusion agenda. Poor infrastructure, low telecommunication technology, and significant branch regulation restrict the geographical expansion of bank branches (CGAP, 2009). Most of Muslim countries particularly in SSA economies are scattered at the low end of the cluster with low number of commercial bank branches per 100,000 adults and low account penetration (Figure 5).

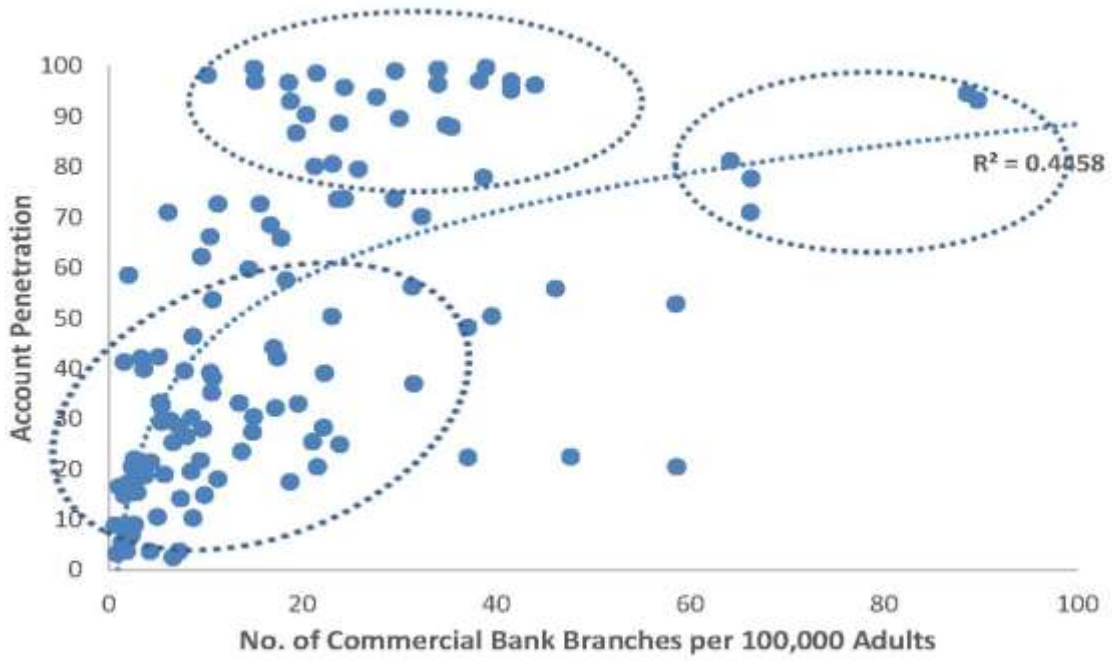
See Appendix 1 for details on the state of financial inclusion in Muslim countries.

2.2 Financial Inclusion and Islamic Finance Industry

From an Islamic economic perspective, the concept of financial inclusion and income equality are not new. These ideas form the basis of risk-sharing contracts and are the main reason behind the prohibition of Riba' and speculative activities. Islamic financial services can addresses the issue of financial inclusion from two approaches - through promoting risk-sharing contracts,

Which provide a viable alternative to conventional debt-based financing, and through specific wealth redistribution instruments - among the society. For instance, the role of Islamic microfinance for supporting micro-entrepreneurs and the poor. On the other hand, redistribution refers to post-distribution of income from wealthy, privileged, and able Muslim to defined poor and needy groups either voluntary or involuntary levies. It is not only ensures social justice in society, but also mobilises resources making it available to the poor and thus improving the productive capacity of the community.

Figure 4. Correlation between Account Penetration and Access Points



Source: Global Financial Inclusion (Global Findex) Database, World Bank

Table 1 shows the state of Islamic banking and financial inclusion in Muslim countries. The degree of religiosity5, on average is about 85 percent in the Muslim countries implies the important role of religion in the daily life and society. The financial exclusion due to religious reasons accounts for about 9 percent in the Muslim countries. Hence, Islamic finance can play a role in bringing more than 40 million financially excluded population because of religious reasons into the formal financial system. On the other hand, the number of banks in a country that offer Shari`ah-compliant financial services per 10 million adults is very low except for few countries such Kuwait, Bahrain, Qatar and Malaysia. Similarly, low number of banks in a 5 Percentage of adults in a given country who responded affirmatively to the question, "Is religion an important part of your daily life?" in a 2010 Gallup poll.

Table 1. Islamic Banking and Financial Inclusion in Selected Muslim Countries

	Religiosity and financial inclusion				Islamic financial institutions (IFIs)			
Economy	Religiosity (%) 1/	Account at a formal financial institution (%, age 15+)	Adults with no account due to religious reasons (%, age 15+) 2/	Adults with no account due to religious reasons (thousands, age 15+) 3/	Number of IFIs	Islamic assets per adult (US$) 4/	Number of IFIs per 10 million adults	Number of IFIs per 10,000 km2
Afghanistan	97	9	33.6	5,830	2		1.1	0.03
Albania	39	28.3	8.3	150	1		4	0.36
Algeria	95	33.3	7.6	1,330	2		0.8	0.01
Azerbaijan	50	14.9	5.8	355	1		1.4	0.12
Bahrain	94	64.5	0	0	32	29,194	301.6	421.05
Bangladesh	99	39.6	4.5	2,840	12	14	1.2	0.92
Benin		10.5	1.7	77	0	0	0	0
Burkina Faso		13.4	1.2	98	1		1.1	0.04
Cameroon	96	14.8	1.1	114	2		1.7	0.04
Chad	95	9	10	573	0	0	0	0
Comoros	97	21.7	5.8	20	0	0	0	0
Djibouti	98	12.3	22.8	117	0	0	0	0
Egypt	97	9.7	2.9	1,480	11	146	1.9	0.11
Gabon		18.9	1.5	12	0	0	0	0
Guinea		3.7	5	279	0	0	0	0
Indonesia	99	19.6	1.5	2,110	23	30	1.3	0.13
Iraq	84	10.6	25.6	4,310	14	98	7.4	0.32
Jordan		25.5	11.3	329	6	1,583	15.4	0.68
Kazakhstan	43	42.1	1.7	126	0	0	0	0
Kuwait	91	86.8	2.6	7	18	28,102	87.2	10.1
Kyrgyz Republic	72	3.8	7.3	272	0	0	0	0
Lebanon	87	37	7.6	155	4		12.4	3.91
Malaysia	96	66.2	0.1	8	34	4,949	16.8	1.03
Mali	95	8.2	2.8	218	0	0	0	0
Mauritania	98	17.5	17.7	312	1	76	4.7	0.01
Morocco	97	39.1	26.8	3,810	0	0	0	0
Mozambique		39.9	2.3	189	0	0	0	0
Niger	99	1.5	23.6	1,910	0	0	0	0
Nigeria	96	29.7	3.9	2,520	0	0	0	0
Oman		73.6	14.2	78	3		14.4	0.1
Pakistan	92	10.3	7.2	7,400	29	40	2.5	0.38
Qatar	95	65.9	11.6	64	14	13,851	86.5	12.08
Saudi Arabia	93	46.4	24.1	2,540	18	1,685	9.2	0.08
Senegal	96	5.8	6	411	0	0	0	0
Sierra Leone		15.3	9.9	287	0	0	0	0

Note: 1/ Percentage of adults in a given country who responded affirmatively to the question, "Is religion an important part of your daily life?" in a 2010 Gallup poll; 2/3/ Number of adults and percentage of adults that point to a religious reason for not having an account at a formal financial institution; 4/ Islamic assets per adult (US$): Size of the Islamic assets in the banking sector of an economy per its adult population.

Source: Bankscope; Global Findex; World Development Indicator; Global Financial Development Report (2014)

Country that offer Shari'ah-compliant financial services per 10,000 km2 make it difficult for the Islamic finance to offer the alternative to this financially excluded population. Efforts to increase financial inclusion in Muslim countries with Muslim populations thus require sustainable

mechanisms to provide Shari'ah-compliant financial services to all residents, especially the Muslim poor and near poor, estimated at around 700 million people who are living on less than $2 per day.

Voluntary or involuntary levies such as Zakah, Sadaqa, Qard-al-Hassan, and Awqaf, enable the idiosyncratic risks of the poor to be shared by the rich through which the economically more able segment of the society shares the risks facing the less able segment of

The population, thus helping to reduce the correlation between the poor income and consumption. Islam places great emphasis on redistribution of income and wealth and legislates institutions using these instruments to enhance financial inclusion. These levies in no way are to be considered charity as often misunderstood by many Muslim. However, these important instruments are less formally developed in most of the Muslim countries. Islamic MSMEs funding could also enhance financial inclusion through the usage of the Islamic financial products and services and help in poverty alleviation, which create jobs for the active poor.

The Islamic legal system (Shari'ah) has its own guidelines and regulations regarding the financial transactions (mu'amalah) for Muslim believers. Many Muslim households as well as MSMEs may be voluntarily excluded from formal financial markets due to religious requirement or lack of Shari'ah-compliant products and services. Such requirements are the prohibition of interest-bearing loans and the requirement for financial services provider to share in the profit and loss of the business activities. Table 2 shows that about 9 percent of respondents without a formal bank account in Muslim countries cite religious factors for their lack of an account compared to 4 percent in the rest of the world. For this group, the majority of conventional financial services do not meet these two main requirements. Therefore, conventional financial service providers are irrelevant to most Muslim individuals and firms in need of bank account or financing.

Table 2. Reasons for Financial Exclusion in Muslim Countries

	All (%)	Muslim Countries (%)	MENA Region (%)	Rest of the World (%)
Have an account at a formal financial institution	50	27	18	51
Do not have an account due to				
Religious reasons	5	9	12	4
Distance	20	33	8	21
Account too expensive	25	29	21	26
Lack of documentation	18	22	10	19
Lack of trust	13	13	10	14
Lack of money	65	75	77	64
Family member already having one	23	11	9	24

Source: World Bank, Global Financial Inclusion Database (the Global Findex).

Demirguç-Kunt et al. (2013) undertake a study on preference and use of Islamic banking services across five countries (Algeria, Egypt, Morocco, Tunisia, and Yemen) with only 2 percent of report using an Islamic banking service. In Nigeria according to EFinA (2010), 78 percent of the population never heard about Islamic banking. On average, 48 percent reports having heard of Islamic products or offered Islamic banking services in their country, with the range varies from 35 percent in Algeria to 57 percent in Tunisia. Only 8 percent reports having an account at a formal financial institution or having borrowed from a formal financial institution in the past year reports using an Islamic banking service. 45 percent reports a preference for the more expensive Islamic bank loan, while 27 percent reports a preference for cheaper conventional bank loan. 54 percent of Moroccan are most likely to pick for the Islamic bank loan, while 40 percent of Tunisian are most likely to choose the conventional loan.

Despite the apparent difficulties in applying the Islamic banking principles in practice, Islamic banking may indeed play an important positive role in improving financial inclusion. The uniqueness of risk sharing principle should be applied to the more traditional and rural areas in Muslim countries. The risk sharing and risk diversification element in Islamic finance instruments also help individuals to mitigate their idiosyncratic risks. World Bank (2014) study shows that the number of Islamic banks per 100,000 adults is negatively correlated with the

Proportion of firms identifying access to finance as a major constraint. This suggest that increasing the number of Shari'ah-compliant financial institutions can make a positive difference in the operations of small firms (0–20 employees) in Muslim populated countries by reducing the access barriers to formal financial services.

Microfinance is believed to be one of the tool for poverty alleviation.6 Microfinance has played a significant role in extending the outreach to more than 100 million poor and low-income and

becoming increasingly integrated with the formal financial system across the globe. MFIs continue to growth despite the economic turmoil with total loans stood at US$43.8 billion in 2008 (CGAP, 2008). Demand for microfinance remains high, for instance, in the Arab region alone, it is estimated that the outreach gap of 19 million borrowers (Sanabel, 2010). On the other hand, the outreach of Islamic microfinance is very limited. Islamic MFIs account for a small fraction of microfinance supply, about 0.5 percent of global microfinance, despite an estimated 650 million Muslims living on less than US$2 a day. Of the 1.28 million Islamic microfinance clients served, commercial banks serve 60 percent, while rural banks serve only 16 percent (CGAP, 2008; 2013). For example, Islamic MFIs in Syria comprises only 3 percent of outstanding microfinance loans.7 the figure also implies a lower coverage rate of Shari'ah compliant microfinance in all the Muslim countries.

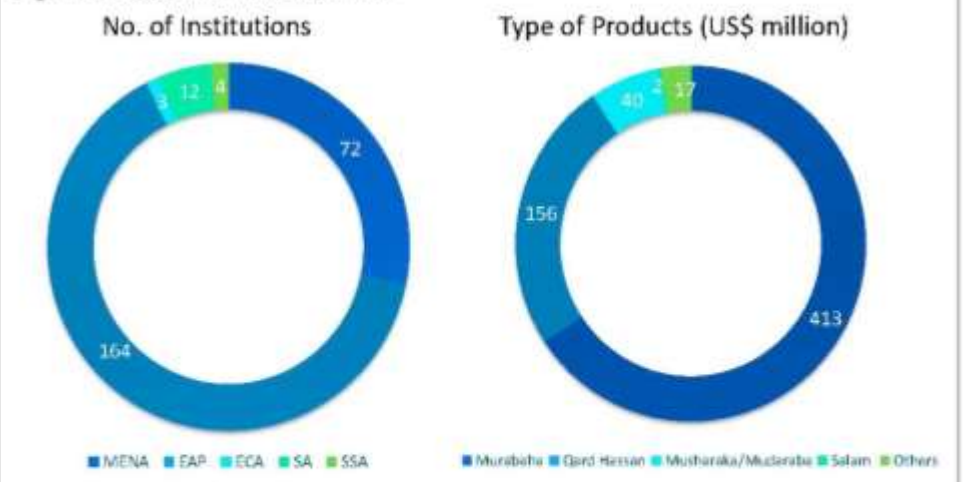
On the other hand, CGAP (2012) study shows that 20-40 percent cite religious reasons for not accessing conventional microfinance. Similarly, IFC (2011) market studies suggest a strong demand for Islamic microfinance products: More than 60 percent of low-income survey respondents in the West Bank and Gaza claim a preference for Islamic products over conventional products.9 In Jordan, 24.9 percent and 32 percent, respectively, of those interviewed cite religious reasons for not seeking conventional loans.10 In Algeria, a 2006 study revealed that 20.7 percent of microenterprise owners do not apply for loans primarily because of religious reasons.11 In Yemen, an estimated 40 percent of the poor demand Islamic financial services, regardless of price. In Syria, a survey revealed that 43 percent of respondents considered religious reasons to be the largest obstacle to obtaining microcredit. Accordingly, constraints to Islamic microfinance sector are mostly related to i) the lack of capacity to design authorized Islamic finance products Islamic microfinance providers that meet the needs of consumers; and ii) micro-level transactions need to be keep at a very low costs.

There are 255 financial service providers offering Shari'ah-compliant microfinance products around the world. Approximately 28 percent of these providers are concentrated in the Middle East and North Africa, which is one of the two regions representing almost 92 percent of all providers. In 2011, 82 percent of the global outreach of Islamic microfinance dominated by three countries namely Indonesia, Bangladesh, and Sudan. The types of institutions offering Shari'ah-compliant microfinance services vary serving1.28 million clients in 19 countries, but a majority (in terms of absolute number) are rural banks. Murabaha is the Islamic microfinance product with the largest outreach (672,000 customers and total portfolio of assets of approximately US$413 million (Figure 5). The limited range of products offered to the Muslim communities will continue to exclude low-income individuals and small enterprises from access to Shari'ah-based finance.

Despite spectacular growth of microcredit particularly in Bangladesh and its replication around the world (see Box 1), the programme has faced criticism because of the high interest charged (30-32 percent effective rate), which may have led to over-indebtedness of borrowers. Some critics have also cited coercive tactics used by some conventional and Islamic MFI institutions and the worry about future sustainability (high overhead costs). According to AFI (2014)12, globally, almost 75 percent of MFIs charged around 25 – 28 percent interest, very few charged above 30 percent. There are few MFIs are able to charge below 25 percent and lower the cost due to increase operational efficiency.

Figure 5. Global Islamic Microfinance

Figure 5. Global Islamic Microfinance



Note: MENA stands for Middle East and North Africa; EAP stands for East-Asia Pacific; ECA stands for Europe and Central Asia; SA stands for South Asia; and SSA stands for Sub-Sahara Africa. Research data do not include Shari'ah-compliant cooperatives (Baitul Mal Wat Tamwil [BMTs]) in Indonesia. Product breakdown is not available from Islamic Bank of Bangladesh Ltd. and some small institutions operating in Africa. The sample covered in this survey does not include respondents from Iran or Malaysia.
Source: CGAP (2013)

Although microfinance has provided most of the access to financial services, it is still largely separate from the overall financial systems. There is further scope of increasing the level of access to financial services. The expansion of financial inclusion can be made possible by means of introducing innovative financial product, developing the efficient and effective financial service delivery mechanism, and increasing the financial literacy of the potential users of financial services. In the process of expanding financial access, MFIs can work further to include the unbankable poor women in the financial sector and provide the financial services in a cost-effective and sustainable way to the households.

On the other hand, Islamic microfinance businesses in most Muslim countries are still being developed and no performance benchmarks have been established. Islamic microfinance also having pricing of some Shari'ah-compliant products offered too closely parallels or higher than pricing of conventional products. The poor must be convinced of the authenticity of Islamic financial products if Islamic microfinance is to reach its full potential. In addition, capacity building is needed at all levels to realize the full potential of Islamic microfinance and product diversity is needed to serve poor people who have diverse financial requirements, and for many, savings or housing products may be more urgent needs.

Box 1. National Microfinance Strategies [1]

Over 30 countries, most in Africa, have National Microfinance Strategies [2]. Developing a national microfinance strategy usually involves four stages: (i) conducting a diagnostic/gap analysis of the microfinance sector; (ii) consulting with stakeholders; (iii) drafting a document, usually by a consultant in cooperation with government; and (iv) adopting and implementing the strategy, including approval by a governmental body and defining actions to put the strategy into practice.

Benefits of Microfinance Strategy

- **Improved dialogue.** The broad consultative process that often accompanies the development of a national microfinance strategy has fostered improved communication among practitioners, donors, and policy makers.
- **Increased knowledge of the sector.** The diagnostic has sometimes led to a deeper understanding of the opportunities and constraints for increasing financial access.
- **Commitment to good practices.** National microfinance strategies have gotten governments and other stakeholders on the record to adopt good practice principles and abandon unsound policies.

Challenges of Microfinance Strategy

- **Weak diagnostics.** Diagnostics of the sector too often lack breadth and depth. The diagnostics often neglect the financial infrastructure or the political economy, omit key actors (such as commercial banks) or do not assess their performance.
- **Isolation from broader financial sector.** With their focus on microfinance, many strategies do not properly take into account (or create links to) the broader financial sector.
- **Inadequate government leadership and capacity.** The responsibility for national microfinance strategies is often placed with a government body that lacks technical capacity and/or the political or legal power to successfully implement the strategy.
- **Unrealistic and "template" action plans.** About half of the national microfinance strategies include action plans for reform, many of which have unrealistic targets.

[1] CGAP Brief (June 2008) National Microfinance Strategies.
[2] **Africa**: Benin, Burkina Faso, DRC Congo, Cote d'Ivoire, Ethiopia, Gambia, Ghana, Liberia, Madagascar, Mali, Malawi, Mauritania, Mozambique, Niger, Nigeria, Rwanda, Sierra Leone, Senegal, Tanzania, Togo, Uganda, Zimbabwe; **Asia**: Cambodia, Indonesia, Lao PDR, Nepal, Pakistan, Philippines; **Europe and Central Asia**: Kyrgyz, Russia, Uzbekistan; **MENA:** Egypt, Jordan, Yemen.

3. Financial Inclusion Frameworks in Muslim Countries

Over the years, there has been substantive development in the architecture and thinking on financial inclusion framework. While there is no "one-size fits all" financial inclusion strategy or approach, but it is important to recognize few core or necessary and sufficient conditions that are needed to maximize the benefits derived from such strategy. The diversity of demographics, regulatory environments, and other factors preclude a simple, off-the-shelf solution for improving financial inclusion. Improving access to financial services across a wide number of areas is best to be initiated by the government. Generally, financial inclusion strategy can be defined as agreed plan of actions, crafted at the national or sub-national level in line with financial inclusion targets and preferably prepared by public sector in partnership together with the private sector to encourage wide-ranging innovation and development.13

Approach to financial inclusion must be pragmatic and comprehensive and addresses at least three aspects - access, usage and quality - of financial services and products.14 These three important aspects should benefit the consumers as the results from financial choices and options within a sustainable (financial capability) and a reliable (consumer protection) framework. To address different barriers to financial inclusion, these strategies can be integrate into public and private sector actions, and focus on high-priority and high-impact areas such as SME finance or financial education.

3.1 Overview of Global National Financial Inclusion Strategies

Globally, 56 countries of which 13 are Muslim countries have committed to formal targets for financial inclusion and have published explicit financial inclusion strategies.15 Financial inclusion policy and strategy among Muslim countries have becoming one of the important policy agenda as more countries have introduced their financial inclusion policy framework in recent years. These commitments and strategies also reflect a growing recognition of the role of financial inclusion in boosting shared prosperity and eradicating poverty. These countries have also made formal commitments under the Alliance for Financial Inclusion's Maya Declaration16 or have been identified as having significant national strategies by the Financial Inclusion Strategy Peer Learning Group.

In principle, many of the national financial inclusion strategies have common similarities. The overall aim of the national financial inclusion strategies pointed towards empowering people by improving their access to financial services and products. Generally, a financial inclusion strategy can be characterised by six implementation stages: a) data and diagnostics; b) targets and objectives; c) strategy building or revision; d) public sector policies, regulation, and financial infrastructure; e) private sector actions; and f) progress monitoring. The strategies generally comprise a mix of commitment of policy areas and numeric targets such as expansion of mobile financial services, financial literacy, improving consumer protection, and microfinance. Anchored in the above strategy, the general approaches for the financial inclusion strategy are as follows:

i. Promote an enabling environment based on the proportionate application of accepted and sound regulatory and supervisory principles. It is important that all players and financial service providers are proportionately and sufficiently regulated to ensure financial system stability and integrity as well as consumer protection.

ii. Enable the delivery of a wide range of services, such as savings, credit, insurance, payment services, and remittance to reach all markets, including those that have been previously unbanked. These services must be appropriately designed and priced and have capacity to safely and effectively provide or deliver to the consumers.

iii. Allow banks and non-banks to leverage linkages and partnerships to expand their range of products and services as well as strengthening their delivery channels to reach the financially excluded population more widely and effectively.

iv. Facilitate useful products and services innovation to operate in an environment where sound principles are a prudently and proportionately applied to cater for the risks associated, and such innovations are sufficiently understood by the consumers.

These four approaches should be anchored with the foundation and framework of a comprehensive and effective consumer protection and financial education along with a robust financial inclusion

data framework. In order to ensure financial inclusion efforts become successful, there is a greater need for the public, especially new participants in the financial system, to be equipped with the necessary knowledge, tools, skills, and mechanisms to ensure that they are adequately informed and protected. The latter will ascertain that policies are truly evidence based and progress can be effectively measured.

Specifically, most of the national strategy contains several common policy areas with a clear defined commitment as follows:17amending the regulatory framework to enhance financial access; improving financial literacy; increasing consumer protection; enhancing data collection and measurement; and expanding mobile financial services. There are also similarities in formulating institutional framework for financial inclusion. In most cases, the central bank is more likely to be a lead agency in the respective countries where it is also acted as an integrated financial sector supervisor. In 40 out of 56 countries, the central bank is the lead agency for implementing financial inclusion strategy, while other institutions also involve such as financial supervision related agencies or ministry of finance.

Although there are some common similarities, the national financial inclusion strategies differ greatly in the level of detail, breadth of coverage, and degree of specificity. Primarily, the country-specific circumstances reflect some of the differences among the strategies, but there is sufficient scope for re-alignment in the strategies. Broadly, there are three difference approaches: (a) stand alone; (b) integrated in financial/development strategy; and (c) specific strategies for specific areas. However, countries with specific numeric targets and timelines for achieving the targets only account about one-third of the total strategies (19 out of 56). The others provide general goals, for instance increasing financial inclusion, without specific numeric targets and timelines commitments.

Due to existing barriers to financial inclusion and country-specific characteristics, several elements of the national financial inclusion strategies are specific to a few countries. Fifteen countries strive for providing alternative financial products such as special savings accounts or mobile money platforms to better cater the requirements of the populations.18 The others have focused on increasing the access through banking correspondents and provision to microfinancial products and services. Four countries focus on setting-up credit informational systems to encourage responsible lending and to provide borrowers credit information, while thirteen countries focus on transforming payment system strategy, which involves efforts such as channeling social payments and remittances through financial accounts.

3.2 Indonesia: Toward Broader Financial Inclusion Strategy

Despite a commitment of Indonesia government to financial inclusion and its pioneering reputation in microfinance that dates back to the early 1980s, the achievements are far from satisfactory and still a serious problem. Rosengard and Prasetyantoko (2011) find that about 50 percent of Indonesian have only limited access to affordable formal financial services, particularly in semi-urban and rural areas. Most of these excluded people have a daily expenditure of less than US$1 per person, while SMEs are still facing a credit crunch even though commercial banks in Indonesia are liquid, solvent, and profitable.

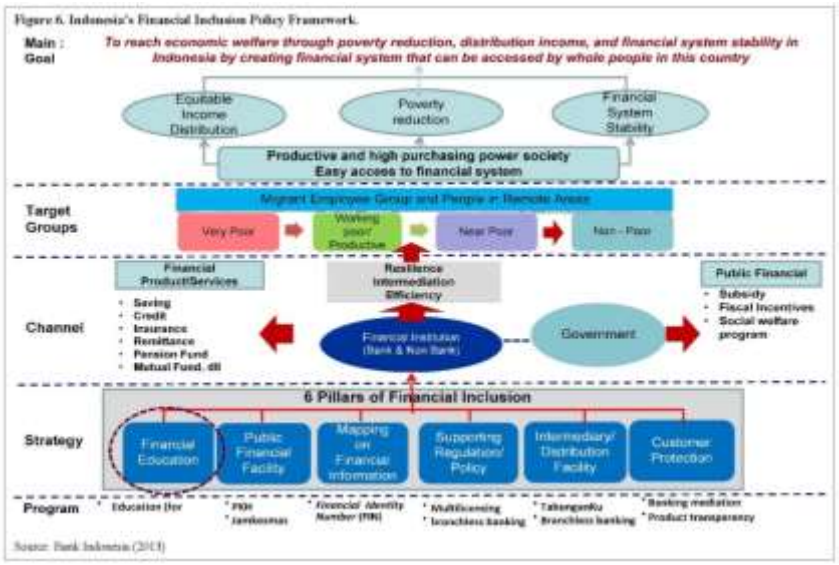
In Indonesia, the government has long recognised the problem of accessibility to formal financial markets. It has attempted to improve accessibility for otherwise excluded groups. From the era of the Suharto presidency to the present, many government-sponsored credit schemes have

attempted to help low-income families improve their finances. The government has been encouraging and facilitating microfinance institutions, banking and non-banking, to grow rapidly and serve small borrowers' demand for credit, which the existing banking system cannot make available. Currently, Indonesia is a global leader in microfinance outreach and innovation with over 94,000 MFIs operating all over Indonesia (Bappenas 2011).

The Government has taken several steps reviving the progress toward greater financial inclusion – recognizing its integral importance in facilitating inclusive economic growth and poverty alleviation. Indonesia has declared the financial inclusion to become the national agenda in 2010. Specifically, the Indonesian government has introduced a new National Strategy for Financial Inclusion with new incentives to encourage diversity – particularly in terms of developing savings products – and reduced barriers to entry for providers. It has also re-examined the regulatory framework and introduced credit guarantees to banks for their loans, enabling them to serve MSMEs that would otherwise remain financially excluded.

The conceptual policy framework for developing an inclusive financial system for Indonesia is shown in Figure 6. Bank Indonesia (BI) has designed the six pillars of financial inclusion policies: i) financial education; ii) consumer protection; iii) mapping on financial information; iv) public financial facility; v) supporting regulation and policy; and vi) intermediary and distribution facility. The strategy is expected to provide a consistent framework and clear guidance on financial inclusion for policymakers and financial institutions

Figure 6. Indonesia's Financial Inclusion Policy Framework.



In both public and private. In supporting financial inclusion, saving mobilization has been conducted in Indonesia through a range of programmes including Bank and Self-help Group Projects; My Saving Programme (TabunganKu); Rural Bank Saving (TAPRINDO); Simpedes (Saving in rural areas); and other microfinancial products.

The government, the financial industry, and communities are Indonesia's financial inclusion stakeholders and each plays a different role. The government is a regulator and supervisor; the financial industry, including MFIs are service providers and the community - particularly the low-income poor, working poor, and near poor - are targeted by financial inclusion programmes. Indonesia has made remarkable progress in improving financial inclusion and has taken a number of major initiatives that are in line with the G20 Principles for Innovative Financial Inclusion. One of the key focus of the government has been introducing incentives that encourage diversity and innovation in products and services, including changes in the law and government-backed initiatives. This has led to the development of new savings and financial products that comply with Shari'ah principles and meet the needs and requirements of many more Indonesia.

In order to fully harness the relationship between financial inclusion and poverty reduction, Indonesian policymakers further strengthen their focus on access to, and use of, a broader range of financial services rather than just credit. Evidence strongly suggests that the financially excluded particularly demand effective access to convenient and safe savings services at affordable prices. Therefore, the current emphasis on improving access to reliable and safe savings facilities should be reinforced as much as possible. Given that people in many remote areas still lack such access, the policies and programmes need to pay more attention to unbanked areas. However, the use of innovative new technology (i.e. mobile payment), may help bring the financially excluded into the formal financial system in those areas at relatively low cost.

Formulation of a legal and regulatory framework for microfinance and improvement of supervision and regulation of cooperatives also help advance the development of financial services for the poor and rural communities particularly in remote rural areas. As stated by Seibel (2011), despite of the rapid development, the performance of Islamic rural bank and microfinance is very poor compared to the conventional rural bank, which has been stagnant for a while (see Box 2). This might be reflected on the inability to provide a full range of

Products and support services to their members as well as the absence of regulation and supervision from the government.

Box 2. Islamic Microfinance Conditions in Indonesia

Islamic Micro/Rural Banks (BPRS):

- Regulated Islamic and conventional rural banks have evolved over 15-year period comprising of 84 BPRS.
- Islamic rural banks have remained small. The volume of their services is negligible, compared to conventional rural banks, accounting for only 4% of the number, 1.5% of the assets and outreach, and 1.2% of deposits of the rural banking sector.
- Islamic rural banks growth has stagnated in recent years and growth in assets has remained far behind that of conventional rural banks.
- Among the reasons of stagnation: governance and management problems, inadequate internal control (by absentee commissioners), lack of external auditing, lack of popular demand for Islamic banking services, emphasis on the informal sector to the neglect of more profitable market segments, and lack of mastery of overly complex Islamic banking practices.

Islamic Financial Cooperatives:

- The cooperative sector has historically suffered from a complete lack of regulation and supervision, including excessive government interference and subsidies, which have distorted rural financial markets and undermined self-help.
- The majority of Islamic cooperatives are reportedly dormant or technically bankrupt.
- Outreach and volume of Islamic cooperatives services are negligible compared to conventional cooperatives, accounting for 7.2% of all financial cooperatives, but less than 1% of borrower. outreach of the sector
- The savings of depositors are at great risk due to lack of monitoring and the authorisation to accept savings from non-members.
- No remedy is in sight except in the framework of a total overhaul of the cooperative system.

Source: adapted from Seibel (2011)

Policy attention on the development of insurance markets for the poor, low-income households and MSMEs must also be substantially increased. This is particularly important given that a vast majority of low-income people do not have easy access to appropriate insurance products and services and therefore remain unprotected. It may also be useful to examine the feasibility of index-based insurance for the farming community. Along with these measures, consumer empowerment programs need to be broadened to improve insurance literacy and insurance capabilities among poor and low-income households.

Access must be improved for a broad range of financial services not just for credit. The current legal, regulatory, and policy framework for branchless banking requires significant improvements. The government is keen to address these issues in a systematic manner and BI is currently studying the branchless banking model in collaboration with the World Bank and IFC and reviewing the existing regulatory framework with a view to making it branchless-banking friendly. Moreover, Indonesia plans to promote use of new technology and public-private partnerships in payment services, money transfers, and micro-insurance, among other things.

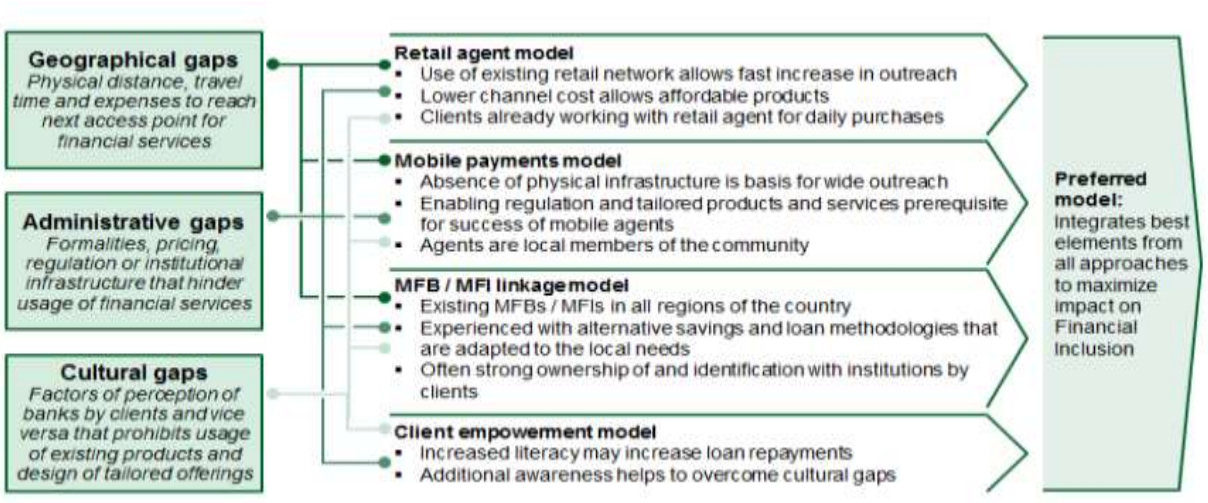
3.3 Nigeria: Financial Inclusion Strategy with Specific Targets

Although the number of financially excluded adults between 2008 and 2012 dropped by 10.5 million, Nigeria still lags behind many of African countries in term of the provision for financial services. Only 46 percent of Nigerian adults have access to or use formal financial services, while another 17 percent rely on informal services. The exclusion rate is much higher in rural areas where half of the population lives. In collaboration with other stakeholders, the Central Bank of Nigeria (CBN) launched the National Financial Inclusion Strategy on October 2012 following Nigeria's commitment to the Maya Declaration of the Alliance for Financial Inclusion aimed at reducing the exclusion rate to 20 percent by 2020.

Under the Nigeria's Financial Inclusion Strategy (FIS), the specific target is to increase adult Nigerians with access to payment services from 22 percent in 2010 to 70 percent in 2020, while those with access to savings to increase from 24 percent to 60 percent. Access to credit from 2 percent to 40 percent, insurance from 1 percent to 40 percent and pensions from 5 percent to 40 percent. The targets are based on international benchmarking exercise against peer countries, while taking into account critical growth factors of the country-specific characteristics. The central bank also established the Micro, Small and Medium Enterprises Development Fund (MSMEDF) to bring down financial exclusion and achieving the overall target of financial inclusion from the current 46 percent to 20 percent by 2020.

The preferred model adopted by Nigerian government is a combination of all five models – branch, retail agent, mobile payment, microfinance bank (MFB/MFI) linkage, and client empowerment (Figure 7). It leverages on the existing global best practices to increase financial inclusion to target levels. It also focuses on technology-driven low-cost channels that can be deployed easily to ensure that access is significantly increased in a way that is profitable for both the financial services providers and end users. In order to meet the targets in 2020, the preferred model would require 4,100 branches, 3,400 mini-branches, 51,800 ATMs, 122,000 retail agents and 55,200 mobile agents.

Figure 7. Nigeria's Financial Inclusion Preferred Model



Source: Central Bank of Nigeria (2012) National Financial Inclusion Summary Report.

Combining various elements from each of the models helps to overcome the existing gaps and barriers to people using financial services. Based on the EFInA Access to Financial Services Survey (2010) each challenge is addressed by specific elements in the Preferred Model: income – addressed by the client empowerment element; physical access – addressed by the retail and mobile payments elements; financial literacy – addressed by the linkage and client empowerment elements; affordability – addressed by the retail and mobile payment elements; eligibility – addressed by the client empowerment element

The major tools for driving the financial inclusion strategy include: a) agent banking; b) financial literacy and consumer protection; c) tiered know-your-customer requirements; d) linkage banking implementation of the MSMEs Development Fund; and e) credit enhancement programmes such as Agricultural Credit Guarantee Scheme (ACGS), Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL), Commercial Agricultural Credit Scheme (CACS), Refinancing and Rediscounting Facilities for SMEs, Small and Medium Enterprise Credit Guarantee Scheme, Entrepreneurship Development Centres and Mobile Money Operation.

As of 2010 according to CBN (2012), Nigeria has a combined total of 5,797 bank branches, 11,223 point-of-sale (POS) terminals and 9,958 ATMs. Although the banked population has grown faster than the bank branch network, the infrastructure is operating below its potential and has the capacity to meet the require demand from clients. The average number of clients per branch in Nigeria is 3882 compare to 3922 in Kenya and 8595 in Tanzania. Although not much work has been done to promote financial inclusion in Nigeria, the CBN financial inclusion strategy (2012) and the CBN microfinance banking policy (2005) are two fundamental state interventions put in place to promote financial inclusion.

Acccording to EFInA Access to Financial Services Survey (2010), distance to a bank branch is the third biggest barrier to having a formal account in Nigeria, after the issues with irregular income and unemployment. Notwithstanding, the emergence of agent and mobile banking in Nigeria has potential to reduce costs and get closer to the customer, the number of transactions through mobile phones and POS terminals are still very low. The CBN currently is actively promoting a cash-lite society, but the outcome will depend on the incentives and the execution of the policies. In the last two years, the CBN has licensed multiple mobile money operators, but Mobile Network Operators (MNOs) yet to issue e-money. To date, only 0.5 percent of the Nigerian adult population is registered with a mobile money operator.

In recent years, several banks both large commercial banks and microfinance banks (MFBs) have failed in Nigeria. The events have led to substantial mistrust in the society towards financial service providers and becoming key challenges to get people banked. The CBN has introduced more rigorous capital requirements for MFBs to address some of the pitfalls under the Microfinance Policy Framework (2011) with a deadline for compliance at the end of 2012. However, many MFBs remain small and local and only serve 5 percent of the banked population. The CBN has also reminded the banks the intention to withdraw licenses when needed. These measures along with the provision to strengthen and consolidate the remaining MFBs and encourage alliances with other service providers are expected to improve the outreach, image and performance of the financial service providers.

The strategy has been put in place equally targeted to improve delivering channels for the financial services between 2010 and 2020:19 deposit money bank branches to increase from 6.8 units in to 7.6 units; ATMs from 11.8 units to 203.6 units; microfinance bank branches to increase from 2.9

units to 5.5 units; mobile agents from 0 to 62 units; POSs from 13.3 units to 850 units (all per 100,000 adults). In the meantime, arrangements are also being developed among government, MFBs or MFIs, commercial banks, and mobile money operators to expand the services to a larger population (see Box 3). For instance, the Nigerian Post (Nipost) can play a role in expanding access given its country-wide presence especially in rural areas and can be turn into a super-agent for mobile money.

Box 3. Financial Inclusion Coordination Mechanisms by the Central Bank of Nigeria

In Nigeria, the Central Bank has put in place various mechanisms to ensure coordination, including:

- Financial System Strategy 2020, an initiative designed to promote collaboration among all stakeholders in the financial system. The steering committee includes members from the Central Bank, Federal Ministry of Finance, Nigeria Deposit Insurance Corporation, National Insurance Commission, National Pension Commission, Nigeria Securities and Exchange Commission, and the Nigerian Stock Exchange.

- The National Microfinance Policy Consultative Committee, chaired by CBN, coordinates on issues related to microfinance. It includes representatives from the Federal Ministries of Finance and Agriculture, National Planning Commission, National Poverty Eradication Programme, Small and Medium Enterprises Development Agency of Nigeria, Bankers' Committee, National Association of Microfinance Banks, Nigeria Association of Small and Medium Enterprises, and Nigeria Deposit Insurance Corporation.

- The Central Bank also hosts a Microfinance Advisory Board (MAB). MAB includes mainly donors such as GTZ, DFID, UNDP, USAID, Ford Foundation, European Union, AfDB, the World Bank, National Association of Microfinance Banks, as well as other government agencies and NGOs.

- The Financial Inclusion Secretariat has a broad membership that includes the National Insurance Commission, National Pension Commission, Nigerian Communications Commission, GIZ, National Identity Management Commission, Federal Ministry of Education, National Planning Commission, Bankers Committee, Apex Associations as well as other affiliate members.

Source: Fathallah, S. and D. Pearce, (October 2013) Coordination Structures for Financial Inclusion Reforms and Strategies, World Bank.

A lot of work still needs to be done to ensure that affordable financial services are made available to those who are under-banked and unbanked in Nigeria. Financial inclusion strategy is a public-private intervention that seeks to overcome the friction that hinders the functioning of the market mechanism and operate in favour of the poor and underprivileged. Financial inclusion intervention is an explicit strategy for poverty eradication and to accelerated growth in Nigeria. However, the success of the strategy depends on the commitment and workable action plan to coordinate and harness the potential of each stakeholder as well as efficiency improvement in guiding the efforts by the Financial Inclusion Secretariat and Financial Inclusion Committee.

4. Improving Financial Inclusion through Islamic Finance

Islamic finance operates based on Shari'ah principles by observing the pillars and conditions of contract in its operational mechanism. Its grounding principles are the objective of Shari'ah (Maqasid) which are to realize human well-being and to repel harms and difficulties in people lives. It is also a sound model for financing development due to the philosophical foundation of an

Islamic financial system goes beyond the interaction of factors of production and economic behavior and the essence of Islamic finance emphasize the principle of justice to all including social justice. These concepts are manifested in the model of Islamic finance, inextricably tied to inclusive growth, thus a strong alternative proposition for financing development.

The central economic tenant of Islam is to develop a prosperous, just, and equal economic and social structure in which all members of society can maximize their intellectual capacity, preserve and promote their health, and actively contribute to the socioeconomic development of society. Islam emphasizes financial inclusion more explicitly. However, two distinct features of Islamic finance differentiate its path of development significantly from conventional financial models: the notions of risk sharing and redistribution of wealth. Islamic finance provides a comprehensive framework to advance financial inclusion by promoting microfinance, micro-insurance and SME financing structured on the principles of risk sharing, and through Islam's redistributive channels, which are grossly under-utilized in many Muslim countries.

In the case of Islamic banking, rather than attempting to adopt debt-based contract for the entire Islamic financial system similar to conventional banking system, the principle of profit and loss sharing should be encourage and apply to wider traditional and rural areas to advance financial inclusion in the Muslim world. The Islamic profit-sharing concept helps to foster economic development in rural area by encouraging equal income distribution and which results in greater benefits for social justice and long-term growth. In this way, Islamic banks could play the role of rural Islamic development banks. Experience from the Sudan and Indonesia seem to indicate that Islamic development banking in the rural area has been rather successful (Stiansen, 1995).

There are four reasons why Islamic financial services based on profit-sharing is more likely to be successful for advancing financial inclusion particularly in rural areas than in modern cities: (i) cheating is likely to be less of a problem in small, transparent societies such as rural communities; (ii) rural people may be more conservative with religion than the urban and city population; (iii) financial institution with an Islamic profile is a necesssary tool to integrate rural population into the national financial system; and iv) the need for Islamic banking as a means of improving income distribution may be greater in rural communities. Thus, small-scale Islamic rural banks or MFIs in the rural areas is alternative source of finance and products (i.e. microsaving, microtransfer, microcredit, microtakaful) to poor or near-poor rural communities.

In this context, Islamic redistributive instruments need to be institutionalize by formalising and standardizing its operations and management of each instrument. For example, for Zakat and Qard-al-Hassan, a formal network of institutions is needed and developed to collect, distribute, and recycle the funds in the most efficient and the most transparent ways. In some countries, point of sale mechanisms such as cash-dispensing machines or ATMs or internet banking could be used to give the consumers the choice and to make it easier and convenience for them to make contributions and donations on the spot. The financial service providers can play a role in collecting and aggregating funds and then distributing to needy poor through selected channels. By utilising domestic Zakah collection through proper management, recent estimate shows that 17 out of 39 Muslim countries can alleviate the poorest living under US$1.25 per day out of the poverty by tapping the large pool of Zakah potential.

However, the potential remains unrealised as actual Zakah mobilised falls short of its potential in most of Muslim countries.

In term of developing Islamic MFIs, development partners' support can be useful if it paves the way for commercialisation and private sector involvement, either as part of private-public sector consortiums or standalone. Currently, Islamic MFIs are too focused on providing microcredit using Murabaha and dependent on both donor and government-funded programmes. Development Finance Institutions (DFIs) can provide support by brokering new banking relationships, by offering incentives for the entry of commercial institutions in offering microfinance, by taking equity positions in Islamic MFIs, by providing credit enhancement on capital market transactions and by promoting international investment funds. Integrating Zakah collection or subsidies can work for Islamic microfinance borrowers and institutions in certain circumstances, but subsidies are best used to build Islamic MFI systems and staff capacity and to cover operating costs. Moreover, it can take some years for MFIs to reach the efficiency and scale needed to cover its own costs.

DFIs can choose to implement financial inclusion outreach and programmes via Islamic MFIs provided that: (i) MFIs are able to evolve business models and growth strategies (economies of scale) to reach out to poor clients on a sustainable basis; (ii) transformation of NGOs into MFIs by helping in proper leveraging funding and supportive prudential regulatory framework; (iii) enhance the ability of MFIs to access financial markets through proper funding mechanism and via a number of instruments; (iv) developing supportive infrastructure for nurturing financially healthy of MFIs via rating agencies and credit information bureaus to assess risks associated with microfinance operations and their clients; (v) forming strategic alliances of MFIs with financial markets in which MFIs can engage with a wide variety of financial market participants; (vi) having proper governance of MFIs to safeguard stakeholder interest in particular depositor funds and donors; and (vii) able to provide greater products diversification and expand the volume of sales through lower average costs.

5. Conclusion

In a nutshell, many empirical evidences suggest that poverty reduction strategies are successful if countries adopt inclusive financial policies. Building inclusive financial systems that are both financially and socially sustainable is a fundamental requirement of any poverty reduction strategy. Expanding financial inclusion is a challenging task since it is not a matter of removing bureaucratic, physical, and financial barriers, but also requires addressing the underlying structural causes. Nevertheless, rising income at the bottom of pyramid, measures to improve contestability of financial systems and underlying information and regulatory environment, the introduction and adoption of new products, processes and technology, may help further lessen these barriers and further increase financial inclusion.

Many factors hinder the access and use of financial services among the population particularly poor segment in Muslim countries. The main obstacles can broadly be characterised as follows: i) social, macroeconomic, and infrastructure features; ii) institutional weakness; iii) obstacles arising from banking activities; and iv) regulatory distortion. Governments are not solely responsible for designing an appropriate policy framework that encourages access to financial services, but financial institutions offering these services must also play a decisive role. Specifically, MFIs such as financial NGO's can play a bigger role in mobilizing savings from the public compared to other institutions that focus exclusively on credit.

Despite the recent financial sector growth in many of Muslim countries over the past decades, many individuals and firms are still excluded from access to financial services. Analysis of the usage and access of financial services by adults and enterprises shows that most Muslim countries lag behind other developing economies in both aspects, and that cost, religious belief, distance, and documentation requirements are among important obstacles. However, as per capita GDP rises some of these barriers to financial inclusion tend to decline. Barriers faced by both households and enterprises also tend to be lower in countries with more competitive, open- market oriented and well regulated financial systems with more developed contractual and informational infrastructures.

The paper proposed six policy recommendations to address the demand and the supply side dimensions for improving financial inclusion via strengthening and widening Islamic

financial services and products as follows: i) strengthen policy target to promote financial inclusion beyond microfinance through national financial inclusion framework and Islamic financial service providers in line with the 10-Year Framework of Islamic Financial Services Industry Development; ii) create a diverse range of Islamic financial products, services and channels tailored to meet the needs of the Muslim and the poor segment of the society through competition, technology and innovation; iii) design scalable, sustainable and inclusive Islamic social financing programmes targeted at the financially excluded; iv) develop redistributive institutions and revitalize Islamic redistributive instruments to reach out financially excluded Muslim population; v) ensure a level playing field and sustainable framework for Islamic microfinance; and vi) improve Islamic financial capability, awareness and mechanism for consumer education and protection.

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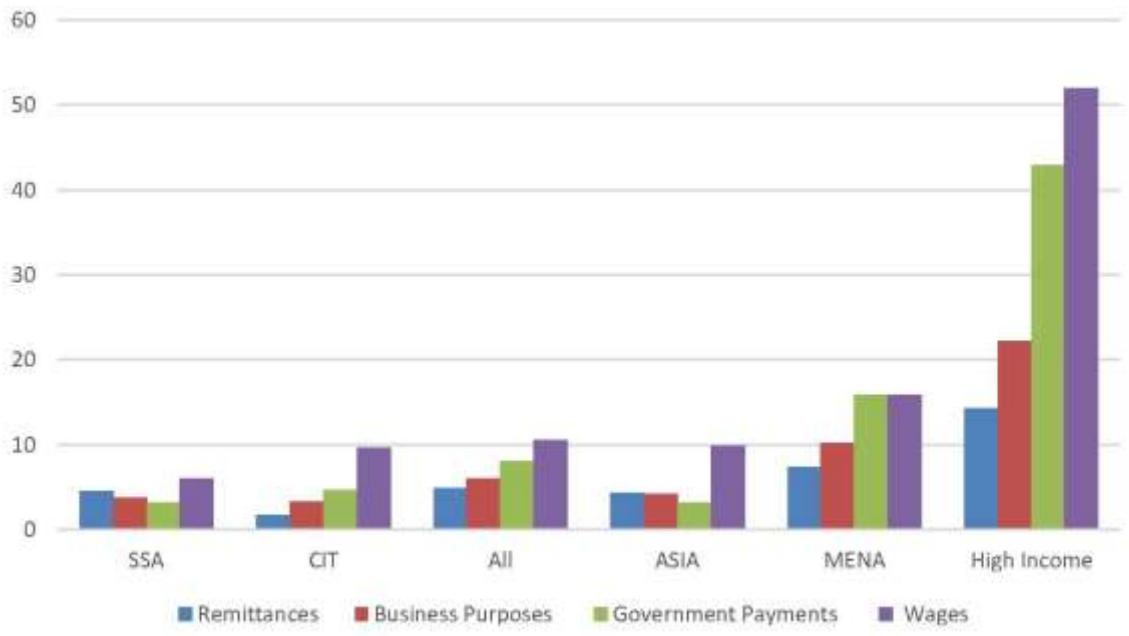
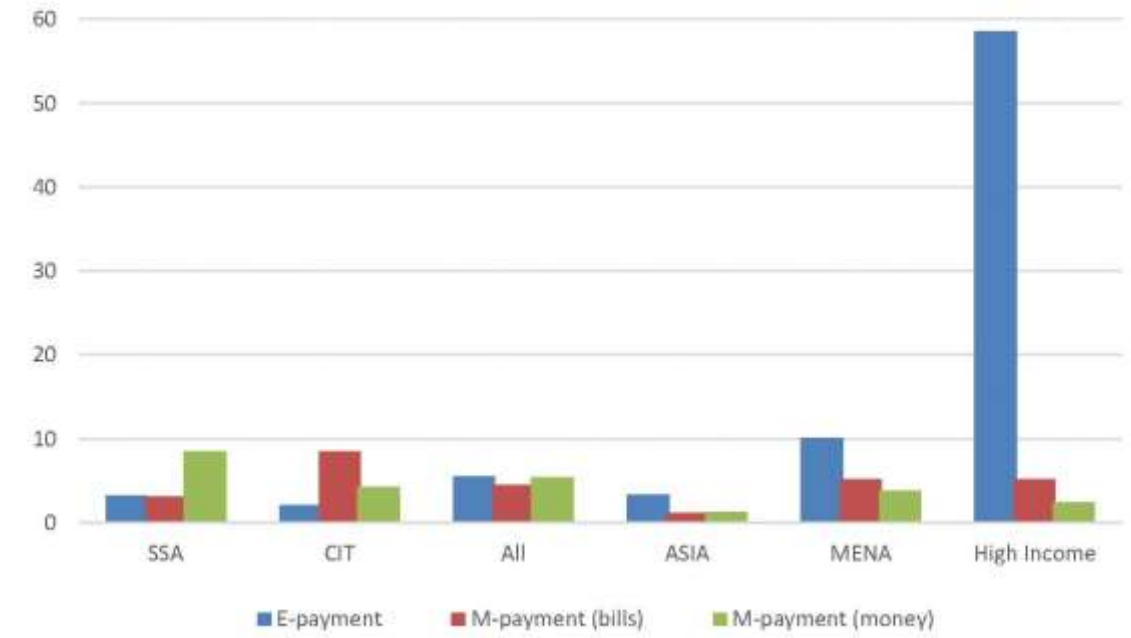
Appendix 1. The State of Financial Inclusion in MuslimCountries

Figure A. Usage of Account by Region



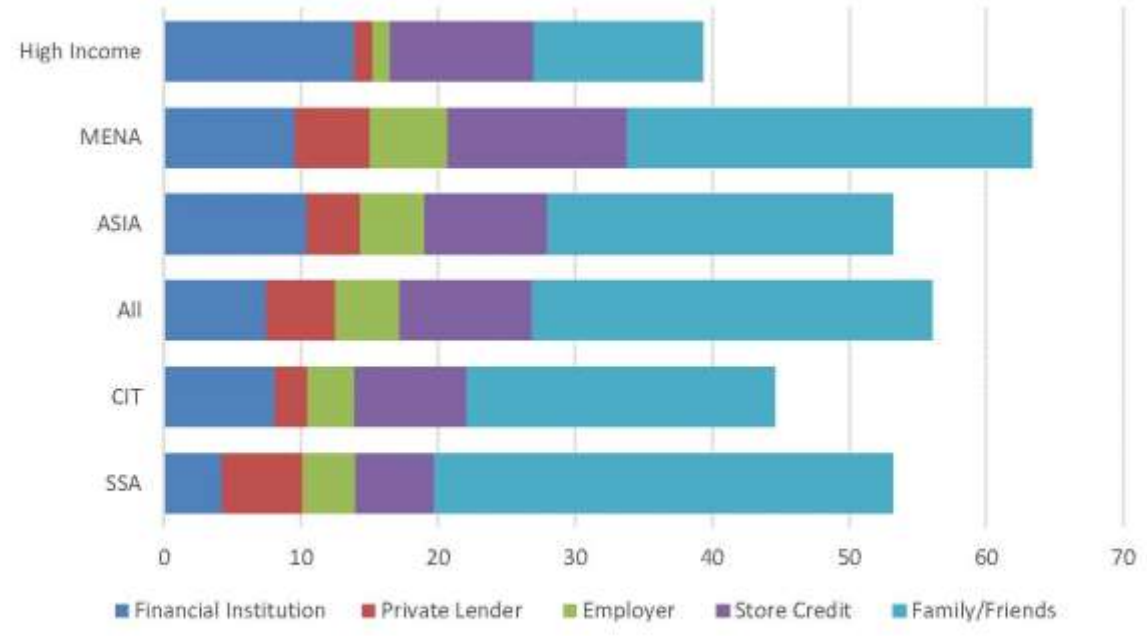
Source: Global Financial Inclusion (Global Findex) Database, World Bank

Figure B. Mobile Payments and Electronic Payments by Region



Source: Global Financial Inclusion (Global Findex) Database, World Bank

Figure C. Origination of New Loans by Region

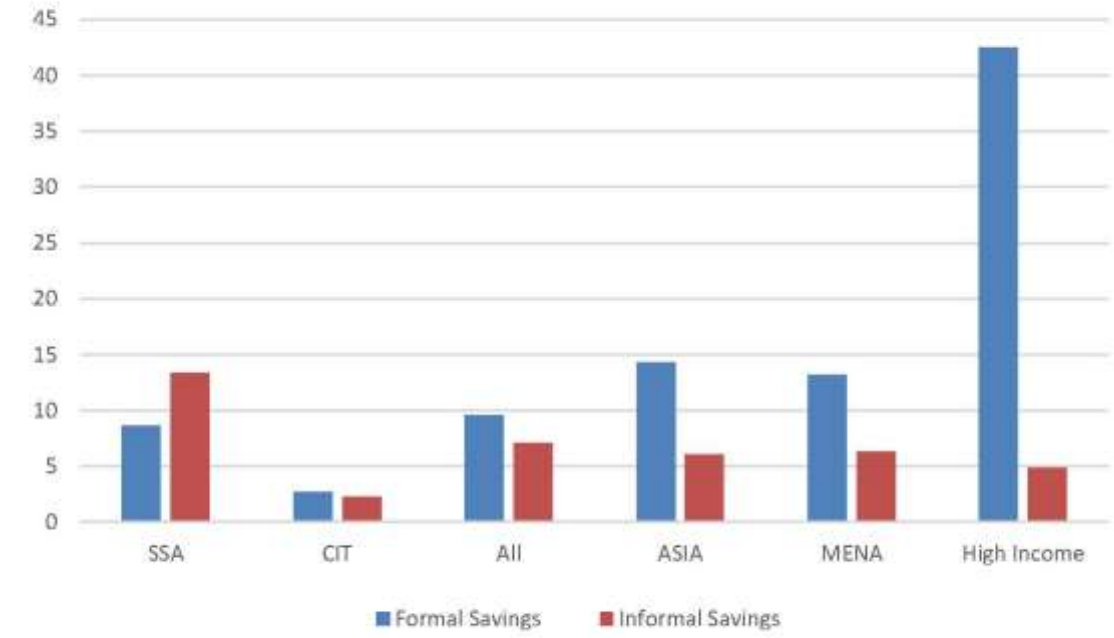


Source: Global Financial Inclusion (Global Findex) Database; World Bank

Figure D. Firm Access to Credit and Account by Region[1/]

Note: 1/ World Bank Classification - EAP: East Asia and Pacific, ECA: Eastern Europe and Central Asia, LAC: Latin America and the Caribbean, MENA: Middle East and North Africa, SA: South Asia, SSA: Sub-Saharan Africa.
Source: Global Financial Inclusion (Global Findex) Database; Enterprise Survey, World Bank

Figure E. Saving Behaviour by Region



Source: Global Financial Inclusion (Global Findex) Database; World Bank

Appendix 2. Financial Inclusion: National Strategy and Policy Framework in Muslim Countries.

	Country	Bangladesh	Guinea	Indonesia	Malaysia	Morocco	Mozambique	Nigeria	Pakistan	Senegal	Sierra Leone	Togo	Turkey	Uganda
National Strategy	Financial Inclusion Strategy (in place or in process)	Yes	No	Yes	Yes	In process	In process	Yes	In process	No	No	No	In process	In process
Maya Declaration	Commitment Under Maya Declaration	1	1	1	1	1	1	1	1	1	1			1
	Maya Commitment Date	Sep-12	Sep-11	Sep-12	Sep-12	Sep-13	Sep-12	Sep-11	Sep-11	Sep-12	Sep-13			Sep-11
	Maya Member Agency	Microcredit Regulatory Authority, Bangladesh	Banque Centrale de la République de Guinee	Bank Indonesia (BI)	Bank Negara Malaysia (BNM)	Bank Al-Maghrib Morocco	Banco de Mocambique	Central Bank of Nigeria	State Bank of Pakistan	Ministere de l'Economie et des Finances du Senegal	Bank of Sierra Leone			Bank of Uganda
Institutions Involved	Commitment Under FISPLG (Financial Inclusion Strategy Peer Learning Group)	1							1	1		1	1	1
	Institutions Involved	Microcredit Regulatory Authority and Bangladesh Bank	Banque Centrale de la République de Guinee	Vice President's Office, Ministry of Finance and Bank Indonesia(BI)	Bank Negara Malaysia (BNM)	Bank Al-Maghrib Morocco	Banco de Mocambique	Central Bank of Nigeria	State Bank of Pakistan	Ministere de l'Economie et des Finances du Senegal	Bank of Sierra Leone	Ministere de l'Economie et des Finances du Togo	Republic of Turkey Prime Ministry, Undersecretariat of Treasury	Bank of Uganda
	Central Bank Involvement	1	1	1	1	1	1	1	1		1			1
	Central Bank Lead?		1	0	1	1	1	1	1		1			1
Financial Indicators	EAS deposit account average annual growth rate (%)	5.49	5.92	4.59	3.27	11.86	16.47		8.41	8.27			9.44	9.91
	Proportion of Adults (age 15+) with Bank Account Access	39.55	3.69	19.58	66.17	39.07	39.90	29.67	16.31	5.82	15.34	18.19	57.60	20.46
Targets	Numeric Targets				1	1		1			1			
	Number of Concrete Targets	7	4	6	8		2	3	10	6	7			1
	Number of Concrete Targets Achieved by 2013	1	0	0	4		0	1	3	3	0			0

Source: Based on AFI (Alliance for Financial Inclusion), World Bank

Appendix 2. Financial Inclusion Policy Framework (con't).

	Country	Bangladesh	Guinea	Indonesia	Malaysia	Morocco	Mozambique	Nigeria	Pakistan	Senegal	Sierra Leone	Togo	Turkey	Uganda
Policy Areas of Commitment	Mobile Financial Services	1			1					1	1			1
	Consumer Protection	1	1		1	1			1					1
	Financial Literacy	1	1	1	1	1			1					1
	Microinsurance	1			1				1					
	Microsavings			1	1									
	Microcredit	1	1		1	1			1	1	1			
	Agent Banking	1	1		1				1					
	Credit Information Systems	1												
	Dedicated Financial Inclusion Unit in Regulator or Ministry of Finance			1										
	What is dedicated Financial Inclusion Unit called?													
	Data and Measurement				1	1			1	1	1			1
	Progress Monitoring				1									
	Regulatory Framework	1	1	1	1				1	1	1		1	
	Alternative Financial Products and E-money Framework			1	1	1								
	Payment System Strategy (Channeling social payments through financial accounts and remittance strategy)										1			
	Financial Identity			1										
	SME Development				1	1								
	Women Empowerment													
	Expansion of Financial Services Infrastructure					1					1			

Source: Based on AFI (Alliance for Financial Inclusion), World Bank

Paper No. 8

FINANCIAL LITERACY FOR INCREASING SUSTAINABLE ACCESS TO FINANCE

Ramesh Prasad Chaulagain*

Abstract

Policies and practices of Nepali financial sector are focused to supply service providers in recent years to increase 'access to finance'. As a result, the numbers of financial institutions are growing rapidly and reached to 197 and their 3,617 branches. Additionally, around 31,500 cooperative societies among which around 13,500 saving and credit cooperative societies are also doing the similar functions in the same market. But, the qualitative reinforcement and sustainable access to finance is questionable. The expansion of service providers also are concentrated in urban areas by which unequal distribution of supply sided access to finance is being practiced. The paper argues, in this regard, whether the expansion of BFIs assures the excess to finance and its sustainability or there are some other sections of the issue of demand sided approach too. The data shows the growth of financial sector and increment in number of population in financial transactions but the primary data shows that such the expansion is necessary but not sufficient condition to assure access to finance and need to empower the people through financial literacy and others.

JEL Code: G21, G29

Key words: financial literacy, financial capability, sustainability, financial inclusion, financial access,

Introduction

This paper primarily, aims to establish a rational linkage of financial literacy and accessing the people in financial services. Secondarily, the paper also aims to discuss about quantitative expansion of financial service centers, outlets and growth volumes of financial transactions are not sufficient conditions to maintain financial inclusion and thereby enhance access to finance. From quantitative perspective, data shows a significant growth of financial service providers, amount of transactions to claim increasing pace of access to finance. But from the qualitative aspect, there are other aspects of financing people to enhance their sustainable access to finance as well. Access to finance, in this sense, is also to address by empowering the consumers and considering demand side factor.

To collect primary data, some interviews, under interpretative paradigm of research, with structured questions were conducted. Under this paradigm of research, researchers 'make sense of (or interpret) the meanings others have about the world' (Creswell, 2009). Some of secondary sources are used to present the numerical data in the paper. Two persons, one as a financial sector regulator and one as a financial sector role player, are selected purposively as mentioned by Yin, (2011). In the same line, Teddlie and Tashakori, (2009) have explained a limited number of sample

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sizes, i.e. below than 30, in qualitative study, selected on the basis of personal judgment of researcher. The list of interview participants including date and venue/institutions of interviews is presented in annexure I.

Access to finance is a growing concern around the world, particularly in the under developed and developing countries. Access to finance is strongly associated with poverty reduction worldwide (World Bank, 2008). Similarly, Nepal Rastra Bank, (2011) in its project report mentioned that providing access to financial services to the poor, marginalized and excluded segment of people would help their livelihood better-off. Similarly, Kendal, Mylenko, and Ponce, (2010) argued that the rise of financial inclusion as an important policy goal is due in part to mounting evidence that access to financial products can make a positive difference in the lives of the poor. There is finding of a positive relationship between and among the financial literacy as a supply side consideration, financial inclusion and financial access. The study helps to explore the issue of financial literacy in terms of access to finance.

The study is useful in three-folds, i.e. for policy makers and regulators, service providers of financial businesses and the consumers of the financial services, i.e. depositors and borrowers of the financial market. The regulation and supervision cost is possible to minimize through financially literate consumers. The service suppliers could minimize their counseling efforts and thereby operating cost. There might be possibility of decrease in indebtness and defaults too. Similarly, the consumers would be aware of financial services by which they would involve in sustainable and consistent financial services.

The Context

Quantitative growth of Nepali financial system is rapidly increased since the 1990s, when the economy was stepped towards liberalization. Nepal Rastra Bank, (2014) states that the reason behind the quantitative growth of banks and financial institutions was the financial liberalization. Within the expansion of the financial system, banking system has a significant stake. The structure of the Nepalese financial system is presented in Annexure II.

As the quantitative growth of financial institutions is increased, it is now easy to say that more people are getting more financial services from them. In this connection, access to finance is the issue to reach the banking services to the people and/or to reach the people in formal financial services. For this, many efforts from the beginning are being made in Nepal. One of the basic objectives of NRB act 2002 was also to expand the banking services to the people. According to Nepal Rastra Bank, (1996) the efforts made to increase banking and financial access of the people in financial services were establishment of Nepal Bank Limited (1937), Ratriya Banijya Bank (1966), Agricultural Development Bank (1968), and some of cooperative societies as the first phase of financial expansion.

From this, the small picture of the efforts for accessing the people in financial services could be seen, but it is quite difficult to assume how much these efforts were being successful. In the second phase, according to the same document, some of joint venture banks were also established. On the same ground, Paudel, (2005) opined the financial sector was liberalized from the beginning of 1990s, as a result new banks and financial institutions were established, from which the efforts of enhancing access of people in financial services was entered into third phase. The ongoing phase is concerned about controlling/minimizing the quantitative growth of the financial

institutions, which are concentrating in urban areas and enhancing the access of rural, marginalized and excluded people in financial services.

The distribution of financial service growth is not unanimous in the country, although we have dual sector of Nepalese economy that comprises rural and urban. In this, most of the banks and financial intermediaries are seen interested to establish in relatively accessible, developed and urban areas. The picture of the regional distribution of these institutions can be seen in the following table. The table shows that the establishment of banks and financial institutions are dense which hold the urban cities and physical accessibility. There is a wider difference between Karnali and Bagmati zone as shown in Annexure III.

In this connection, the Nepal Rastra Bank, (2010) has paused the new licensing policy and process to the purely commercial financial intermediaries, i.e. class A, B, and C since its monetary policy for the fiscal year 2010/11. From this effort, NRB is working to downsize the number of financial intermediaries in one side, and applying promotional strategies for D class micro financial institutions in those districts where the access if found relatively poor. The common objectives of these policy stands are increase the access to finance of those people who are marginalized, excluded and minorities.

Some Indicators of Measuring Access to Finance

Consultative Group to Assist the Poor, (2009) has summarized three major categories of measuring access to finance in its survey report, i.e. savings and payments, credit, outreach or the coverage of delivering financial services such as BFI branches, automated tailoring machine (ATM). The survey was conducted in 144 countries including OECD countries. In the report, the deposit and credit values are compared with GDP values whereas the physical expansions of the services are presented in numbers in terms of rural and urban. Suarez, (2010) categorizes two broader indicators to measure access to finance in her background paper through OECD development centre, i.e. deposit and credit to deposit ratio, and physical expansion of financial service providers (BFIs) such as branches and their ATMs.

Kendal, Mylenko and Ponce, (2010) in a World Bank Study, have highlighted the indicators of access to finance in terms of number of bank accounts (saving, credit), outreach (ATM, number of branches per 1 lakh people, adult population and BFI braches ratio, number of branches per sq. K.M area), saving and credit to GDP ratio. From these references, it is summarized that the common indicators to measure the access to finance are growth of saving, credit, remittance, investments and expansion of branches of financial intermediaries, its ATM machines etc. The 2006 Access to Financial Services Survey done by Ferrari, Jaffrin, and Shrestha, (2007) has mentioned the measuring indicators of access to finance are financial service receiver people by per branch BFIs such as access to deposit, credit and payment services, opening bank account, increment in loan, increment in savings, increment in BFIs assets, monthly average saving, average credit outstanding, growth in number of BFIs.

Problems

As 2.5 billion people worldwide still lack access to formal banking services, credit facilities, or savings instruments, bringing this largely ignored missing market into the formal financial system would enrich and strengthen the global economy (Nepal Rastra Bank, 2014, p19). The same report has also mentioned that ninety to hundred percent of working age people in the rural areas are

out of access to formal financial system in Nepal. Atkinson, A. and F. Messy, (2013) mentioned in OECD working paper about 2.3 Billion of working age adult world side are excluded from financial inclusiveness. It shows the poor situation of expenditure management, borrowing, saving, and investing from formal financial system and it also shows the possibility of exploitation by informal and shadow banking practices to the people.

Government of Nepal, (2014) highlights that in spite of physical expansion of financial service providers in the country, around 70 percent of people are out of formal financial access (p98). To solve this, coordinated efforts of central bank and the government through fiscal and monetary policy are necessary. The report does not only state the inadequate expansion of physical expansion of financial intermediaries, but also explores the unequal distribution of such the expansion within the country, for example some districts such as northern areas of the countries. Remote areas remain very poorly-served by formal financial institutions compared with urban areas (p22).

Ferrari, Jaffrin, and Shrestha (2007) mentioned in a World Bank survey report on access to finance about unfair concentration of financial intermediation in privileged areas that the poor accessible are of financial service expansion areas. They argued that only increasing number of financial intermediation does not assure the quality financial access, its sustainability and satisfaction of service consumers. Ferrari, Jaffrin, and Shrestha, (2007) explored that access to bank accounts and use of payment services is worse in rural Nepal than in rural India (p16).

In the same line, Consultative Group to Assist the Poor, (2009) explored that about three billion people in the world are out of formal access to financial services due to which they are unable to achieve their financial welfare. The survey report said that because the lack of access to financial services prevents poor and low-income people from making everyday decisions that most people around those dinner tables take for granted (p1). From these references, it is argued that merely expanding BFIs branches are inadequate, although such the expansion is more concentrated in urban areas, how people made empower and enable to consume such supply sided services.

Linking Financial Literacy with Access to Finance

Australian Securities and Investments Commission, (2014) defines Financial literacy as a combination of knowledge, skill, attitude and behavior on usual financial matters. Program for International Student Assessment, (2012) has added some of understanding and concept of financial risk, financial motivation and confidence of financial matters and decision making in the definition of financial literacy. Similarly, Organization for Economic Cooperation and Development, (2005) as a pioneer researcher institution in the world, has broadly defined the financial literacy in terms of skill development and enhancing access to financial services on the basis of informed choices among financial alternatives. It also has connected the financial literacy with financial well-being of individuals. There are several other definitions, explanations and explorations of financial literacy, whereas the core elements are the financial awareness, ability, perceptions and actions regarding the personal financial matters. Therefore, there is rationale expectation that financial literacy is a key possible remedial aspect of the people to enhance access to financial services.

The strategic plan, a milestone financial document to achieve financial stability, growth and justice has documented that a larger segment of population have poor access to formal financing. The same document has also highlighted the importance of financial literacy for marginalized and poor segment of people. Financial literacy will be enhanced focusing specially on women, victims of

conflict, ethnic minorities, deprived and marginalized section of population (Nepal Rastra Bank, 2012, p31). It shows the close and positive linkage of financial literacy to increase the access to finance. Similarly, Government of Nepal, (2014), in its economic survey has mentioned about weaker access to finance situation and weaker inadequate financial inclusion in the country. The review report prioritizes increasing financial literacy of the people to increase such the access and achieve such the inclusion.

Nepal Rastra Bank, (2014) mentions in its monetary policy that every steps of the bank is to achieve financial inclusion and access to finance and it is to be linked with financial literacy and financial consciousness of rural people. It also indicates that the financial knowledge, consciousness and skill of the individuals are the bases for financial inclusion and access. According to the same policy, the bank is preparing the financial literacy strategy to increase the access to financial services of the people and enhancing their capability for use of financial instruments.

The Financial Stability Report of Nepal Rastra Bank, (2014) has also explained that there is close relationship of access to finance, financial education and financial literacy. In other words, to increase outreach of the financial services of deprived, marginalized and excluded segment of people, financial literacy and debt counseling are significant. Financial literacy is critical for promoting access to finance by creating incentives and environments that promote desired financial behaviors such as saving, budgeting, or using credit wisely (The World Bank, 2009). The report says that financially literate consumers of financial services can better select the appropriate financial services at competitive cost, and thereby the access to finance would be consistent and sustainable.

In the same line, Wachira, (2012) has opined that household financial matters are the factors affecting to accessing them in financial services and said that in order to understand the link between household financial decisions and financial literacy, there is need to understand households effective numeracy strength, as well as the connection between financial literacy and access to credit services (p2). His study found that financial literacy is positively related to access to financial services. He further argued that knowledge and skills on financial matters helps to select useful financial services with lowest possible cost that helps for sustainable use of such services.

Nepal Rastra Bank, (2011) in its project report of Enhancing Access to Financial Services, has mentioned that promoting financial literacy among poor, women, minorities, disabled, dalits would be a good ways to achieve access to financial services of them. Similarly, Atkinson & Messy, (2013) have also clearly mentioned in their OECD working paper that the target of financial literacy is to achieve financial inclusion and enhance access of the people in financial services. They have also argued that the financial illiteracy is a supply side barrier for poor financial access and inclusion both.

Summarizing, from all the studies and other documents conclude in the same line that there is close relationship between financial literacy of a person and his/her consistent access to particular financial service behavior. But it is quite difficult to say by how much the access to those financial services are affected by how much financial knowledge and skills. It is so, the relative concept that is unable to quantify the interrelationship of these two domains. Another, it is also not that easy to say which one modality of financial literacy intervention is useful to enhance access to finance in particular segment of people. It means that there is not any 'one-size-fits-all' solution to make

the people financially literate. It is so a contextual, relative and ever changing issue of personal financial knowledge, skill and behavior.

Some efforts to increase access to finance:

Nepal Rastra Bank has played a leading role in increasing the expansion of banking services and building public confidence in financial system from the beginning. There are several policies, efforts and reforms are developed in this regards. Most of the financial plans, policy, and strategies are directed towards facilitating the people in financial service with this and that ways. But it is quite clear that the socio-economic condition of the country is largely diversified that invites a multi-angled efforts to solve the problems of financial inaccessibility. It also means that, one-size-fits-all strategy will not work (Consultative Group of Assist the Poor, 2009, p4) in this regards. Contextual, time specific, and capacity specific remedies are useful to enhance qualitative and quantitative access to finance.

In this reference, the NRB act 2002 has mentioned its fifth objective as to increase people's confidence towards financial system. It means that people should be eligible, accessible and capable to consume their services provided. The NRB has the role to play to achieve this objective. Strengthening the resilience of the banking system and promoting public confidence are major concerns of the central bank (Nepal Rastra Bank, 2012).

Nepal Rastra Bank, (2012) has mentioned in its five year strategic plan about how to achieve access to finance. The growth of banks and financial institutions in the last two decades has been primarily urban centered. Thus a large segment of rural households does not have access to formal financing (p30). It is anticipated that by mid-July 2016, about two-third population will have access to formal financing (p31). Some recent efforts are:

Nepal Rastra Bank, (2014) has mentioned some directives to provide concessional deprived sector credit to Dalit, freed Kamaiya, Badi, Haliya, victims of conflict, single women, disabled and old aged citizens (p32). The districts having poor access to finance are Manang, Humla, Dolpa, Kalikot, Mugu, Jajarkot, Bajhang, Bajura, Darchula (p33). "Only about 30.0 percent of the adult populations have a bank account in the formal financial institutions which is fairly below as compared with other countries in the world and especially with South Asian countries. Remote areas remain very poorly-served by formal financial institutions compared with urban areas" (p22).

Government of Nepal, (2013) has also focused to enhance access to finance through banking services in its three year of comprehensive development plan.

Government of Nepal, (2010) had also focused in its twelfth three year comprehensive development plan to increase financial access. The document has stressed that the financial access of the rural people is very poor (p40).

"D" class institutions are receiving the license on a selective basis as microfinance financial institutions can be an effective means for financial inclusion and poverty elimination in rural areas (Nepal Rastra Bank, 2014, p103). Indirectly, such the practice to control the new licensing to A, B and C class financial Institutions affects the access to finance adversely. But the efforts to include the rural sector, women, marginalized, minorities and excluded segment of people are expected to include in financial mainstream with the efforts of D class financial intermediaries.

To enhance financial inclusion and access to finance, a provision of granting interest free loan up to Rs. 2 million has been made for MFFIs for opening branch in 22 remote districts where presence of micro finance service is minimal. Such facility can be enjoyed for up to two branches established within first six months of this fiscal year (Nepal Rastra Bank, 2014, p109). This could facilitate the hardcore financial group of people.

"On the policy front, legal frameworks regarding the establishment of Micro Finance Authority and National Micro Finance Fund are under-way; the merger process of five rural development banks is at the final stage; a separate unified directive for 'D' class MFIs has been already put in place; revision of directives issued to cooperatives licensed by the NRB is under consideration; FINGOs have already been asked to transform themselves into 'microfinance financial institutions within a stipulated time frame; formulation of National Financial Literacy Policy is underway and different public awareness programs, including 'NRB with Students' program are being carried-out on the financial literacy front; and priority has been given to set a separate credit information agency for the micro finance institutions. All these initiatives are expected to promote financial discipline and corporate governance; increase financial soundness and ultimately contribute for the financial stability as a whole" (Nepal Rastra Bank, 2014, p109,110)

It has now been made mandatory to open at least three branches outside the valley to establish a branch within Kathmandu Valley and among them, one branch should be in one of the least branch districts. Among the remaining two branches, at least one should be outside the head quarter or municipality. Within the Kathmandu Valley also, priority will be given to establishment of branches outside the ring road area or in V.D.C.s (Nepal Rastra Bank, 2014, p111).

Nepal Rastra Bank, (2014) emphasizes that the financial literacy is a promotional tool for increasing access to finance for which, financial literacy policy and strategy are necessary to formulate. It has two implications, i.e. effective role of financial literacy to increase the access of people and ongoing effort to increase access to financial services. In the later years, the tensions of policy makers are not limited in expansion of financial services but also empowering the consumers through financial literacy as well.

Data and Discussions

The table in annexure IV shows a consistent growth of financial institutions including saving and credit cooperative societies (SACCOS) during the seven years period. The growth of class D financial institutions and SACCOS are more consistent rather than the others. The table only shows the number of institutions licensed not their branches. The table in annexure V shows the branches of these financial intermediaries. The table also shows a consistent growth of BFIs branches except class C in later years. Here, NA represents the unavailability of the data. While talking about the access to finance, the density of BFIs branches are also important that also shows the concentration of these services geographically. Top ten districts having most financial access and bottom ten districts having least financial access are presented in the table as shown in annexure VI. The table and data is based only on the total branches of banks and financial institutions, i.e. A, B, C, and D. The total population of Nepal according to the latest census is 2,64,94,504 (Center Bureau of Statistics, 2011). According to the table, Bajura is the least and Manang is the most dense districts from supply sided access to finance perspectives. Similarly, the table in annexure VII shows the situation of some of the additional indicators of access to finance during seven years period in the country.

The table shows a consistent growth of deposit, credit and assets of banks and a financial institution, which helps to generalize that the access coverage of people in financial services is in increasing order in these year. Almost the amounts of saving, credit and assets of banks and financial institutions (excluding SACCOS) is found consistently increased. It is clearly found that the stake of total deposits in GDP is reached to 78.84 percent and per capita deposit has been reached to rupees 57 thousand and above.

Similarly, there are some of other indicators to show the access of people in financial services as the table in annexure VIII. In the table, we can see the number of deposit account reached to more than the half of the total population. But, Consultative Group to Assist the Poor, (2006) estimates that about one third of total deposit accounts of the developing countries are multiplied (p6).

Qualitative data and data analysis

The interview participants argued that only increasing the service providers, increment amount of saving and credit, do not necessarily assure the sustainable access to finance. The reason behind this arguments are of two fold; there is still lack of how the service providers are making the consumers capable enough with available services for the long run and also the supply sided expansion is more concentrated in urban and relatively developed areas of the country. The data, views and arguments derived from them are coded broadly into following themes and thereby described.

Concept of access to finance and financial literacy

Access to finance is a process of increasing vertical and horizontal expansion of financial services and service providers according to need of people. The services are, normally, the saving, credit and remittances. Some of efforts of enhancing access to finance are practiced in the country, still a larger segment of people are out of such a reach. It is so, the actions are required to modify and emphasized to include them in financial mainstream. In another side, the financial literacy is financial knowledge and know-how to empower the existing clients and potential clients for their sustainable use of financial services from formal financial institutions. The financial literacy is fundamental to save the people from financial fraudulences and exploitations, helps to decrease cost of financing and risk, helps to control multiple financing and useful to promote fair financial competitiveness as well.

Links of financial literacy and access to finance

The participants have the unanimous opinion on the relationship of financial literacy and access to finance. There is strongly positive and effective relationship between these two domains. Financial literacy is one of the ways to make the people conscious, capable and motivate for taking better financial decisions. It is one of the ways making the people capable to select the appropriate financial tools and for sustainable use of it. Financially literate people also claim of their financial right as economic citizen. There are two usual questions while exploring the access to finance and financial literacy as its one of the demand pull factors; why the persons need to reach in financial services and what is the role of financial literacy for this. Tseng, (2011) argued in his PhD thesis that the capability is better and valuable wealth of an individual than financial and non-financial wealth. It means that making financial and non-financial aids and privileges are less effective

enough than making them capable to do something. Similarly, Welch, (2002) explained that disability and poverty have double razed; one promotes next and vice-versa. It means that to reduce the burden of poverty, some of capabilities are necessary to enhance. For this, one of the ways is making the persons capable to understand, evaluate and behave rational financial activities in their regular lives. It makes them independent, capable and sustainable as Sen, (n.d.) described quality of human life is basic issue of capability approach.

Ways forward to increase access to finance

Some of the ways forward the access to finance are; promoting financial literacy, increase the knowledge and skill of financial role players, conducting market research to identify potential financial service clients, continuing the credit plus activities in rural areas particularly, developing financial and non-financial infrastructures, providing some incentives to motivate the service providers. These ways forwards are useful to maintain qualitative and quantitative tools to enhance access to finance.

Summarizing, the common views of the participants are in favor of both of qualitative and quantitative growth of financial services in the country. The quantitative growth concerns about increment of BFIs and SACCOS whereas the qualitative growth considers how more people are motivated towards the financial services and using these services in sustainable ways. Present efforts of access to finance seem less effective because the people are assumed less financially literate. They are unable to express their demand, unable to make their financial plan and are less conscious about financial service in more extent.

Conclusions

There is increasing level of quantitative growth of financial services and institutions which normally show the positive trend of increment in access to finance. Still, there is doubtful situation of multiple financing (NRB, 2014) and duplication of deposit accounts (CGAP, 2006). The distribution of such the financial service suppliers are unequal, i.e. more concentration in urban areas than the rural areas of the country. "Despite rapid growth in the number of banks and financial institutions, a large proportion of rural population does not still have access to formal financing. During the plan period, policies will be designed to promote inclusive banking and increase the financial outreach to two-third of the total population" (Nepal Rastra Bank, 2012, p4).

In the same line, NRB, (2011) has raised the question on merely quantitative growth of financial services and service providers and has asked where is the quality or demand side satisfaction, the consistent involvement of consumers, the sustainability of these services and the positive impact of these so called increased accesses to finance? There is need to assess the impact of these services to make the people capable enough in consuming, utilizing and sustaining the available financial services. Access is not only about having a bank account, but also is about the convenience and safety of the account and whether these services are fairly priced, meet the needs of customers, and are offered by a solid institution that will be around over the long haul to help its customers manage their financial lives (CGAP, 2006).

Another question regarding the access to finance is inter-linkage of financial services with other social aspects such as education, empowerment, migration, equity and equality, poverty reduction, social cohesion and harmony, health consciousness, and nation building etc. Every intervention should have the ultimate target to change the lives of the people and transforming them from

usual cognition, behavior and well-beings. The policy makers and role players should know how far the financial interventions and efforts are able to transform the people, otherwise these efforts are meaningless.

Roles of financial activists, market research to know the financial need of people, and the financial literacy are some of keys to promote access to finance. Among them, financial literacy is more useful tool make 'economic citizen'. The policy makers, in this regards, should be aware of formulating financial literacy strategy and similarly the actions plans for promoting it. The financial literacy is also vital to protect 'client right' that is required to formulate from policy side and from educating the people. Still, financial literacy is 'necessary but not sufficient condition' for enhancing access to finance.

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Annexure I

List of interview participants and plan

S.N.	Name of Participants	Designation	Institutions	Interview Date
1	Mr Chintamani Siwakoti	Act. Executive Director	Nepal Rastra Bank	2015/01/09

2	Mr BhojRaj Basyal	Deputy General Manager	Nirdhan MF Bank	2015/01/14

Annexure II

Structure of Nepalese financial system

S.N.	Nature of Institutions	Number
1	Commercial Banks	30
2	Development Banks	82
3	Finance Companies	51
4	Micro Finance Development Banks	34
5	Savings and Credit Cooperatives*	13,378
6	NRB Licensed FINGOs	28
7	Insurance Companies	25
8	Employees Provident Fund	1
9	Citizen Investment Trust	1
10	Postal Saving Bank	1

Source: Nepal Rastra Bank, Banking and Financial Statistics, Oct-2014

Source: *=Department of Cooperatives

Annexure III

Regional Distribution of Financial Intermediaries

S.N.	Zones and Regions	Class A	Class B	Class C	Class D	Total	Population
1	Mechi	81	30	8	71	190	

2	Koshi	151	67	14	105	337	
3	Sagarmatha	72	12	4	68	156	
	Eastern Development Region	304	109	26	244	683	58,11,555
4	Janakpur	83	37	4	82	206	
5	Narayani	162	114	21	117	414	
6	Bagmati	567	166	111	89	933	
	Central Development Region	812	317	136	288	1553	96,56,985
7	Gandaki	111	125	32	65	333	
8	Lumbini	135	138	29	94	396	
9	Dhawalagiri	38	29	5	21	93	
	Western Development Region	284	292	66	180	822	49,26,765
10	Rapti	55	36	5	41	137	
11	Karnali	14	0	0	5	19	
12	Bheri	77	40	4	42	163	
	Mid-western Development Region	146	76	9	88	319	35,46,682
13	Seti	55	15	2	39	111	
14	Mahakali	37	13	0	22	72	
	Far-western Development Region	92	28	2	61	183	25,52,517
	Grand Total	1638	822	239	861	3560	2,64,94,504

Source: Banking and financial statistics, Oct 2014: Nepal Rastra Bank

Annexure IV

No of Banks and Financial Institutions

S.N.	MP year	Class A	Class B	Class C	Class D	SACCOS	Total
1	2014/15	30	84	53	37	12,983	13,187

2	2013/14	31	86	59	31	12,614	12,821
3	2012/13	32	88	70	23	11,392	11,605
4	2011/12	31	87	80	21	10,558	10,777
5	2010/11	27	79	79	18	8,000	8,203
6	2009/10	26	63	77	15	NA	181
7	2008/09	25	63	78	12	NA	178

Source: Monetary policy (from 2008 to 2014), Nepal Rastra Bank: data compiled by author

Annexure V

No of Branches of Banks, Financial Institutions except SACCOS

S.N.	MP year	BA	BB	BC	BD	Total
1	2014/15	1547	818	239	826	3430
2	2013/14	1486	764	242	634	3126
3	2012/13	1369	686	331	550	2936
4	2011/12	1098	495	281	425	2299
5	2010/11	966	NA	NA	NA	966
6	2009/10	681	NA	NA	NA	681
7	2008/09	178	NA	NA	NA	178

Source: Monetary policy (from 2008 to 2014), Nepal Rastra Bank, compiled by the author

Annexure VI

The districts having most and least financial access in Nepal

S.N.	Districts	Total population per branch	S.N.	Districts	Total population per branch
1	Bajura	67,456	1	Manang	2,179

2	Bajhang	65,053	2	Mustang	2,242
3	Jajarkot	57,101	3	Kaski	3,076
4	Kalikot	45,649	4	Kathmandu	3,335
5	Bhojpur	36,492	5	Chitwan	3,694
6	Baitadi	35,843	6	Lalitpur	4,180
7	Khotang	34,385	7	Rupandehi	5,030
8	Darchula	33,319	8	Rasuwa	5,413
9	Rukum	29,795	9	Kavre	5,535
10	Okhaldhunga	29,597	10	Bhaktapur	5,859

Source: Nepal Rastra Bank (Banking and Financial Statistics, 2013 July)

Annexure VII

Some financial access indicators (Rupees in Millions)

SN	Indicators	07/2008	07/2009	07/2010	07/2011	07/2012	07/2013	10/2014
1	Amount of total deposits	5,08,90,5	6,74,58,4	7,88,08,3	8,73,48,8	10,76,62,9	15,57,27,8	15,20,42,5
2	Amount of total credits	3,91,53,7	5,11,75,2	6,20,83,7	7,18,67,4	8,07,57,9	9,79,12,1	11,80,75,2
3	Total assets of BFIs	7,06,32,4	9,88,87,8	10,26,59,5	11,66,21,4	13,80,97,1	16,20,69,5	19,13,85,0
4	Nominal GDP	8,18,40,1	9,60,01,1	11,70,99,3	13,45,76,7	15,58,17,4	17,01,19,1	19,28,51,7
5	Total Deposits/GDP	62.18	70.27	67.30	64.91	69.10	91.54	78.84
6	Total Credit/GDP	47.84	53.31	53.02	53.40	51.83	57.56	61.92
7	Total assets of BFIs/GDP	86.31	103.01	87.67	86.66	88.63	95.27	99.23
8	Per capita deposit (Rs)	21,982	29,138	34,040	32,969	40,636	58,777	57,386

Source: Banking and financial statistics, October 2014, Nepal Rastra Bank

Annexure VIII

Some other indicators of access to finance

S.N.	Indicators	Situation
1	Density of BFI branches	9,816
2	No of deposit accounts	1,44,16,701
3	No of credit accounts	9,49,777
4	No of people using debit cards	41,45,405
5	No of people using credit cards	59,352
6	No of ATM machines	1,676
7	Deprived sector credit/total credits	5.16

Source: Monetary policy (from 2008 to 2014), Nepal Rastra Bank, compiled by the author

Paper No. 9

Micro Finance and the Financial Inclusion- A Role of Government

Dr. Channaveere Gowda B.N and Dr. Rohini.V.S*

Abstract

Microfinance has assumed immense importance throughout the world in view of its efficacy in credit dispensation, loan repayment and reduction of poverty. It has been recognized as an important tool in connecting the unbanked population to mainstream finance. Providing financial access to the poor by linking them with financial institutions (banks) has always been an important priority of every government. Financial inclusion, implying expanding access to financial services to those currently not accessing them, is an important objective in many developing countries. Financial inclusion is instrumental to the inclusive growth process and sustainable economic development of the nation. There has been an increasing awareness and realization that financial services hold the key to mainstreaming the poor and disadvantaged with the development of the country. Inadequacies in rural access to formal financial system and the seemingly extortionary terms of informal finance for the poor warrant a strong need and ample space for innovative approaches to serve the financial needs of rural poor. Over the last decade and a half, toils have been made by government financial institutions, and NGOs, often in partnership, to develop new financial delivery approaches. Financial inclusion stands for provision of important financial services like credit, savings, insurance and remittances at an affordable cost to the disadvantaged, marginal and low-income groups across sections of the society. The primary goal of financial inclusion is to broaden the scope of activities of the formal financial system that could tag the poor people with low incomes into formal financial system in a gradual manner with focus on freeing the poor people from poverty. The demand for greater financial inclusion is vast. Millions of people around the world are currently unable to access financial services, due to factors such as their cost, lack of access, and inadequate financial literacy and financial education. According to the World Bank sources, over 2.5 billion adults are estimated to lack access to formal financial services and a vast majority of low income people with access are under-served. Over 50 developing countries are either implementing national financial inclusion strategies or in the process of developing such strategies and central banks are playing a major role in efforts in developing and emerging economies. This research paper is based on the secondary information for theoretical and analytical purpose. Also highlight certain financial inclusion measures taken by the Government of India and the Reserve Bank of India in this regard and outline their efforts and achievements as well as the constraints faced by each initiative.

Key words: Microfinance, Financial inclusion, Developing countries, Reserve Bank of India, World Bank

Introduction: Micro finance has become one of the most important discussed issues in the last three decades all over the world. Today Micro finance programmes and institutions have become increasingly important components of strategies to reduce poverty and promote micro and small

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enterprise development, apart from the unorganized financial sector. The organized financial sector has been emerging in a big way to participate in the micro finance movement, especially in the rural areas. Micro finance, being a participative model, can address the needs of the poor especially women members. It envisages the empowerment of the members by promoting their saving habits and extending bank loans to them. Robinson (2001) defines Micro finance as small scale financial services, primarily credit and savings, provided to people who farm, fish or herd and adds that it refers to all types of financial services provided to low income households and enterprises.

In the emerging economy like India, where majority of the population resides in rural areas, rural development becomes imperative for economic development. And for the rural development, poverty reduction needs to be the core focus of all development programmes. Though the Government of India (GOI and Reserve Bank of India (RBI) have been initiating various poverty alleviation programmes since independence, not much progress could be marked. Micro finance is one such intervention aiming at poverty reduction by providing basic financial services to the underserved section of the society at affordable terms.

Objectives: The overview of the study presented in this paper is to provide a detailed analytical framework, based on theoretical considerations and practical experience for considering the role Government (GOI) and the of Reserve Bank of India (RBI) in Micro finance and financial inclusion in the country.

Methodology: This study is purely based on the secondary information. The information has been collected from various sources like journals, books, manuals, and reports of the concerned literature. The study is mainly focused on recent developments in micro finance sector towards financial inclusion in emerging countries like SAARC countries in general and India in particular.

Review of Literature: The basic idea of microfinance is to provide credit to the poor people who otherwise would not have access to credit services. Micro-credit programmes extend small loans to very poor people for self-employment projects that generate income and allow them to take care of themselves and their families. This programme is working in many developing countries. There is no dearth of literature related to microfinance. In order to find the impact of microfinance programme, impact assessment studies have been done by many authors in different countries like Bangladesh, India, Pakistan, Nepal, Thailand, Ghana, Rwanda, Peru and many other countries of South Asia and Africa. A bird-eye- review is presented in the following paragraphs.

Empirical studies (including those cited in Duvendack et al., 2011) have shown that there is no strong evidence of net income gains for borrowers through this process. Indeed, given the nature of the loans (small amounts given for short durations at very high interest rates), this is scarcely surprising. Banerjee et al. (2010) found, on the basis of a randomized controlled trial of households in Hyderabad, India, that existing business owners appeared to use microcredit to expand their businesses, while (poorer) households with low predicted propensity to start a business increased their spending on non-durable items, particularly food. The study found 'no discernible effect on education, health, or women's empowerment'. Often, those who showed some benefit were those who had higher and more secure incomes to start with, as Snodgrass and Sebstad (2002) showed for Zimbabwe. A study of north-east Thailand (Coleman, 2006) found that microfinance borrowers tended to be significantly wealthier than their non-participating neighbors. The wealthiest villagers were nearly twice as likely to become borrowers as their poorer neighbors and the wealthiest were also more likely to use their power to obtain much larger loans than others. A study in India

(Dewan and Somanathan, 2007) similarly found that participation of the poorest households in microcredit is disproportionately low.

Ashe and Parrott (2001) conducted a study on the women empowerment programme in Nepal and showed that 89,000 out of 1,30,000 or 68 per cent of women in the programme experienced an increase in their decision-making roles in the areas of family planning, marriage of children, buying and selling property and sending their daughters to school. These all areas of decision-making were traditionally dominated by men.

The studies by Anita Campion (2000) and Basu and Srivastava (2005) review the objective of these MFIs to be reducing poverty. Further co-existence/linkages between the private sector/micro finance, banking sector, NGOs and the government and its effective contribution towards development has also been observed. While Otero (1999) tries to define MF as the provision of financial services to the poor, Ledger wood (1999) includes savings, credit, insurance and payment services under it. However, Shrestha (1998) of the Centre for Self-help Development (CSD), Nepal reported that women were able to make small purchases of necessary items like groceries independently. But larger purchases and personal purchases, like jewelry, always required the consent of the husband, representing incomplete progress toward empowerment in this area.

Singh (2003) had explained the failure of government initiated anti-poverty programmes and the success of microfinance programme as an effective poverty alleviation strategy in India. According to him the government-implemented rural development programmes failed because these were centrally invented (lacking participation of local level institutions), politically motivated, had leakages, misappropriation and heavy administrative expenses. Failures of these institutional initiatives and learning from the success of the Grameen Bank in Bangladesh had given way to the development of microfinance programme in India in 1992. Many NGOs who were following SHG promotion approach such as Mysore Resettlement and Development Authority (MYRADA) in Karnataka, Society for Helping and Awakening Rural Poor through Education (SHARE) in Andhra Pradesh, Rural Development Organization (RDO) in Manipur, People's Right and Environment Movement (PREM) in Orissa and Andhra Pradesh, Youth Charitable Organization (YCO) in Andhra Pradesh, Acil Navsarjan Rural Development Foundation (ANaRDe) in Gujarat, ADITHI in Bihar Professional Assistance for Development Action (PRADAN) and Rural Development Society for Vocational Training (RUDSOVAT) in Rajasthan came forward in this venture. These NGOs were proving very successful in reducing poverty level of its clients and generating additional employment opportunities.

Despite its young age microfinance sector had a diversified growth and multiplicity of impacts (on income, employment, health, education, housing and sanitation etc.) and was gaining significance in the process of development, particularly, when subsidy and grant based schemes were losing their importance. Dr. C. Rangarajan (2006), writing on the MF and its future directions, outlines the evolution of SHGs through MF, their three stages-meeting the survival requirements, meeting the subsistence level through investment and setting up of enterprise for sustainable income generation. Other studies observe the changing perception of the Bankers about SHGs which are becoming their profitable clients (Christen, 2006) and also agencies of women empowerment, especially the women entrepreneurship.

The literature on microfinance offers a diversity of findings relating to the type, functioning, contribution and level of impact of the programme. The present paper attempts to review the available literature on various related issues studied hitherto. In light of the review, an attempt

has been made to throw light on major issues like financial inclusion, role of government and central banks in strengthening financial sector through MF in India.

Micro Finance-The Concept: According to Otero (1999, p. 8), Micro Finance is the provision of financial services to low income poor and very poor self employed people. These financial services according to Ledger wood (1999) generally include savings and credit but can also include other financial services such as insurance and payment services. In simple terms Micro Finance (MF) is the supply of loans, savings and other basic financial services to the poor (www.cyap.org). The task force on supportive policy and regulatory framework for MF has defined MF as the provision of thrift credit and other financial services and products of very small amounts to the poor in rural, semi-urban or urban areas for enabling them to raise their income levels and improve living standards (Reserve Bank of India, 2005).

The history of Micro credit movement can be dated back to 1976 when Mohammed Yunus set up the Garmin Bank experiment at the outskirts of Chittagong University, Bangladesh (Mahajan, 2005). During the early 1980's a noble approach of sinking formal and informal institutions emerged where Self Help Groups (SHGs) were to act as intermediaries between micro entrepreneurs and the banks. Asian and Pacific Regional Agricultural Credit Association (APRACA) established in Indonesia in 1977 was the first one to implement such project.

MF in India traces its origin back to the early 1970s when Self Employed Women Association (SEWA) of the state of Gujarat formed an urban co-operative bank called the Shri Mahila SEWA Sahakari Bank with the prime objective of providing services to poor women employed in the unorganized sector. As elsewhere, Microfinance, in India also began as part of a developmental and poverty-reduction project, led by NGOs who thought this would be an effective way of allowing the poor to lift themselves out of poverty by their own efforts. The sector went on to involve, by 1980s, the concept of SHGs- the informal bodies that would provide their clients with much needed savings and credit services. Many NGOs began the process of group lending based on self-help groups (SHGs) and the linkage with commercial banks (whereby banks were allowed to lend to groups with a proven track record of repayment). SHGs and their federations became the intermediaries between individual clients (who were mostly women) and the commercial banking system through the SHG–Bank Linkage Programme (SBLP).

Since its beginning the sector has grown significantly over the years to become a multibillion dollar industry with bodies such as the Small Industries Development Bank of India (SIDBI) and the National Bank for Agriculture and Rural Development (NABARD) devoting significant financial resources. Today the top five private sector MFIs reach more than 20 million clients i.e., nearly every state in India and many Indian MFIs have emerged to be global leaders in the industry.

The major concern about development minded MFIs, however was that many of them did not attach importance to their financial soundness and sustainability within a reasonable period and became subsidy dependent. Thus in the nineties, the emphasis was on ensuring that MFIs were financially sound. Without self sufficient financial institutions, there is little hope for reaching the large members of the poor households.

Microfinance in India – New Dynamics: Asia has been leading the global exposure to microfinance. It is estimated that in 2010, 75% of the world's microfinance borrowers (around 74 million

borrowers) were based in Asia (Microfinance Information Exchange, 2012). Seven out of every 10 of such borrowers live in India (32 million) or Bangladesh (22 million). Furthermore, over the past decade India has become the most dynamic country for microfinance. While the number of borrowers in Bangladesh remained broadly stable in the 2000s, after an earlier period of growth in the 1990s, in India the number of borrowers increased 5-fold in just six years until 2010. In 2011, there was an estimated $4.3 billion given out as loans to around 26.4 million borrowers in India (most of whom (nearly 90%) were concentrated in just two states: Andhra Pradesh and Tamil Nadu!)

India emerges to be the world's third-largest economy (measured in terms of purchasing power) next only to US and China. The economic potential of this country, which has more than 1.2 billion inhabitants, is, however, far from being exhausted. This is because around half a billion Indians are still excluded from the formal financial sector. This enormous excess demand has driven the powerful expansion of the local microfinance sector – till recently. Lack of awareness among the masses was one of the factor in addition to which less importance to financial soundness and sustainability by the MFIs led to disruption in the sector. However, the timely and effective measures taken by the Reserve Bank of India in the wake of this crisis contributed to the sector's recovery. In addition, well-functioning credit bureaus are providing greater transparency. Furthermore, established MFIs appear to have successfully adapted their operations to the legally prescribed profit margin and interest rate limits. They have managed to enhance their operational efficiency by taking steps such as significantly expanding their client base and increasing the average loan volume granted per loan officer. The national microfinance sector has since then emerged from stronger than before. It now serves 25 million clients and has been growing by an impressive 30% to 50% per year – a rate that appears to be sustainable.

The transformation of the business models of MFIs entails both opportunities and challenges: while group loans used to be the dominant microfinance product in India, individual loans are steadily growing in significance. This is because many microfinance clients have demonstrated their creditworthiness over several credit cycles and are now demanding more flexible conditions, as well as larger loans. In contrast to easily replicated group models, however, the extension of credit to individuals is dependent on effective review processes being carried out by experienced loan officers – a requirement that large, well-established MFIs are probably best able to meet. In the coming years, the entire sector is expected to benefit from the appointment of Raghuram Rajan as the Governor of the Reserve Bank of India for he is known to be a strong advocate of the development of the financial sector and of financial inclusion. Under his leadership, the role of RBI would gain more significance. The issuing of bank licenses to MFIs should meet with support – thus promoting the growth and operational transformation of the sector.

Financial Inclusion: Providing financial access to the poor by linking them with banks has always been important priority of the Government of India (GOI) and Reserve Bank of India (RBI). "Financial inclusion is delivery of banking services at an affordable cost ('no frills' accounts,) to the vast sections of disadvantaged and low income group. Unrestrained access to public goods and services is the sine qua non of an open and efficient society. As banking services are in the nature of public good, it is essential that availability of banking and payment services to the entire population without discrimination is the prime objective of the public policy."

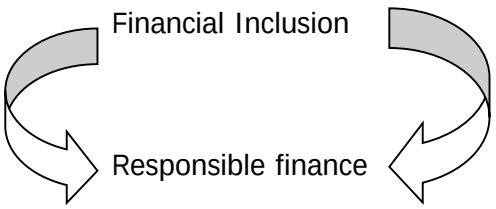
Financial inclusion is a multidimensional, pro-client concept, encompassing increased access, better product and services, better informed and equipped consumers and effective use of products and services. Putting this concept in to practice requires more than institutional expansion

and portfolio growth, goals that drove early development of the micro finance sector. The clearance of the draft document of the micro finance institution (Development and Regulation) Bill by the central cabinet is an indication of the government faith in the sector. The RBI and NABARD have supported the propagation of micro finance considerably through the SHG-bank linkages programme (SBLP) and have designed incentives to support micro finance institutions (MFIs) by placing MFIs under priority sector lending (PSL). Priority sector lending requirements mandate banks to ensure that 40% of their aggregate net banking credit goes to stipulated sectors that are considered important to foster financial inclusion.

Role of Government in Financial Inclusion: Microfinance is now seen as an integral part of an inclusive financial system. As a result, financial inclusion has become an important policy goal that complements the traditional pillars of monetary and financial stability, as well as other regulatory objectives such a consumer protection (Hanning and Jansen 2010). Governments have increasingly embraced financial inclusion as one of their policy objectives. Data from financial access 2010 survey (CGAP 2011) show that in 90 per cent of economies, at least some aspect of the financial inclusion agenda is under the purview of the main financial regulator. This fact sheet will highlight several financial inclusion measures taken by the Government of India (GOI) and Reserve Bank of India (RBI) and outline their efforts and achievements as well as the obstacles faced by each initiative.

Figure 1: Financial Inclusion Strategies

Financial Inclusion		Financial inclusion combined with financial literacy, consumer protection
Examples of how households/firms can benefit	⟷	Examples of how households/firms can benefit
Microfinance reduces exposure to Potential losses to enable business growth		Micro insurance understand the risks covered, cost compared to the potential benefit, select product
Basic bank accounts low income household access through a mobile phone or ATMs		Basic bank accounts select a bank account that meets its needs, manage fees and debt levels
Regulatory reforms innovation by financial institutions to serve lower income clients		Regulatory reforms harmonization of regulation to capability levels and objectives of education programs



Source: Tata and Pearce 2012.

Government of India has a long tradition of promoting financial inclusion. For more than four decades, the central bank (Reserve Bank of India) has been operating priority sector lending mandating a portion of banks loan portfolios to be in the agriculture sector and to small and micro enterprises. In 2005, it required banks to offer basic no-frills accounts with no or very low, minimum balances and affordable charges. However, use of these accounts has been very low. In 2011, banks were advised to provide at a minimum four products.

a) A savings or overdraft account,

b) A remittance product for electronic transfer of government benefit and other remittances,

c) A pure savings product and

d) Entrepreneurial credit.

In a parallel initiative in 2010 the government and the central bank set goals to provide by 2015 all 6, 00,000 villages in India with a banking outlet with stipulated annual targets along the way. While these targets were not specified by law, the Reserve Bank of India requires all banks to report progress regularly and closely monitors their achievements.

Recent Developments in Micro Finance Sector in India: Recently RBI has given recognition status to self-regulatory organizations which adhere to set of functions and responsibilities prescribed by RBI. The table below shows the timelines and amendments of guidelines by RBI for the microfinance sector.

Table 1: Recent Developments in Micro Finance in India

Year and Date	Major Developments
October 2010	Formation of Malegam Committee by RBI to study the issues and concerns in microfinance sector
January, 2011	RBI released Malegam Committee recommendations for the Microfinance sector
May, 2011	Acceptance of broad framework of Malegam Committee recommendations in Monetary Policy Statement 2011-12 including: Retention of priority sector lending status for bank loans to MFIs, margin cap at 12% and interest rate cap at 26%.
December, 2011	RBI introduced new category of NBFC and termed as 'Non-Banking Financial Company-Micro Finance Institutions' (NBFC-MFIs). Some of the key points include Minimum Net Owned Fund of Rs.5 crore for new NBFC MFIs and for existing NBFC MFIs w.e.f. April 1, 2012 Capital Adequacy Ratio of 15% (relaxation for AP based MFIs for FY12 and for NBFC MFIs with loan portfolio less than Rs.100 crore)

	Margin cap at 12%, interest rate cap at 26% and processing charges at 1%
	Amendment to NBFC MFI guidelines by RBI which included
	Registration compulsory for NBFCs intending to operate as NBFC MFIs by October 2012
August, 2012	Relaxation in meeting norm of Minimum Net Owned Fund of Rs.5 crore for existing NBFC MFIs. It has to be met in tranches with Rs.3 crore NOF by March 2013 and Rs.5 crore by March 2014
	Removal of interest rate cap and linked to borrowing rate plus fixed margin. Margins are capped at 10% for large MFIs and 12% for others
	Amendment to NBFC MFI guidelines by RBI which included
July, 2013	Relaxation in margin cap for all NBFC MFIs irrespective of size at 12% till March, 2014. However from April, 2014,margins are capped at 10% for large MFIs and 12% for others
Nov, 2013	RBI has allowed recognition of industry association of NBFC MFIs as Self-Regulatory Organisation (SRO).
	Amendment to NBFC MFI guidelines by RBI with respect to pricing of credit: it would be lower of two
Feb, 2014	The cost of funds plus margin
	The average base rate of the five largest commercial banks by assets multiplied by 2.75

Pradhan Mantri Jan-Dhan Yojana (PMJDY) is a National Mission on "Financial Inclusion" is the most recent illustration of the Government of India in this regard. On 15th August 2014, India's prime minister announced the launch of India's most intensive financial inclusion mission titled "Pradhanmantri Jan-Dhan Yojana".

The Yojana (Plan) encompasses an integrated approach to bring about comprehensive financial inclusion of all the households in the country. It envisages universal access to banking facilities with at least one basic banking account for every household, financial literacy, access to credit, insurance and pension facility. In addition, the beneficiaries would get RuPay Debit card having inbuilt accident insurance cover of 1 lakh. The plan also envisages channeling all Government benefits (from Centre / State / Local Body) to the beneficiaries' accounts and pushing the Direct Benefits Transfer (DBT) scheme of the Union Government. The technological issues like poor connectivity, on-line transactions will be addressed. Mobile transactions through telecom operators and their established centers as Cash Out Points are also planned to be used for Financial Inclusion under the Scheme. Also an effort is being made to reach out to the youth of this country to participate in this Mission Mode Programme. In Toto, the plan PMJDY seems to be a combination of knowledge and technology, ensuring access to various financial services to the excluded sections i.e. weaker sections & low income groups.

The initial target of the scheme happens to be to generate/facilitate about 7 crore accounts by January 26th 2015. As per the data provided by the Department of Financial services, Ministry of Finance, Government of India, as of now 11 crore accounts have been created/facilitated which is expected to reach nearly 15 crore by 26th January 2015. This accounts to an achievement of more than cent percent.

Table 2: Pradhan Mantri Jan - Dhan Yojana (Accounts opened as on 31.01.2015)

S.No	Banks	No of accounts (in lacs)			No of rupee debit cards (in lacs)	Balance in accounts (in lacs)	No of accounts with zero balance (in lacs)
		Rural	Urban	Total			
1	Public Sector Banks	533	451.47	984.48	912.32	817463.04	655.41
2	Regional Rural Banks	184.89	32.98	217.87	149.68	159948.08	159.35
3	Private Banks	32.26	20.12	52.38	45.93	72551.5	29.97
Total		750.15	504.57	1254.73	1107.93	1049962.62	844.73

Source: Ministry of finance, Govt of India

Conclusion: To conclude the Government of India has come out with several measures to its record in the field of financial sector development. There is an increasing clarity that governments do have a constructive role in building financial systems that work for the poor particularly in a democratic set up like that of India. It is a fact that some government programmes still undermine microfinance markets. There are proponents who argue that when mandates are imposed financial institutions will do their best to comply with the targets at the lowest cost. For instance, the Microfinance Institutions (Development and Regulation) Bill, 2011 which envisages RBI as the sole regulator of microfinance sector covering all forms of MFIs in addition to NBFC-MFIs. The ultimate decision whether to mandate financial inclusion in the law depends on the specific context of a country.

Keeping all these observations aside, it is an appreciable fact that the government and the central bank of India (RBI) have taken several initiatives to include the unbanked part of the population. For a country like India, where even today majority of the population resides in rural areas with least banking facilities, financial inclusion is the road to become a global player.

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Paper No. 10

Capital Financing and Industrial Output Growth in Bangladesh: A Co-integration Analysis and Innovation Accounting

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Abstract

Economic growth in a country is entirely driven by the accumulation of technologically progressed capital machinery and input factors along with the potential role of finance to assist the accumulation of capital. Following the hypothesis, the Bangladesh economy registered annual growth rate more than 6 percent during the last decade. Industrial output mostly contributed to GDP growth through the process of exports of manufacturing products. In Bangladesh, the industry sector contributed around 30 percent in GDP and recorded over 8 percent growth in FY2014. However, the country has a comparative disadvantage in producing capital machinery and industrial raw materials; the import of capital goods and industrial raw materials fill this gap. The economy covered around 23 percent by import, while imported capital machinery and industrial raw materials occupied almost half of the total import. In this paper, we focus on the question whether imports of capital goods and industrial raw materials promote industrial output growth as well as in economic growth. Based on the available empirical evidences using the cointegration and vector error correction model we find significant result that in the long-run there remains a positive relationship between capital financing and industrial output growth in Bangladesh. The evidence suggests further export promotion and imports of capital goods not only for Bangladesh, but also for other emerging economies that seeking foster growth through economic openness.

Keywords: Economic growth, capital goods, imports, exports, cointegration, vector error correction.

JEL Codes: C32, F31, F41, O14.

1. Introduction

While, the global financial crisis of 2008 adversely affected almost all the economies of both developed and developing countries; Bangladesh, one of the South Asian 'tiger-case' recorded more than 6 percent GDP growth per annum since 2004 along with strong macroeconomic fundamental. The accomplishment has drawn attention in the global economy and has become a model in developing countries. Since early nineteen-eighties, the gradual shifting of its polices from anti-export bias to export promotion by providing various export incentives, by deregulating the

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import process through reducing tariff and non-tariff barriers, and by implementing investment friendly fiscal and monetary policies have significantly contributed in the remarkable economic growth of the country. Subsequently, the industry sector has been expanded; share of industrial output in GDP became almost double in FY20143 from 15 percent in early eighties. The annual growth rate of industrial output also increased to 8.4 percent in FY2014 from the around 2 percent in early eighties.

Since the independence in 1971, Bangladesh has a comparative disadvantage in producing capital machinery and industrial raw materials. The import of capital machinery and industrial raw materials from technologically advanced countries maintained this gap. The significant policy changes promoted the import of capital machinery and industrial raw materials for domestic manufacturing industries that played a key role in the process of industrialization of the country. The economy accounted around 23 percent by imports and total import payments stood at USD 40.69 billion in FY2014; while, the imports of capital machinery and industrial raw materials occupied almost half of total import. In early eighties, the share of total import in GDP was around 14 percent and the imports of capital machinery and industrial raw materials contributed around 13 percent in aggregate import. Thus the import of capital goods stimulated the productivity of domestic manufacturing industries that increased manufacturing output and lead to the growth of exports. Hence, total export earnings enlarged to USD 30.18 billion (18 percent of GDP) in FY2014 from only USD 0.75 billion (4 percent of GDP) in FY1980. In total export, share of manufacturing products contributed around 96 percent in FY2014 which was 61 percent in FY1980. Certainly, exports accelerated economic activities and promoted GDP growth.

However, most of economic literatures in developing economies in Asia- like South Korea, Malaysia, Thailand, Singapore, Taiwan find that the import of capital goods and private investment escalated countries' industrialization process that lead to attain a higher and sustainable growth of industrial output. In Bangladesh economic literature, although research on exports, remittance inflows, economic growth and poverty is numerous; there are little paralleled studies particularly on the area of imports of capital goods, industrial output and economic growth. The causes might be that- first, until early eighties, in Bangladesh most of the import item were food grains, fuel, and durable and non-durable finished goods. The second, during the first decade of Bangladesh, there was a resources constraint; socio-economic indicators were very weak and volatile with high poverty, high unemployment, high inflation, large budget deficit, and small amount of exports and remittance inflows along with acute balance of payments (BOPs) problem. More than that, lack of a sufficient number of observations for any time series analysis.

On this context as discussed above, the main objective of our study is to search whether there exist any long-run relationship between industrial output growth and capital financing; analyzing the contribution of capital financing to the growth of industrial output of Bangladesh by applying quantitative econometric techniques. We define capital financing in terms of imports of capital machinery and industrial raw materials, and private sector credit. These factors are commonly used in the industry sector aiming to foster countries' economic growth through industrialization.

We develop a model by taking variables such as industrial output, imports of capital goods, private sector credit and real interest rate, and use time series data for the period FY1980 - FY2014. The Johansen cointegration technique and vector error correction (VEC) model along with supportive econometric test criterions are applied in this study. We also present a synthesis of the

[3] FY refers Fiscal Year that starts July and ends June.

cointegration and innovation accounting to unveil the relationship among the variables that used in the model for short-run and long-run dynamics.

The estimated results of this study provide the evidence that there exists a long-run cointegration relationship among the variables; both imports of capital goods and private sector credit contribute to the growth of industrial output whether real interest rate does an opposite reaction. The finding suggests that, like many other developing and emerging economies in Bangladesh, imports of capital goods promote industrial output growth that support the economy to achieve a higher and sustainable GDP growth in the long-run.

The rest of the paper comprises as, Section 2 contains the literature review; Section 3 provides the description of the variables considered and the methodology. Estimating results of the cointegration and error correction model are discussed in Section 4 and conclusion is drawn in Section 5.

2. Literature Review

Economists have been centered in the growth hypothesis across countries and most of the studies find that factors such as exports, imports, remittances, investment and economic openness lead economic growth for instance. They have analyzed these factors based on different theoretical frameworks, from the neo-classical growth model to recent endogenous growth model. Since, the main objective of our study is to examine the existence of long-run positive relationship between capital financing and industrial output growth in Bangladesh, we seek literatures those are mostly relevant in this regard as follows.

Both approaches as mentioned above, import-led growth consider technological progress through availability of capital machinery and input materials, human capital as well as private investment in both developed and developing countries. As, developing countries have comparative disadvantage in producing capital goods, literatures support that imports of capital goods promote industrialization in these countries. Evidences supporting import-led growth can be found in the cross country study of Thangavelu and Rajaguru (2004) for India, Indonesia, Malaysia, Philippines, Singapore and Taiwan. Similar findings are also found in the literature of Awokuse (2007) for Poland and in Awokuse (2008) for some South American countries.

In a study on Indian economy, H. Rana (2000) finds that imported technology and capital goods that use in domestic manufacturing industry has a positive impact on country's economic growth. The study also examines that newly established domestic industries those produce capital goods contribute to the increase of productivity of manufacturing industries; where the productivity of domestically produced capital goods itself seems to stem from imported technology.

Using highly disaggregated trade data for a large number of countries and constructing an index that measures the productivity level which is associated with country's import, C. Veeramani (2009) examines the impact of imported intermediate and capital goods on economic growth. Results of this study conclude as that higher initial value of the index leads to a faster growth rate on per capita income in subsequent years (during 1995–2005) and vice versa.

For Turkish economy Uğur, A. (2008) finds a casual relationship between output growth and total import. The author also discovers mixed causality relationship between various categories of imports (imports of investment goods, raw materials, consumption goods and others) and GDP

growth. Herrerias and Orts (2011) in their study explore that the rate of capital accumulation and the relative proportion of imported capital goods over domestically produced capital goods that use in domestic industries directly promote the Chinese per capita income also GDP growth. They argue that imported capital goods encourage Chinese GDP for long-run in the process of trade openness.

However, we find a small number of literatures on imports and economic growth on Bangladesh economy where we observe diverse results. Among those, Dawson (2006) discovers imports cause GDP but negatively and exports cause GDP to grow fast. He uses annual data for the period 1973-2003. Here the author considers both pre and post reforms period that might be provide such result. In an another study, Hossain et al. (2009) using annual data for the period 1973-2009 examine the long run relationship of exports, imports and output growth and could not find any relationship between imports and economic growth. Their finding evidences that in long-run exports impact economic growth positively. They also find that exports significantly promote imports in the long-run as well in the short-run but not vice versa. Paul (2011) also finds very similar outcomes in a study where he employs annual data of exports, imports and GDP growth rate for the period 1979-2010. This study finds a long term relationship between export and GDP growth but no evidence between imports and output growth.

Work on Bangladesh economy, over the period 1976Q1 – 2003Q4 and using Engel-Granger casualty test Mamun and Nath (2005) find unidirectional casualty from exports to GDP growth. In this study industrial production index is used but could not find any impact of that on GDP. On the other hand, Sultan P. (2008) evidences that there exists a cointegration long-run relationship between GDP and industrial value added; the Granger casualty test supports that GDP growth rate causes industrial value added but not vice-versa. In an another study, using quarterly data for the period 1974-1985, Hossain (1995) estimates manufacturing production function by applying OLS. The estimated results show that real expenditure which is proxy of imported capital goods and private sector credit has a positive impact on manufacturing output. In this study, he uses dummy variable for policy changes - improvement of industrial management during post 1975 that contribute to the increase of manufacturing output.

As discussed above, we can summarize the shortcomings of existence literature on imports and economic growth in Bangladesh as i) choice of specific variables, ii) methodological deficiencies, iii) regimes biasness for inclusion of both pre and post reform periods in a single time span, iv) a small number of observations for time series analysis, v) omitted variables bias and vi) very few number of literature. More than that, there is no such a study that focuses particularly the impact of imports of capital goods and industrial raw materials on industrial output growth in Bangladesh. Our study attempts to overcome these shortcomings clearly focusing on capital financing (imports of capital goods and private sector credit) and industrial output growth in Bangladesh.

3. Model, Methodology and Data

3.1 The Model Specification

Economic theory asserts that acceleration of industrial production depends on the availability of capital machinery, industrial raw materials and investment in both developed and developing economies. Like many other developing countries, Bangladesh economy requires capital machinery and input materials as the country has a comparative disadvantage in producing such goods. Of course, financial support- credit from banks is also needed. These factors strongly contribute to

the growth of GDP. Based on this hypothesis, the main objective of our study is whether the import of capital goods and industrial output are positively associated or not and to analyse the impact of the import of capital goods and private sector credit as exogenous variables on industrial output growth in Bangladesh. In this case, for simplicity we develop a four-variable model that stated as:

$$Y\_IND_t = f(IMP\_CG_t, PRC_t, IR_t) \quad (1)$$

In difference form

$$\Delta Y\_IND_t = f(\Delta IMP\_CG_t, \Delta PRC_t, \Delta IR_t) \quad (2)$$

Where, Y_IND is industrial output, IMP_CG denotes imports of capital goods (including imports of capital machinery and industrial raw materials), PRC is private sector credit from banks, IR denotes interest rates, t is year and Δ represents first difference of the variable. Assuming that imports of capital goods and private sector credit are positively associated with industrial output; on the other hand, interest rate impacts industrial output negatively.

Following the equations 1 and 2, we develop the error correction equation that to be estimated as follows,

$$\Delta(LnY\_IND_t) = \alpha + \Sigma \beta 1 \Delta(LnIMP\_CG_t) + \Sigma \beta 2 \Delta(LnPRC) + \Sigma \beta 3 \Delta IR_t + \lambda ECT_{t+\varepsilon t} \quad (3)$$

Where, t represents year, Δ is first difference calculation, Ln is natural logarithm, ECT denotes the error correction term and ε is residuals of the sample. α is constant term of the equation and βi (i = 1, 2 and 3) denotes estimated parameters where β1, β2 > 0 and β3 < 0 (i, e, the signs of the coefficients of β1, β2 are positive and negative for β3. If λ = 0 is rejected, error correcting mechanism happens and the tested long-run relationship is reliable.

3.2 Methodology

Cointegration technique is adopted in this paper to examine whether there remains the long-run or the short-run relationship among the variables of industrial output, imports of capital goods, private sector credit and real interest rate in the model of equation 3. We also estimate the equation by using vector error correction (VEC) model and test the adjustment dynamics for any disequilibrium position of any shock in the economy. The whole process is developed by three steps.

The first, testing unit roots process of the series to identify the order of integration of the variables considering in this study. In econometric analysis most of the macroeconomic variables are characterized by unit-root processes i.e., non-stationary (Nelson and Plosser 1982) for time series data. In general, unit roots precede cointegration test; otherwise, regression of non stationary variables may leads to spurious results. The Phillips-Perron (PP) test and the Augmented Dickey-Fuller (ADF) test are the most commonly used to check the stationary of the series. However, Phillips and Perron (1988) propose a modification of the Dickey-Fuller (DF) test and have developed a comprehensive theory of unit roots. The PP test has established a t-statistics on the unit root coefficient in a DF regression which corrected for autocorrelation and heteroskedasticity. Maddala and Kim (1998) argue that the DF test does not have serious size distortions, but less influential than the PP test. Choi and Chung (1995) also argue that for low frequency data, the PP test emerges to be more persuasive than the ADF test. Hence, we apply the PP methodologies to test the unit roots of the variables and whether the series are I (0) or I (1).

The second, checking the long-run relationship among the variables of the model as stated in equation 3. If the variables are found to be I (1), i.e., series are stationary at first difference level, cointegration is to be pursued as per the Johansen approach following the literatures of Johansen (1988), Johansen and Juselius (1990), and Juselius (2007). In this study, the number of the cointegration relation must be less than four as there are four variables in the model. We apply both the trace and maximum eigenvalue tests to check the existence of long-term cointegration relationship of the variables in the model.

Finally, we analyse the long-run and short-run dynamics through error correction mechanism. The VEC model is developed to estimate cointegration equation for long-run and to analyse short-run dynamics of the variables. Moreover, in innovation accounting process we analyze the impulse response functions and variance decompositions of the variables in the system to unveil the dynamic relationship among the variables. The model is also being tested with the sequence of miss-specification tests without showing any autocorrelation or normality problems.

3.3 The Data Set

Bangladesh is born in 1971 after the nine months war of independence. In this study, we employ annual data for the period FY1980-FY2014. The period is taken that started in FY1980 for two reasons. The first, the first regime of Bangladesh economy was under socialist planning, post-war anomalies, militant coups and external shock. The first decade i.e., 1970s almost passed by reconstructing the demolished infrastructures such as roads, highways, bridges, buildings, houses and power stations those were badly damaged or demolished during the Liberation War in 1971. In addition, the famine of 1974 almost crippled the economy, and causing starvation, diseases and deaths. The global oil shock of 1974 reinforced the supply shock of the famine; the country's socio-economic condition became worse. In 1975, the economy was also affected by the bloody military coup. Thus, the period FY1972-FY1975, could not be entirely attributed in economic activities by the policy measures those were associated with high level of nationalization process under socialist planning.

Secondly, major policy changes related to the transition of the economy from nationalization to privatization process were carried out after 1975. Since 1976, economic policies shifted to private sector-led export promotion industrialization strategy from public sector-led and import-substituting strategies through the declaration of the Industrial Investment Schedule in 1976, the withdrawal of private investment ceiling in 1978, and the promulgation of the Foreign Investment Act in 1980. Aiming to improve competitiveness, enhancing economic efficiency and promoting export-led growth major significant policy reforms such as dismantling state enterprises' interventions, increasing participation of private sector, launching peg exchange rate with a basket of currencies by dropping single currency fixed exchange rate (against Pound Starling), reducing tariff and non-tariff barriers, etc. were undertaken during the period FY1976-FY1980. Due to these widespread turbulences and transition of the economy as discussed above, the Bangladesh's economic growth as well as other macroeconomic indicators was highly volatile during the period FY1972-FY1979 (Appendix Figure 1). Hence, by excluding the period FY1972-FY1979, we consider sample period that begins in FY1980 to avoid any spurious results.

Taking into account the previous discussion, our dataset consists of industrial output (Y_IND), imports of capital goods (IMP_CG)4, private sector credit (PRC) and interest rate (IR). All variables

[4] Imports of capital goods refer here the imports of capital machinery and industrial raw materials.

are in real terms5. Natural logarithm form is used here for all variables except interest rate for convenience to get stationary more easily, and is helpful to eliminate the heteroskedasticity problem of time series data that is very common practice in econometrics. However, the characteristics of time series and the relationship among the variables would not be changed. The series of imports of capital goods and private sector credit in value (million BDT) and nominal interest rate (in percentage) have been collected from Bangladesh Bank (BB), and industrial output (value in million BDT) and consumer price index (CPI) have been collected from Bangladesh Bureau of Statistics (BBS). The sources are the authorities of the respective series; there is no doubt about the originality of the data.

4. Estimation Results

4.1. Unit roots tests

In this study, the four macroeconomic variables that we have used as we see in Panel A of Figure 2 in Appendix I, are most likely to have unit roots in levels. To test unit roots in the variables of the model we apply the PP methodologies. Accordingly, the results present in Table 1, show that series of industrial output (Y_IND), imports of capital goods (IMP_CG), private sector credit (PRC) and real interest rate (RIR) of Bangladesh for the period FY1980 to FY2014 have unit roots in level; only private sector credit (at 5% for Model B) and interest rate (at 10% for Model A) reject null hypothesis. However, in first differences of all the variables, the PP tests statistics reject unit roots at 1% level of significance and thus the variables are integrated of order one, i.e., I(1) and the series become stationary in first differences. The test is robust and consistent in all the series irrespective of their specifications. Thus the variables now qualify to examine cointegration.

[5] We deflated nominal values of industrial output, imports of capital goods and private sector credit with the GDP deflator (Base: FY1996=100). And real interest rate is calculated using Fishers' equation: RIR= (Nominal interest rate - CPI inflation rate).

Table 1. Unit root tests

Variable	Phillips-Perron test						Integration remarks
	In level			In first difference			
	Model A	Model B	Model C	Model A	Model B	Model C	
LnY_IND	4.58	-2.33	6.79	-4.14	-6.72	-1.76	I(1)
	(1.00)	(0.41)	(1.00)	(0.00)***	(0.00)***	(0.07)*	
LnIMP_CG	-0.99	-3.48	6.52	-10.52	-10.58	-4.59	I(1)
	(0.74)	(0.06)	(1.00)	(0.00)***	(0.00)***	(0.00)***	
LnPRC	-2.21	-409.00	6.27	-4.25	-4.50	-2.33	I(1)
	(0.21)	(0.02)**	(1.00)	(0.00)***	(0.00)***	(0.02)**	
RIR	-2.80	-2.93	-1.31	-17.28	-22.03	-14.54	I(1)
	(0.07)*	(0.16)	(0.17)	(0.00)***	(0.00)***	(0.00)***	

Note: Model A includes intercept, Model B includes both intercept and trend, and Model C none.

The null hypothesis reviles that the variable has a unit root.

p- values shown in the parenthesises following each adjusted t-statistics.

*, **, and *** denote the significance of the statistics at 10%, 5% and 1% levels respectively.

4.2 Cointegration and Vector Error Correction Estimation

In our four-variable case, the number of cointegration relation must be less than four. To qualify this property we employ the Johansen cointegration approach under both Option 3 (linear deterministic trend in data assuming intercept without trend in cointegration equation and in VAR) and Option 4 (linear deterministic trend in data with intercept and trend in cointegration equation and no intercept in VAR). Before going to test cointegration, optimal lag length is required. For determining the lag length, the most common procedure is to estimate an unrestricted VAR with the variables and is to use the Akaike information criterion (AIC) or Schwartz Bayesian criterion (SBC) or Hannan-Quinn information criterion (HQ). However, all the criterions- the AIC, SBC and HQ criterions advise one lag for the analysis of cointegration and VEC of the model (in Appendix Table A1).

In Appendix, Table A2 demonstrates the results of Johansen cointegration. The cointegration rank of both the trace and maximum eigenvalue tests reveals an evidence of one cointegration relationship among the variables under the Option 3; while under Option 4, trace test shows two cointegration relationships in the model but the maximum eigenvalue test accords no cointegration. Both options certainly indicate that there is an evidence of cointegrating relationship among the variables of the model. However, option 3 produce robust results in both the trace and maximum eigenvalue tests. The tests criterion recommends the existence of the long-run relationship among the variables- industrial output, imports of capital goods, private sector credit and real interest rate in the model.

We apply VEC model to estimate the cointegrating equation and to synthesize the long term relationship between endogenous and exogenous variables in the model along with short-run adjustment dynamics. Following the Equation 3, we find the estimated cointegrating equation that stated in Equation 4. The equation shows the long-run cointegrating relationship between industrial output which is considered as an endogenous one and imports of capital goods, private sector credit and real interest rate which are exogenous variables in the model. At equilibrium level, the estimated equation is normalized on industrial output and provides a positive sign that is expected. The estimated cointegrating equation also exhibits that the coefficients of explanatory variables such as imports of capital goods, private sector credit and real interest rate are significant at 5 percent level and hence possesses expected signs. The signs of the coefficients of the variables indicate that in the long-run, industrial output is positively associated with the import of capital goods and private sector credit; while the impact of real interest rate on industrial output performs an opposite one. This empirical evidence supports the hypothesis that the import of capital goods and private sector credit lead industrial output growth in the long-run in Bangladesh.

In the cointegrating equation 4, the value of the coefficient of imports of capital goods indicates that an increase of 1% growth of imports of capital goods causes to an increase of 0.42% in industrial output growth. This supports the fundamental role of the import of capital goods that fulfilling the shortage of capital machinery and industrial raw materials that finally contribute to the growth of domestic industries of Bangladesh. Related to private sector credit, the value of the coefficient shows that 1% increase in private sector credit causes 0.31% increase in industrial output growth. On the other hand, the value of the coefficient of real interest rate indicates that 0.02% decrease of industrial output growth by 1% percentage point change of real interest rate.

Cointegrating equation:

ect(t) = LnY_IND(t-1) - 0.42 LnIMP_CG(t-1) - 0.31 LnPRC(t-1) + 0.02 RIR(t-1) - 7.20 (4)

(0.1581) (0.0223) (0.0102)

Table 2: Speed of adjustment for any disequilibrium level

Error Correction:	**ΔLnY_IND**	**Δ LnIMP_CG**	**Δ LnPRC**	**Δ RIR**
CointEq1: ecm (t-1) (the speed of adjustment)	-0.1075***	0.1370	0.1852**	-6.6118**
	(0.0239)	(0.1557)	(0.0654)	(2.9170)
** and *** indicate the significance of the statistics at the 5% level. Numbers in parenthesis are standard errors.				

The error correction term (Table 2) on the regression with first differenced industrial output addresses the short-run adjustment dynamics of the variables, if by any means the equilibrium relationship is stunned. The estimated result exhibits that corresponding error correction term on first differenced industrial output provides a negative sign as expected and significant at the 1 percent level. The coefficients of first differenced private sector credit and real interest rate are also significant at 5 percent level but the coefficient of imports of capital goods is insignificant and posses a positive sign. Hence, in the process of error correction term of the estimated VEC model, the significant coefficients of the variable industrial output along with expected sign recommends that the endogenous variable perform well to adjust relationships if by any means any disequilibrium once the system is shocked while imports of capital goods do not so. The value of coefficient of the first-differentiated industrial output in the estimated model -0.1075 indicates that only 10.75 percent of the last year's disequilibrium is corrected current year and that requiring 9.30 years to bringing the system into the steady state if once it is distorted.

Moreover, in Appendix, Figure 3, the scatter diagrams and regression lines with the series of LnY_IND, LnIMP_CG, LnPRC and interest rate also exhibit the long run relationships among the variables. The relationship of industrial output with the imports of capital goods and private sector credit looks highly positive association that indicates a strong interdependence among these variables particularly for a country like Bangladesh. On the other hand, industrial output and interest rate are negatively associated. From the diagram, we also see that there is a positive association of imports of capital goods with private sector credit.

4.3 Impulse Responses and Variance Decompositions

The realization of generalized impulse responses and forecast error variance decomposition of industrial output derived from VECM, are presented in Appendix Figure 4 and Table A4. Figure 4 presents that there exists a positive and very strong response on industrial output for that of one standard deviation innovation in imports of capital goods and private sector credit. On the other hand, one standard deviation innovation in real interest rate has a strong negative and divergent impact on industrial output.

While impulse responses are very effective to measure the sign and magnitude of responses to specific shocks, the variance decomposition analysis delivers a critical inside into the relative importance of each variable in the system. According to the analysis of variance decomposition we finds that share of the forecast error variance of industrial output decline gradually for its own shock with increasing forecast horizon (Table A4 in Appendix), while share of imports of capital goods and private sector credit increase slowly. Around 67 percent of the forecast error variance

of industrial output accounted for its own shock at 9 years. At this time horizon remaining variability of industrial output accounted by the shock in imports of capital goods (14%), private sector credit (11%) and real interest rate (8%). The outcomes strongly support the results in VECM that estimated previously.

5. Conclusion

The evidence of time series analysis of our study supports that there exists a long-run relationship among the variables of industrial output, imports of capital goods, private sector credit and real interest rate in Bangladesh economy. The estimated result of the cointegrating equation shows that imports of capital goods and private sector credit greatly promote industrial output growth; while that of real interest rate performs an opposite one. Hence, the finding establishes a hypothesis that in Bangladesh, in the long-run, imports of capital goods lead the country's economic growth through acceleration of the industrialization process that is supported by related literatures of developing economies in Asia such as India, Indonesia, Malaysia, Philippines, Singapore, Thailand and China where imports led growth through the process of industrialization.

The justification of this growth hypothesis can broadly be categorized into four. First, imports of capital machinery and industrial raw materials that use in domestic manufacturing industries increase economic scale of industries and accelerate industrial output; finally promotes economic growth. Second, as imported capital machinery and industrial raw material raise domestic manufacturing output that accelerate exports; the multiplier effects of foreign exchange receipts from the export of manufacturing products further contribute to produce more for both domestic and foreign markets as of income effect. In fact, in Bangladesh, exports of manufacturing products are considerably benefited from its industrial output that depends on the import of capital machinery and industrial raw materials. Third, capital goods and industrial raw materials are imported from technologically advanced countries reasonably at low prices; it reduces the cost of production as well as increases productivity of domestic manufacturing industries. Finally, imports of capital goods create many positive externalities through the process of industrialization. On the other hand, private sector credit also encourages private investment that evolves industrialization. Through these channels, country's industrialization process moves ahead and industrial output grows faster that finally contribute to the growth of GDP.

From the evidence of our study, we strongly believe that like many other developing countries, Bangladesh economy requires the import of capital goods to sustain the current level economic growth through industrialization process as the country has a comparative disadvantage in producing capital machinery and qualitative input materials. Moreover, to attain a middle income status country by 2021 with aiming to increase employment and reducing poverty, we have to achieve higher level of growth that should be sustainable. Obviously, there is nothing any alternative except the acceleration of its industrialization process. Thus, more liberalized trade, and export diversification and promotion policies along with development of infrastructure and improvement of energy and power supply to attract FDI and to set up international multination manufacturing industry would be the foremost concern to the authority and policy makers in Bangladesh. These finding have policy implications not only for Bangladesh, but also for other developing economies those desire to grow fast. Finally, this paper raises an additional question that how we estimate the import demand function for Bangladesh that left for future research.

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Appendix

Table A1: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-101.59	NA	0.00	6.03	6.21	6.10
1	76.58	305.43*	4.67*	-3.23*	-2.34*	-2.93*
2	86.35	14.51	6.94	-2.88	-1.28	-2.32

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion,

HQ: Hannan-Quinn information criterion

Table A2: Johansen Cointegration Tests

Test indicator		Option 3			Option 4		
		λ Stat	CV	CE	λ Stat	CV	CE
λtrace tests	HO: r = 0 HA: r > 0	52.10	47.86 (0.02)**	1	80.40	63.88 (0.00)***	1
	HO: r ≤1 HA: r >1	22.53	29.80 (0.26)	0	48.51	42.92 (0.01)**	1
λmax tests	HO: r = 0 HA: r = 1	29.57	27.58 (0.03)**	1	31.89	32.12 (0.05)	0
	HO: r =1 HA: r =2	11.73	21.13 (0.57)	0	28.91	25.82 (0.02)	0

Note: The λtrace and λmax are estimated as per Johansen (1988) and Johansen and Juselius (1990).

CV indicates critical values calculated for the 5 percent significance level and CE stands for number of cointegration equation.

P-values presented in the parenthesis.

r denotes for the rank of the matrix, which indicates the number of the CE between the variables.

HO and HA indicate the null and alternative hypotheses respectively.

Option 3 includes an intercept without trend in the CE and the test VAR, whereas Option 4 includes an intercept and a trend in the CE without any trend in the VAR.

The λtrace and λmax test statistics under both models are calculated by allowing for linear deterministic trends in data.

** and *** denote the significance of the statistics at 5% and 1% level respectively and rejects null hypothesis.

Table A3: Vector Error Correction Estimates

Cointegrating equation:

ect(t) = LnY_IND(t-1) - 0.42*** LnIMP_CG(t-1) - 0.31**LnPRC(t-1) +0.02**RIR(t-1) - 7.20

Error Correction:	ΔLnY_IND	Δ LnIMP_CG	Δ LnPRC	Δ RIR
CointEq1: ecm (t-1) (Speed of Adjustment)	-0.1075*** (0.0239)	0.1370 (0.1557)	0.1852** (0.0654)	-6.6118** (2.9170)
ΔLnY_IND(t-1)	0.2127	0.7116	0.5036	-41.6039**
	(0.1265)	(0.8224)	(0.3455)	(15.4096)
Δ LnIMP_CG(t-1)	-0.0532	-0.1164	-0.1025	-4.4905
	(0.0307)	(0.1998)	(0.0839)	(3.7430)
Δ LnPRC(t-1)	-0.0406	0.3109	0.4148	8.8691
	(0.0655)	(0.4260)	(0.1790)	(7.9829)
Δ RIR(t-1)	0.0031**	-0.0014	0.0055	-0.2278
	(0.0014)	(0.0091)	(0.0038)	(0.1698)
C	0.0534***	0.0345	0.0462	1.9086
	(0.0118)	(0.0769)	(0.0323)	(1.4407)
R-squared	0.5864	0.0808	0.4536	0.4094
Adj. R2	0.5151	-0.0777	0.3594	0.3075

Note: *, ** and *** refer that coefficients are significant at the 10%, 5% and 1% level respectively.

Values in parentheses against each coefficient indicate standard errors.

"Δ" stands for first-order difference operator.

"ect" stands for error correction term and "ecm" is error correction model.

Values in parenthesis are the standard errors of the coefficients.

Table A4: Generalized Forecast Variance Decomposition of Industrial Output

eriod	S.E.	LnY_IND	LnIMP_CG	LnPRC	RIR
1	0.0240	100.0000	0.0000	0.0000	0.0000
2	0.0354	99.5530	0.0845	0.1354	0.2271
3	0.0446	96.1755	1.2798	1.0647	1.4800
4	0.0563	88.7362	4.7572	3.0331	3.4736
5	0.0686	82.5109	7.6024	4.9914	4.8953
6	0.0811	77.3327	9.8481	6.8008	6.0183
7	0.0935	73.0029	11.6831	8.3882	6.9257
8	0.1059	69.4992	13.1507	9.7208	7.6294
9	0.1179	66.6735	14.3184	10.8299	8.1782
10	0.1296	64.3696	15.2599	11.7552	8.6154
11	0.1410	62.4727	16.0288	12.5300	8.9685
12	0.1520	60.8970	16.6634	13.1825	9.2571
13	0.1626	59.5757	17.1926	13.7357	9.4961
14	0.1728	58.4577	17.6384	14.2078	9.6961

Table A5: Autocorrelation LM Tests

Lags	LM-Stat	Prob
1	15.95939	0.4558
2	17.40763	0.3597
3	16.14343	0.4430
4	23.10214	0.1110
5	14.07222	0.5933
6	20.60337	0.1943
7	14.26986	0.5786
8	13.16987	0.6603
9	12.59700	0.7020
10	10.49414	0.8396

Probabilities from chi-square with 16 df.

Table A6: Normality Tests

Component	Jarque-Bera	df	Prob.
1	0.666717	2	0.7165
2	1.395751	2	0.4976
3	3.584666	2	0.1666
4	0.096641	2	0.9528
Joint	5.743775	8	0.6759

Figure 1: Trends of Annual Economic Growth in Bangladesh: FY1972-FY2014 (Base FY96=100)

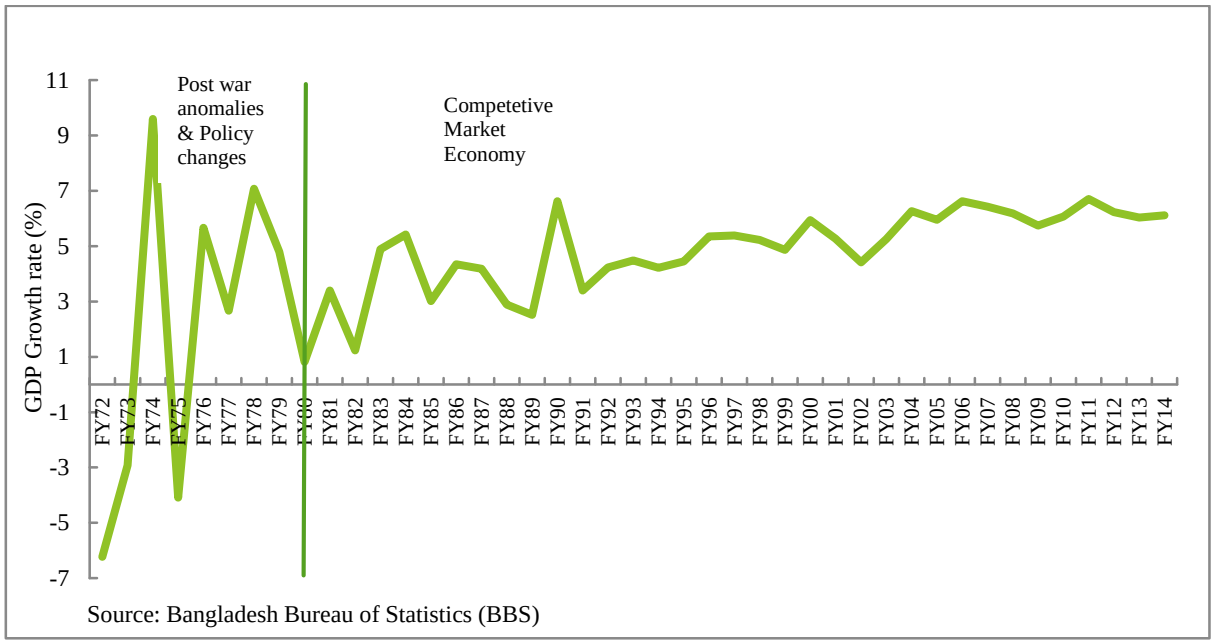
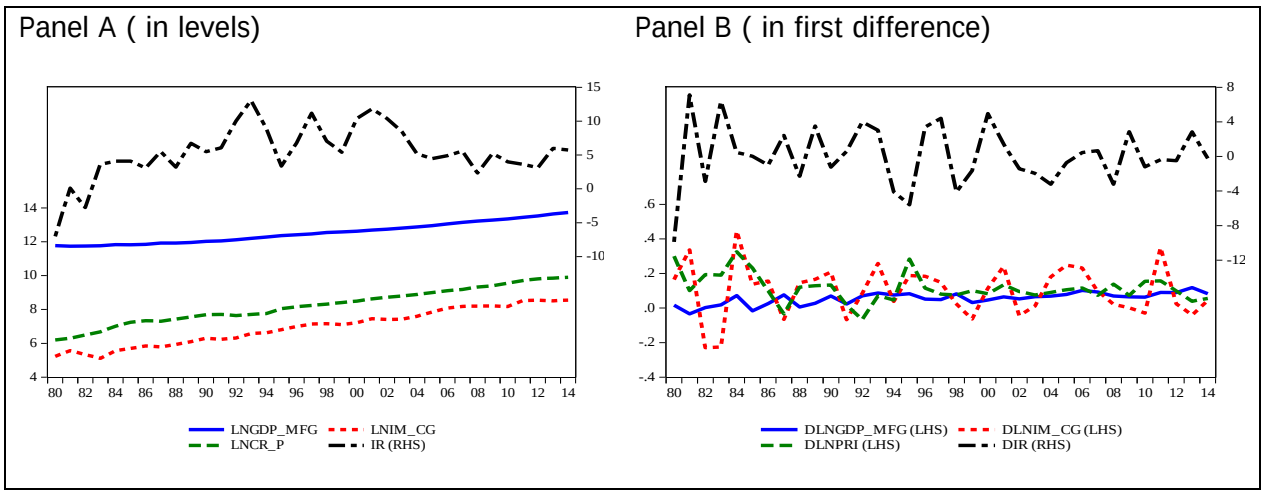


Figure 2: Trends of the variables of the model

(Industrial output, imports of capital goods, private sector credit and real interest rate of Bangladesh)



Source: Bangladesh Bank and Bangladesh Bureau of Statistics

Figure 3: Scatter Plots with industrial output, imported capital goods, private sector credit and interest rate of Bangladesh

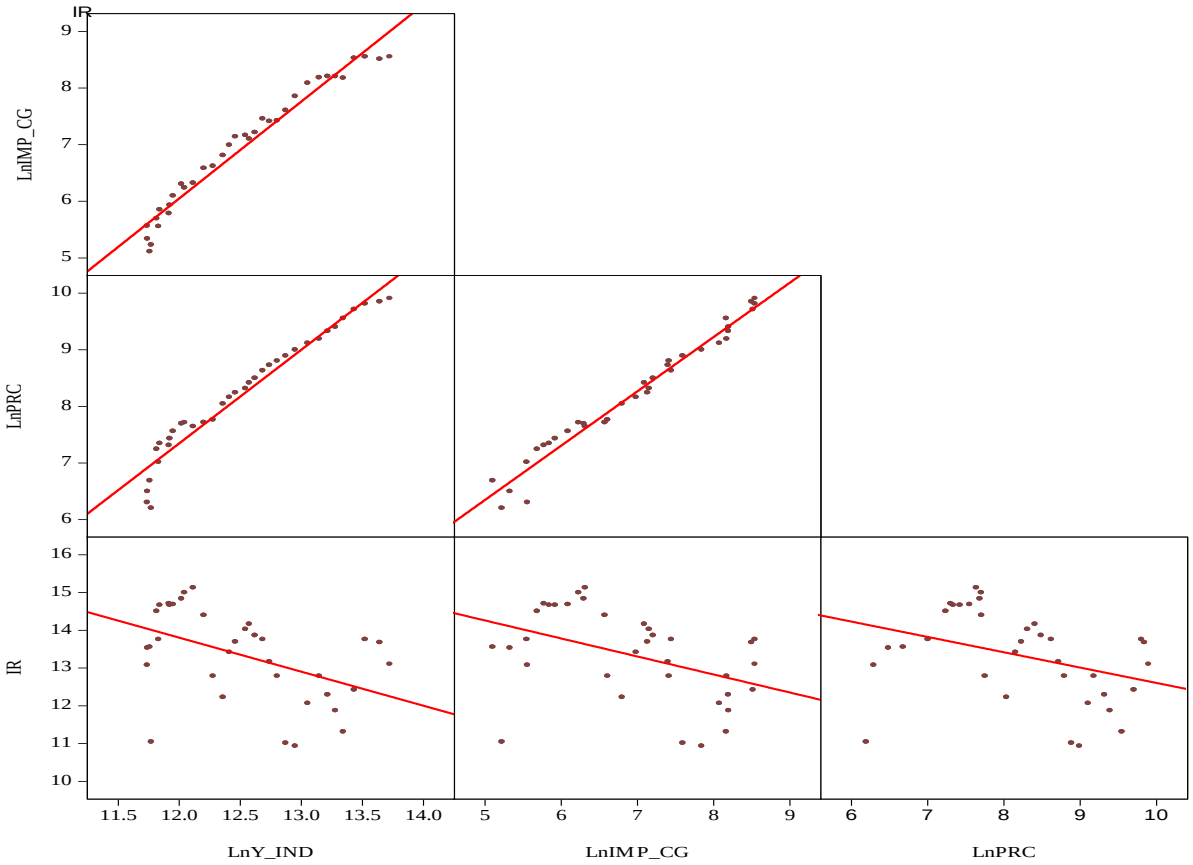
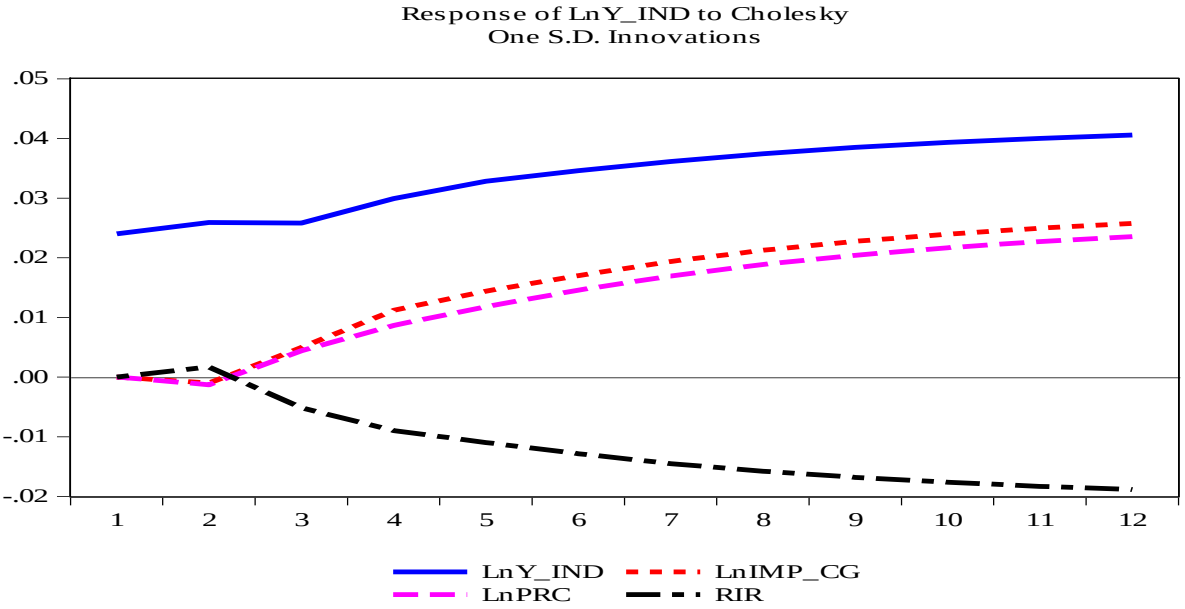


Figure 4: Generalized Impulse Response of Industrial Output in Bangladesh



Paper No. 11

Macro Economic linkages of Inflation in South Asia

Dr. Sudhakar Patra*

Abstract

The objective of the paper is to analyze the macroeconomic linkages of inflation, money supply and GDP growth in five South Asian Countries, namely Bangladesh, India, Nepal, Pakistan and Sri Lanka from 1991 to 2013.The study is based on secondary data collected from South Asian Development Report, and World Bank database and Website of Nepal Rastra Bank. The trend analyses of time series data are conducted using growth rates, line graphs, least square methods and macro economic linkages among CPI, Money Supply& GDP are analysed of using coefficient of Correlation, Granger Causality test. The average inflation in Bangladesh from 1991 to 2013 is 6.08 percent where as it is 7.96 percent in India, 7.93 percent in Nepal, 10.96 percent in Pakistan and 9.81 percent in Sri Lanka. India, Nepal and Sri Lanka have negative trend of inflation which is marginally declining over the years. The analyses indicate that there is no uniform causality among inflation, money supply and GDP growth in all countries. The causality varies from country to country.

Key Words: Correlation, Inflation, Money Supply, Linkage, Policy

JEL Codes- E 31, E 51

Introduction

Inflation is a global economic phenomenon that always evokes heated debates among economic researchers. It appears in different ways in different countries or in a particular country in different periods of time. Inflation is defined as a price rise in the general level of goods and services over a period of time of a country. Sometimes, it is referred as an increase to the supply of money and credit. If the supply of goods and services does not increase relative to supply of money, it may result in the escalation in the price of goods and services, which will then lead to the value of money being lower than it actually is. When inflation happens, it involves all levels of the community, households, workers, investors, and as well as pensioners are affected. The effect also varies as certain people benefit from it while others get the losses. It depends on how the money is used either been used to repay debt or to purchase goods. A high rate of inflation has brought the country many problems such as lost of investment, economic recession, slow down of economic growth and most important of all, the drop in the value of the currency.

In economic study, the most known theory of inflation is the occurrence of inflation driven by either increased demand or increased cost pressures which is so-called as demand pull and cost push respectively. Economists agree that inflation pressures come from domestic and external sources as well as from both the supply and demand sides of the economy. Inflation is a global

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phenomenon and significant macroeconomic variable which affect the economic growth of all most all countries of the world. While some amount of inflation is inevitable and is perhaps necessary to accompany development, inflation beyond a certain limit is considered undesirable. A mild rate of inflation within 4 percent per year is good for an economy, but many developing countries of the world are experiencing inflation above the mild rate which is harmful for the economy. Control of inflation has, therefore, become one of the primary objectives of Government intervention in many developing countries (Islam, 2008). The inflation has been over stressed as a prime element in the policies prescribed by the international financial organizations and donor countries in the frame work of conditionality of lending. The inflation is measured from the changes in consumer price index (CPI) in all countries. The objective of this research paper is to analyze the inflation scenario in five South Asian Countries (Bangladesh, India, Nepal, Pakistan and Sri Lanka) with its macroeconomic linkages.

Literature Review

Masih and Masih (1998) investigated the causality between money (M1 and M2) and prices in four Southeast Asian developing countries, namely Thailand, Malaysia, Singapore, and the Philippines from January 1961 to April 1990. They found that money supply lead prices which are in agreement with the monetarist view. Empirical studies in pre-growth period (before 1990) generally found a negative inflation-growth relationship. A pregrowth literature study in 1985 had al-ready reported a finding that GDP growth was negatively related to the growth rate of inflation. Fischer (1993) reported findings that growth was related inversely to inflation. New-growth models of course focused on the long run. The collective wisdom of the literature could be made consistent by saying that inflation was positively related to growth at short-run, cyclical frequencies, but negatively related to growth at long-run, steady-state frequencies. There was only one problem with this reconciliation of the short run and long run that there was no robust long-run, cross- section relationship between inflation and growth. The study reported statistically significant negative relationships between growth and inflation in the new-growth period. Several studies have estimated a negative relationship between inflation and economic growth. Nevertheless, some studies have accounted for the opposite. Thirlwall and Barton (1971), in one of the earliest cross-country studies, report a positive relationship between inflation and growth in a cross section of industrial countries and a negative relationship in a cross section of 7 developing countries.

Mallik and Chowdhury (2001) on the other hand conducted an empirical analysis by applying co-integration and error correction models, to examine the short-run and long run dynamics of the relationship between inflation and economic growth for four South Asian economies: Bangladesh, India, Pakistan, and Sri Lanka. They found two motivating results. First, the relationship between inflation and economic growth is positive and statistically significant for all four countries. Growth to changes in inflation rates is smaller than that of inflation to changes in growth rates. Therefore, these four countries are on the turning point of inflation-economic growth relationship.

Faria and Carneiro (2001) used a bivariate time series model (i.e., vector autoregression) with annual data for the period between 1980 and 1995, to investigate the relationship between inflation and economic growth in the context of Brazil which has been experiencing persistent high inflation. The empirical results obtained shows that there exist a negative relationship between inflation and economic growth in the short-run but inflation does not affect economic growth in the long-run. Their empirical results also support the super neutrality concept of money in the long run. This in turn provides empirical evidence against the view that inflation affects economic

growth in the long run. Abbas and Husain (2006), and Muhd Zulkhibri (2007) employed similar vector autoregressive (VAR), Johansen cointegration method and Granger-Causality test to analysis the relationship between money, inflation and real output in Indonesia, Pakistan and Malaysia respectively and conclude that money supply is a lead indicator of inflationary pressure. Ahmed and Mortaza (2005) empirically explored the relationship between inflation and economic growth in Bangladesh, using annual data set on real GDP and CPI for the period of 1980 to 2005, and the co-integration and error correction models. The empirical evidence demonstrates that there exists a statistically significant long-run negative relationship between inflation and economic growth for the country as indicated by a statistically significant long-run negative relationship between CPI and real GDP. Saaed (2007) explored the relationship between inflation and economic growth in the context of Kuwait, using annual data set on real GDP and CPI for the period of 1985 to 2005. The estimated result of the relationship shows a long-run and strong inverse relationship between CPI and real GDP in Kuwait. In a broader scope, Omoke and Ugwuanyi (2010) examined the causality between money, price and output in Nigeria between 1970 and 2005, and employed cointegration and granger-causality test analysis. Their analysis revealed that there is no existence of a cointegrating vector in the series used. Money supply was seen to Granger cause both output and inflation. The result suggest that monetary stability can contribute towards price stability in the Nigerian economy since the variation in price level is mainly caused by money supply and they conclude that inflation in Nigeria is to an extent a monetary phenomenon.

Trend of Inflation in selected South Asian Countries

South Asia is well established in a high growth path with strong and improving macroeconomic fundamentals where growth is primary driven by domestic demand. In macroeconomic management, the key areas of concern are inflation and increasing current account deficits (Rajan R, 2003). The average inflation in Bangladesh from 1991 to 2013 is 6.08 percent where as it is 7.96 percent in India, 7.93 percent in Nepal, 10.96 percent in Pakistan and 9.81 percent in Sri Lanka (Table-1). Hence average inflation is highest in Pakistan in last 23 years and lowest in Bangladesh. It is evident that inflation rate in these south Asian countries remain high as ideal rate of inflation is within 4 percent per year. The standard deviation of inflation is also high in Pakistan followed by Sri Lanka. Pakistan has the maximum inflation 24.89 percent in 2000.

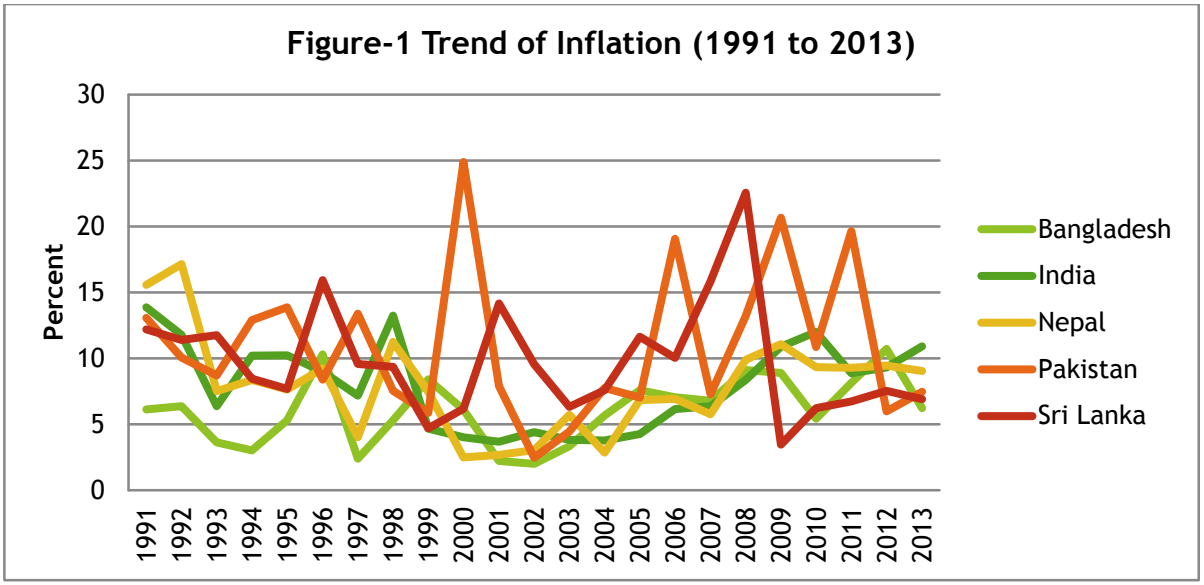
Table-1 Inflation (Annual %) in South Asia

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1991	6.13	13.87	15.56	13.06	12.19
1992	6.36	11.79	17.15	10.06	11.38
1993	3.63	6.36	7.51	8.70	11.75
1994	3.01	10.21	8.35	12.89	8.45
1995	5.31	10.22	7.62	13.87	7.67
1996	10.30	8.98	9.22	8.37	15.94

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1997	2.38	7.16	4.01	13.38	9.57
1998	5.31	13.23	11.24	7.53	9.36
1999	8.40	4.67	7.45	5.86	4.69
2000	6.11	4.01	2.48	24.89	6.18
2001	2.21	3.68	2.69	7.89	14.16
2002	2.01	4.39	3.03	2.46	9.55
2003	3.33	3.81	5.71	4.44	6.31
2004	5.67	3.77	2.84	7.75	7.58
2005	7.59	4.25	6.84	7.03	11.64
2006	7.05	6.15	6.92	19.05	10.02
2007	6.77	6.37	5.75	7.27	15.84
2008	9.11	8.35	9.88	13.20	22.56
2009	8.90	10.88	11.08	20.67	3.46
2010	5.42	11.99	9.32	10.85	6.22
2011	8.13	8.86	9.27	19.64	6.72
2012	10.70	9.31	9.45	5.97	7.54
2013	6.22	10.91	9.04	7.45	6.91
Mean	6.08	7.96	7.93	10.96	9.81
S.D	2.52	3.30	3.76	5.67	4.31
Minimum	2.01	3.68	2.48	2.46	3.46
Maximum	10.70	13.87	17.15	24.89	22.56

Source- World Bank Database

Line graph of trend of inflation in all 5 countries is shown in figure-1. Pakistan and Sri Lanka have more fluctuation in inflation over the years but it is less in Nepal.



Least square trend was computed using a linear trend equation in the form Y = a + b t. Bangladesh and Pakistan have positive trend of inflation over the years from 1991 to 2013(Table-2). The coefficient of Bangladesh is significant at 10 percent level where as it is not significant for Pakistan. India, Nepal and Sri Lanka have negative trend of inflation which is marginally declining over the years. The least square coefficients are not significant in these countries.

Table-2 Least Square Trend Results of Inflation

Country	Constant(a)	Coefficient(b)	P Value
Bangladesh	4.32	0.15***	0.06
India	8.60	-0.05	0.62
Nepal	9.16	-0.10	0.40
Pakistan	10.52	0.04	0.84
Sri Lanka	10.99	-0.09	0.48

Source- Computed by the Author using STATA, *** significant at 10 % Level

Trend of Broad Money Supply

Money supply is an important determinant of Inflation of a country. In the long-run the relationship between money supply and price is very strong and their correlation is almost one. For the short-term relationship, empirical evidence of relationship between money growth and inflation is weak and unclear. A variety of studies on money demand yield very dissimilar results. As result, it is difficult to establish a straight relationship between these two variables in the short-term. In the long-run the relationship between inflation and money growth depends on the demand for money and money supply. Central banks affect the money supply through their policy actions such as buying and selling government securities, changing reserve requirements, or changing the interest rate at which the central bank provides reserves to financial intermediaries. The money supply

can grow at the same rate as real output to maintain same price level. However, if ceteris paribus, money supply grows faster than the rate of real output, it will cause inflation. But, in the real world there are other reasons why an increase in the money supply does not lead to an increase in inflation. Sometimes the money supply is hard to calculate and is constantly changing. Large increases in the money supply are often just due to changes in the way people hold money, such as increase in credit card use may cause an increase in Broad money. The growth rate of money supply in five countries from 1991 to 2013 is given in table-3.

The average growth of money supply is 16.34 percent in Bangladesh, 16.91 percent in India, 18.10 percent in Nepal, 15.61 percent in Pakistan and 17.21 in Sri Lanka. Hence money supply increases within a range of 15 percent to 20 percent in these south Asian countries. The standard deviation is more in Nepal which is 7.88 which implies money supply growth fluctuates more in Nepal over the years. It is lowest in India that is 2.90. So India has consistency in Money supply growth over the years. Bangladesh has the highest money supply growth of 42.64 percent in 2001(Table-3).

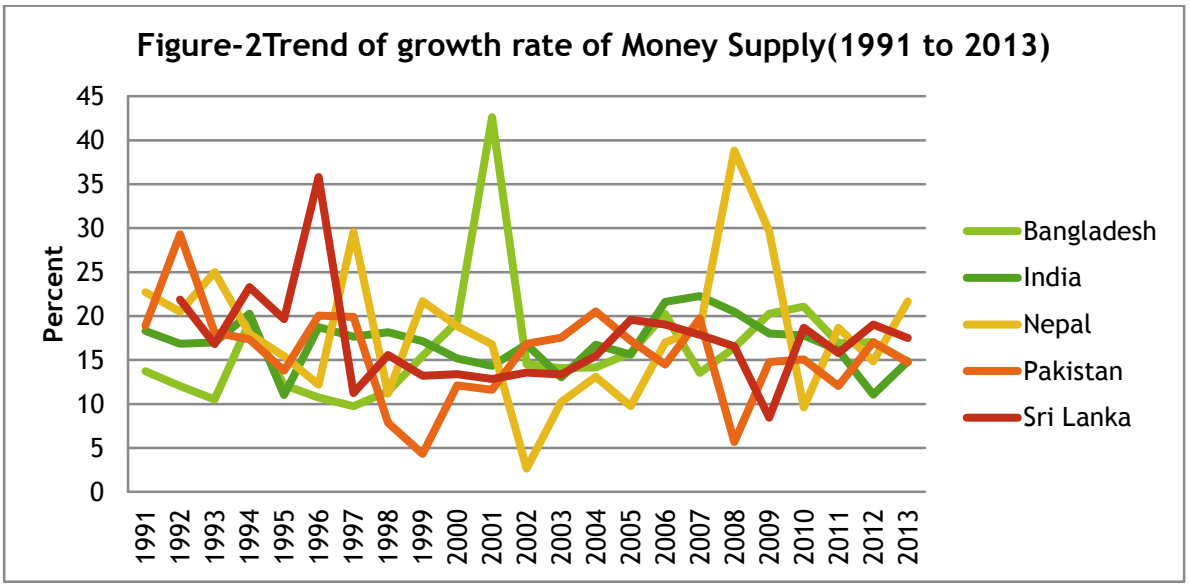
Table-3 Growth Rate (Percent) of Broad Money Supply in South Asian Countries

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1991	13.71	18.32	22.72	18.94	NA
1992	12.04	16.86	20.50	29.30	21.87
1993	10.51	17.01	25.02	18.13	16.80
1994	19.33	20.28	17.98	17.37	23.31
1995	12.15	11.01	15.43	13.81	19.67
1996	10.73	18.74	12.20	20.07	35.83
1997	9.74	17.66	29.54	19.91	11.26
1998	11.41	18.17	11.18	7.86	15.59
1999	15.47	17.15	21.68	4.31	13.21
2000	19.35	15.17	18.85	12.13	13.39
2001	42.64	14.32	16.78	11.62	12.86
2002	14.52	16.76	2.66	16.84	13.59
2003	14.08	13.03	10.22	17.53	13.36
2004	14.15	16.73	13.09	20.51	15.48
2005	15.83	15.60	9.74	17.20	19.57
2006	20.24	21.63	16.99	14.50	19.04

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
2007	13.55	22.27	18.53	19.72	17.86
2008	16.43	20.50	38.84	5.69	16.55
2009	20.26	18.00	29.62	14.76	8.44
2010	21.09	17.80	9.59	15.05	18.67
2011	16.91	16.14	18.67	12.04	15.81
2012	17.02	11.05	14.86	17.03	19.05
2013	14.86	14.83	21.66	14.73	17.49
Mean	16.34	16.91	18.10	15.61	17.21
SD	6.62	2.90	7.88	5.35	5.45
Minimum	9.74	11.01	2.66	4.31	8.44
Maximum	42.64	22.27	38.84	29.30	35.83

Source- World Bank database

Figure-2 shows the trend of growth of money supply through line graph in five south Asian countries from 1991 to 2013. Money supply growth in Nepal and Bangladesh has more fluctuation over the years.



The least square trend equation and results are given in Table-4. The coefficient is positive only in Bangladesh but negative in other four countries. All the coefficients are not significant. There is marginal increase in money supply growth in Bangladesh and marginal decrease in other four countries.

Table-4 least square trend results of Money Supply

Country	Constant(a)	Coefficient(b)	P Value
Bangladesh	13.48	0.24	0.26
India	17.28	-0.03	0.75
Nepal	18.32	-0.02	0.94
Pakistan	18.40	-0.23	0.17
Sri Lanka	19.96	-0.22	0.23

Source- Computed using STATA

Trend of GDP Growth

Gross domestic product in the South Asian Countries represents the total aggregate output of the country. It is important to keep in mind that the GDP figures as reported to in statistical volumes are sometimes already adjusted for inflation. In other words, if the gross GDP was calculated to be 6% higher than the previous year, but inflation measured 2% over the same period, GDP growth would be reported as 4%, or the net growth over the period. The relationship between inflation and economic output (GDP) plays out like a very delicate dance. Unfortunately the inflation-buys-growth idea still lives on in public policy. It is true that a surreptitious bout of inflation can temporarily fool an economy into growing faster than it otherwise would. But afterwards, you pay a penalty–long-term losses that may swamp the temporary gains. This is not to say that a country moving from high inflation to low inflation will not suffer some short-term adjustment costs. But if so, the moral is that once you get your country into a hole (high inflation), climbing out is likely to be painful. The answer, though, is not to get "a little bit" back into the hole. Annual growth in the GDP is vital for investment. If overall economic output is declining or merely holding steady, most companies will not be able to increase their profits, which is the primary driver of stock performance. However, too much GDP growth is also dangerous, as it will most likely come with an increase in inflation, which erodes stock market gains by making our money (and future corporate profits) less valuable. Most economists today agree that 2.5-3.5% GDP growth per year is the most that our economy can safely maintain without causing negative side effects. Over time, the growth in GDP causes inflation, and inflation begets hyperinflation. Once this process is in place, it can quickly become a self-reinforcing feedback loop. This is because in a world where inflation is increasing, people will spend more money because they know that it will be less valuable in the future. This causes further increases in GDP in the short term, bringing about further price increases. Also, the effects of inflation are not linear; 10% inflation is much more than twice as harmful as 5% inflation. Hence it is important to analyse trend of growth of GDP and linkage with inflation. The GDP growth rate in five south Asian countries are given in table-5.The average GDP growth is 6.42 percent in India, 5.41 percent in Bangladesh,4.40 percent in Nepal, 4.02 percent in Pakistan and 5.48 percent in Sri Lanka. But standard deviation is lowest in Bangladesh where growth rate of GDP is more consistent. In Sri Lanka GDP growth rate was negative (-1.55 percent) in 2001.

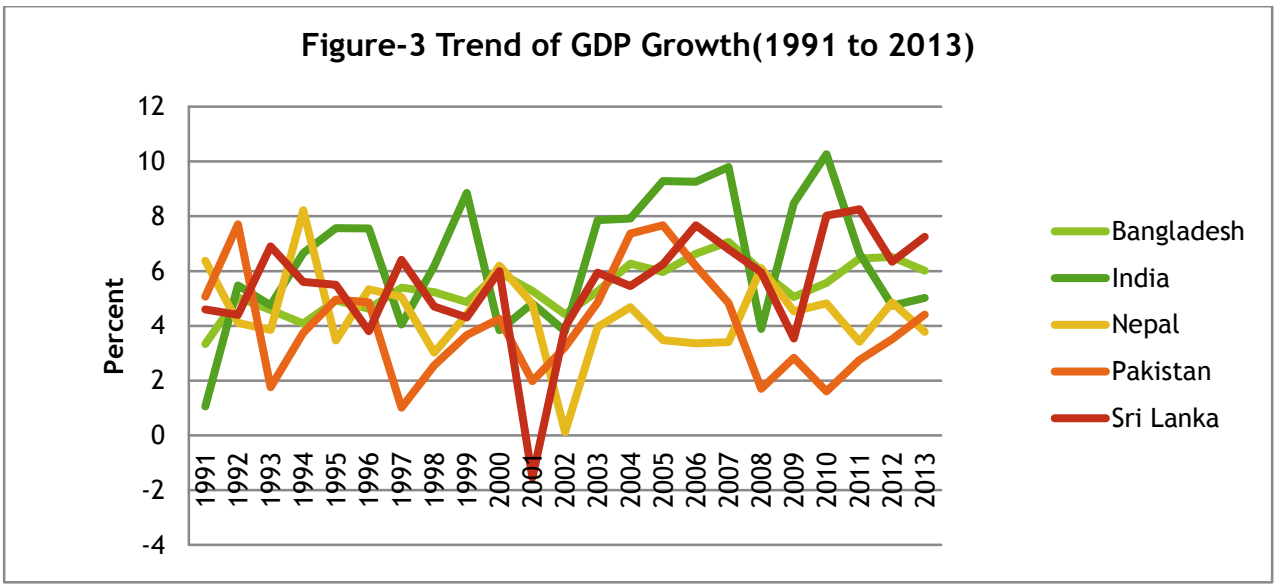
Table-5 GDP growth rate (Annual %) in Selected South Asian Countries

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1991	3.34	1.06	6.37	5.06	4.60
1992	5.04	5.48	4.11	7.71	4.40
1993	4.57	4.75	3.85	1.76	6.90
1994	4.08	6.66	8.22	3.74	5.60
1995	4.93	7.57	3.47	4.96	5.50
1996	4.62	7.55	5.33	4.85	3.80
1997	5.39	4.05	5.05	1.01	6.41
1998	5.23	6.18	3.02	2.55	4.70
1999	4.87	8.85	4.41	3.66	4.30
2000	5.94	3.84	6.20	4.26	6.00
2001	5.27	4.82	4.80	1.98	-1.55
2002	4.42	3.80	0.12	3.22	3.96
2003	5.26	7.86	3.95	4.85	5.94
2004	6.27	7.92	4.68	7.37	5.45
2005	5.96	9.28	3.48	7.67	6.24
2006	6.63	9.26	3.36	6.18	7.67
2007	7.06	9.80	3.41	4.83	6.80
2008	6.01	3.89	6.10	1.70	5.95
2009	5.05	8.48	4.53	2.83	3.54
2010	5.57	10.26	4.82	1.61	8.02
2011	6.46	6.64	3.42	2.75	8.25
2012	6.52	4.74	4.85	3.51	6.34
2013	6.01	5.02	3.78	4.41	7.25
Mean	5.41	6.42	4.40	4.02	5.48
SD	0.90	2.38	1.54	1.94	2.03

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
Minimum	3.34	1.06	0.12	1.01	-1.55
Maximum	7.06	10.26	8.22	7.71	8.25

Source- World Bank database and Authors calculation

The trends of growth of GDP in five countries are given in figure-3. India has more fluctuation in GDP growth rate than other countries.



The least square trend was computed and coefficient is positive in Bangladesh, India and Sri Lanka but negative in Nepal and Pakistan. The coefficient is significant at 1 percent level in Bangladesh only. (Table-6)

Table-6 least square trend results of GDP growth

Country	Constant(a)	Coefficient(b)	P Value
Bangladesh	4.22	0.10*	0.00
India	5.00	0.12	0.11
Nepal	5.04	-0.05	0.28
Pakistan	4.45	-0.04	0.57
Sri Lanka	4.23	1.10	0.10

Source- Computed by the Author using STATA

Correlation and Linkage among Inflation, Money supply and GDP

In statistics, dependence is any statistical relationship between two random variables or two sets of data. Correlation refers to any of a broad class of statistical relationships involving dependence. It can refer to any departure of two or more random variables from independence, but technically it refers to any of several more specialized types of relationship between mean values Inflation, money supply and GDP are there macro economic variables which are closed interlinked. There is low negative correlation between inflation and money supply in Bangladesh and Pakistan but low positive correlation in India, Nepal and Sri Lanka (Table-7). It implies that there is weak linkage between inflation and money supply growth. The correlation between Inflation and GDP growth is very low and negative in India, Pakistan and Sri Lanka but low positive in Bangladesh and Nepal. It shows weak linkage of inflation with GDP. The correlation between GDP and money supply is positive in all five countries.

Table-7 Pearson's coefficient of correlation among Inflation, Monet supply and GDP growth rates

Country	R1	R2	R3
Bangladesh	-0.17	0.35	0.10
India	0.12	-0.16	0.17
Nepal	0.26	0.19	0.46
Pakistan	-0.15	-0.09	0.49
Sri Lanka	0.38	-0.17	0.09

Source- Computed by the Author using STATA

R1 =Coefficient of Correlation between inflation and money supply growth

R2 = Coefficient of Correlation between inflation and GDP growth

R3 = Coefficient of Correlation between Money Supply and GDP

Causality Analyses

The Granger causality test is a statistical hypothesis test for determining whether one time series is useful in forecasting another. Ordinarily, regressions reflect "mere" correlations, but Clive Granger argued that causality in economics could be reflected by measuring the ability of predicting the future values of a time series using past values of another time series. Since the question of "true causality" is deeply philosophical, econometricians assert that the Granger test finds only "predictive causality". This test was used in this study to determine causality among inflation, money supply growth and GDP growth in Five South Asian countries from 1991 to 2013. The results are shown in table-8. In Bangladesh, GDP growth granger causes inflation. There is no causality between Money supply and Inflation in Bangladesh. GDP Growth and Money supply growth together granger cause inflation in this country. In India, only GDP growth Granger causes inflation. In Nepal, Inflation only Granger causes money supply. In Pakistan Inflation Granger cause GDP growth. In Sri Lanka, inflation Granger causes Money supply. The analyses indicate that there is no uniform causality in all countries. The causality varies from country to country.

Table-8 Granger Causality between Inflation and GDP Growth (1991-2013)

Null hypothesis	Country	P Value	Decision	Type of Casality
Inflation does not Grager cause Money Supply	Bangladesh	0.569	Accept H0	No causality
Money supply does not Gannger cause Inflation		0.388	Accept H0	No causality
Inflation does not granger cause GDP growth		0.516	Accept H0	No causality
GDP growth does not granger cause inflation		0.007	Reject H0	Unidirectional
GDP Growth and Money supply growth donot granger cause inflation		0.027	Reject H0	Unidirectional
Inflation does not Granger cause Money Supply	India	0.57	Accept H0	No causality
Money supply does not Ganger cause Inflation		0.23	Accept H0	No causality
Inflation does not granger cause GDP growth		0.12	Accept H0	No causality
GDP growth does not granger cause inflation		0.002	Reject H0	Unidirectional
GDP Growth and Money supply growth do not granger cause inflation		0.07	Reject H0	Unidirectional

Null hypothesis	Country	P Value	Decision	Type of Casality
Inflation does not Granger cause Money Supply	Nepal	0.056	Reject H0	Unidirectional
Money supply does not Ganger cause Inflation		0.11	Accept H0	No causality
Inflation does not granger cause GDP growth		0.033	Accept H0	No causality
GDP growth does not granger cause inflation		0.334	Accept H0	No causality
GDP Growth and Money supply growth do not granger cause inflation		0.16	Accept H0	No Causality
Inflation does not Granger cause Money Supply	Pakistan	0.78	Accept H0	No causality
Money supply does not Ganger cause Inflation		0.18	Accept H0	No causality
Inflation does not granger cause GDP growth		0.017	Reject H0	Unidirectional
GDP growth does not granger cause inflation		0.41	Accept H0	No Causality
GDP Growth and Money supply growth do not granger cause inflation		0.35	Accept H0	

Null hypothesis	Country	P Value	Decision	Type of Casality
				No Causality
Inflation does not Granger cause Money Supply	Sri Lanka	0.059	Reject H0	Unidirectional
Money supply does not Ganger cause Inflation		0.294	AcceptH0	No causality
Inflation does not granger cause GDP growth		0.106	AcceptH0	No causality
GDP growth does not granger cause inflation		0.84	AcceptH0	No causality
GDP Growth and Money supply growth do not granger cause inflation		0.47	Accept H0	No causality

Source- Authors computation using STATA

Policy Suggestion and Conclusion

In South Asia inflation is an important macroeconomic variable which influence economy and standards of living of people of a country. The current state of South Asia's inflation is highly unstable and vulnerable to fuel and food price hike. So control of inflation should receive more priority than growth in South Asia. Both fiscal and monetary policy tools should be applied simultaneously to contain price hikes. In India inflation has reduced substantially in this election year but it is likely to increase and remain unstable. The Reserve Bank of India may increase in its key policy rates slightly and use currency appreciation as a major instrument to contain imported inflation. The agricultural growth has been sluggish in recent years The Govt. of India should ban exports of selected food grains and fix higher prices of exportable agricultural products to avoid price spiral in its domestic market. So management of supply side of food articles should be the most crucial task to keep inflation under check. Bangladesh has favourable current account position for which it can afford to keep its currency slightly stronger. The monetary policy should be more contractionary even if it reduces economic growth of the country. Sri Lanka and Pakistan should adopt same contractionary policy because of rising current account deficit. In Bangladesh and Pakistan, the supply side of the commodity market is disrupted by internal political unrest and emergency rules. In Sri Lanka market is disrupted by ethnic conflicts. So there is need on the part

of South Asian countries to address supply side bottlenecks in the commodity markets. Except India, other south Asian countries should also rely on external aid if their agriculture fails to provide good harvest in a particular year. Monetary and exchange rate policies in these inflation hit south Asian countries should be applied prudently to fight inflation by appreciating their currencies depending on their macroeconomic conditions. Fuel cost economization and automatic adjustment of oil price is needed in most south Asian countries along with high fiscal risk of petroleum subsides. The financial sector should be made more vibrant in these nations to contain inflation. The monetary policies in these countries have been lax for which money supply is increasing steadily in recent years. Since money and credit growth have strong linkage with inflation, credit supply should be regulates in time of commodity inflation in South Asian Countries. Rapid growth along with inflation control should be simultaneously taken care of in these countries.

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Paper No. 12

Panel data analysis of financial development, economic growth and rural-urban income inequality: Evidence from SAARC Countries

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Abstract:

The purpose of this paper is to examine the relationship between financial development and rural-urban income inequality in SAARC countries using panel data from 1986-2012. The stationarity properties are checked by the LLC and IPS panel unit root tests. The paper applied the Pedroni's panel co-integration test to examine the existence of the long run relationship and coefficients of co-integration are examined by Fully Modified Ordinary Least Squares. The short term and long run causality is examined by panel granger causality. The results of Pedroni co-integration test indicate that there exists a long run relationship among the variables. Evidence suggests that financial development and economic growth indicators are negatively associated with rural-urban income inequality, whereas trade openness is positively related to rural-urban inequality. The empirical results of panel granger causality indicate evidence of short-run causality running from economic growth and financial development causes rural-urban income inequality. The present study recommends for appropriate economic and financial reforms focusing on financial inclusion to reduce rural-urban income inequality in SAARC countries. Financial policies geared towards agriculture and rural population should be adopted to reduce the prevailing rural-urban income inequality in SAARC region.

JEL classification: D30, F43, G28, O16, O53

1. Introduction

The relationship between financial development and economic growth has received great attention in the recent literature (King and Levine, 1993; Xu, 2000; Levine et al., 2000; Al-Yousif, 2002; Abdullahi D. Ahmed, 2010; Bittencourt, 2012; Uddin et al., 2013). These studies have tried to address the issue; how an economy's financial system affects its growth and vice-versa. While recent liberalization has established a robust link between financial development and economic growth, policy makers are also interested in the benefits of accelerated growth. Further, given the

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concern about the income distribution, policy makers want to know how financial policies affect both economic growth and income distribution. Despite several attempts to establish the link between financial development and income inequality (Beck et al. 2000, Levine et al. 2000; Li and Zou, 2002; Clarke et al., 2003, 2007; Beck et al., 2007; Iyigun and Owen, 2012), the issue remained unresolved in the literature, especially the relationship between financial development and rural-urban income inequality.

In the last two decades, many countries in Asia have achieved remarkable growth and poverty reduction. From 1990 to 2010, the annual growth rate of GDP for developing Asian countries reached about 7.5%, which is more than double the 3.4% of Latin America. During this period SAARC countries achieved quite a substantial growth rate of 6.5%. This dramatic growth has drastically improved the standards of living and greatly reduced poverty. During 1990-2010, the region's per capita has increased from $522 to $2779. The major contributors to this growth are India and Bhutan (members of South Asian Association for Regional Cooperation (SAARC)). The percentage of the population living at or below $2 a day poverty line, between 2000 and 2010 fell from 86.27% to 50.77% in Bangladesh, from 81.37% to 72.19% in India, from 88.97% to 67.28% in Nepal and from 37.04 to 12.22% for Maldives. The South Asian Association for Regional Cooperation (SAARC) countries have also demonstrated remarkable achievements in the sphere of financial sector development. From 1990 to 2010, the domestic credit to the private sector as a share of GDP has increased from 11.81% to 37.79% in Bangladesh, from the mere 2.74 % to 25.94% for Bhutan, from 23.60% to 41.68% for India, for 9.87% to 39.50% in Nepal and from 17.34% to 38.51% for Maldives. Similarly, another indicator of financial development, broad money as a share of GDP has also demonstrated a remarkable growth during 1990 to 2010 in all the SAARC countries (Table-1).

Table 1: Financial development indicators

	Indicators	Bangladesh	Bhutan	India	Srilanka	Nepal	Pakistan	Maldives
1990	Domestic credit to private sector (% of GDP)	11.81	2.74	23.60	19.69	9.87	24.92	17.34
	Broad money (% of GDP)	19.53	15.21	38.67	30.73	27.86	41.46	30.24
	GDP per capita growth	0.76	7.00	3.39	2.83	1.78	3.19	....
	GINI coefficient	27.22	....	31.50	32.47	30.06	33.35	....
	Poverty headcount ratio	89.06	....	83.77	....	....	89.16	....
	Rural-urban income inequality	1.49	2.103	1.24	1.08	4.08	1.23	....
2000	Domestic credit to private sector (% of GDP)	21.06	23.60	23.51	22.42	26.59	26.59	16.11

	Indicators	Bangladesh	Bhutan	India	Srilanka	Nepal	Pakistan	Maldives
	Broad money (% of GDP)	28.24	33.66	45.65	34.69	39.17	43.72	34.23
	GDP per capita growth	2.71	5.01	4.04	4.29	2.62	1.62	....
	GINI coefficient	30.29	38.40	31.82	33.95	35.23	30.84	62.69
	Poverty headcount ratio	86.27	....	81.73	48.09	88.97	79.33	37.04
	Rural-urban income inequality	1.14	1.068	1.04	0.89	2.30	1.07	....
2010	Domestic credit to private sector (% of GDP)	37.79	25.94	41.68	29.76	39.50	23.94	38.51
	Broad money (% of GDP)	55.90	55.19	67.65	38.90	61.04	44.33	36.71
	GDP per capita growth	0.73	5.60	5.71	5.00	2.50	3.07	5.29
	GINI coefficient	32.93	42.45	33.64	39.24	38.33	31.31	37.37
	Poverty headcount ratio	50.77	39.64	72.19	30.91	67.28	71.54	12.22
	Rural-urban income inequality	0.85	0.59	0.79	0.62	2.07	1.12	....

Source: World Bank database

Note: Poverty headcount ratio is the poverty headcount ratio at $2 a day (PPP) (% of population). Rural-urban income inequality is the ratio between agricultural to industrial value-added as % of GDP.

Economic growth, financial development and poverty reduction; however, been accompanied by rising inequalities in most of the SAARC countries. The figures in table 1 clearly demonstrates that during 1990 to 2010, the Gini coefficient has increased from 22.27 to 32.93 in Bangladesh, from 31.50 to 33.64 in India, from 32.47 to 39.24 in Sri Lanka and from 30.06 to 38.33 in Nepal. However, rural-urban income inequality figures suggest that from 1990 to 2010; the ratio of rural-urban income inequality has decreased from 1.49 to 0.85 in Bangladesh, from 2.10 to 0.59 in Bhutan, from 1.24 to 0.79 for India, from 1.08 to 0.62 in Sri Lanka, from 4.08 to 2.07 in Nepal and from 1.23 to 1.12 for Pakistan.

There has been very little empirical investigation of the impact of financial development on rural-urban income inequality for South Asian Association for Regional Cooperation (SAARC) SAARC countries [1]. Therefore the aim of the present study is to investigate empirically the causal relationship between financial development and rural-urban income inequality using panel data in SAARC countries for the time period 1986-2012.

The remainder of the paper is organized as follows: Section 2 discusses the trends of financial development, income inequality and economic growth in SAARC countries. Section 3 presents an overview of related literature and what we contribute to the literature, while Section 4 describes the variables and methodology. Section 5 presents the estimation techniques. Section 6 presents the empirical results. Section 7 provides conclusion and policy implications.

2. Theoretical underpinnings of finance-inequality link

It is generally accepted in the literature that an efficient, well functioning and vibrant financial system is a necessary condition for long term economic growth. Schumpeter (1911) argued that financial intermediation through banking played a prime role in economic growth by affecting the allocation of saving and thereby improving productivity, technical change and economic growth. Policies directed towards enabling financial intermediation for a strong and vibrant financial sector through two channels. First, these policies make credit cheaper, boost entrepreneurial activities, generate employment opportunities and enhance the welfare of the poor. Second, the availability of the credit at cheaper cost can provide crucial support to the financial weaker section by allowing them to invest in health, education and improve the life of their children and enhance human capital of the economy which in turn improves the income distribution. Levine (1999) emphasized the role of the financial system in bridging the information asymmetries between savers and borrowers, thereby performing the function of saving, capital fund allocation, monitoring the use of funds and managing risk which altogether supports the economic growth.

However, credit model suggests that capital market imperfections might affect the income distribution during economic development. Greenwood and Jovanovic (1990) present a theoretical model analyzing the role of financial development in fostering economic development. The model predicts an inverted U-shaped relationship between income inequality and financial sector development. At the initial stages of financial market development, high transaction cost prevents low income class individuals to be engaged with financial systems and to benefit from it. Assuming this the poor save less and thus accumulate wealth slowly, income differences widens. Over time, as the financial system matures the transaction cost declines and access of its use increases to a wider section of the society.

Contrary to Greenwood and Jovanovic (1990), Banerjee and Newman (1993) and Galor and Zeira (1993) suggested that long run income convergences in income levels of rich and the poor will not necessarily happen in economies with capital market imperfections and an initially unequal distribution of wealth will maintain this inequality and grow more slowly than a similar economy with a more equitable model of distribution of wealth. Together, both the models suggest that countries with capital market imperfections should have higher income inequality and observed a negative relationship between financial development and income inequality.

Brownbridge and Kirkpatrick (2000; 2002) suggest that impact of market imperfection will be compounded by a weak financial regulatory and supervisory framework. These problems are often pronounced in low income countries where institutional and regulatory skills are limited, and where political pressure to induce regulatory endurance further weakens the effectiveness of the regulatory and supervision process.

Market failures resulting from the presence of asymmetric information in the financial markets and the problem of asymmetric information create problems in the financial system on two-fronts: before the transaction (adverse selection) ad after the transaction (moral hazard). These market

imperfections create disparities in access to credit and investments. Hence market imperfections are linked to inequalities in income and distribution of wealth, which suggest that those who have financial, physical and human capital resources are likely to get benefits from financial development (Jalilian and Kirkpatrick, 2005). Further market imperfections create discrimination against those who do not have sufficient wealth for collateral because the market behavior will allocate credit to those who have collateral. However, Banerjee (1993) is of the view that given the unequal distribution of the income of developing countries, the gap between those who have the access to the financial system and those do not, can be expected to widen, particularly in the presence of fixed monitoring cost.

The predictions of these models are linked to the sectoral structure of the economy. Focusing on the transition from agriculture to industry, from rural to urban, Kuznet (1995) expected that there might be an inverted U-shaped relationship between financial development and income inequality. As people move from low income (agriculture) to high income (industry), income inequality rises. However, as agriculture sector shrinks, the marginal productivity of wage earner increases, this trend reverses the inverted U-shaped relationship. Helpman (1998) pointed out this after the initial stage, more people in rural area adopt the new technology and new entrants catch up with those who started earlier. This will reverse the trend of the income inequality. It is also stated that income inequality will be higher in industrial and service sector (modern sector), where highly talented individual gain a larger reward due to easy access to finance in the sector. This results in greater within sector inequality in the modern sector that would have been possible in the agriculture sector. Consequently the inequality would be higher in countries with larger modern sector and greater financial depth than the in countries with only one or either of these characteristics (Clarke et al. 2002).

Levine (1993) assumes that inequality is directly related to financial development as well as to other explanatory variables. Further the model also identifies that inequality is indirectly linked to financial development through economic growth.

3. Review of related literature

From the theoretical point of view, studies on the concept of finance-inequality relationship are few in number. There are two distinctive theoretical hypotheses regarding the finance-inequality link: an inverted U-shaped relationship (Greenwood and Jovanovic, 1990), which suggests that that inequality rises during the first stage of development after that it decreases when economy further develops. Alternative view of modern economic theories supported the negative hypothesis (Banerjee and Newman, 1993; Galor and Zeira, 1993); they suggested that higher level of capital market imperfections leads to income inequalities.

There is a growing empirical literature that seeks to test these theories. Li, Squire and Zou (1998) were the first that made a significant contribution in examining the determinants of inequality. They used a sample of 49 countries during the time period 1947-1994 and found evidence that better schooling, more civil liberties, deeper financial markets reduces inequality. In the sensitivity analysis they controlled for several other variables: Initial GDP per capita (real), urbanization ratio and black market premium.

Westley, (2001) examined the impact of financial markets on income distribution for Latin American countries, and concluded that easy access to financial resources through micro finance policies can reduce income inequality. Clarke, Xu and Zou (2006) conducted a cross country

analysis of 83 countries between 1960 and 1995. They found that that financial development reduces the level of the Gini coefficient. The dependent variable in their regressions is the level of inequality, measured by the Gini coefficient. They controlled for initial GDP, inflation, government consumption, ethnic fractionalization, the protection of property rights and the sectoral structure of the economy. Their empirical results concluded that in the long run, inequality is less when financial development is greater, consistent with Galor and Zeira (1993) and Banerjee and Newman (1993).

Beck et al. (2007) examined the relationship between financial intermediary development and income distribution in 72 countries with time span 1960 – 2005. They concluded that financial development is associated with a lower growth rate of the Gini coefficient and a higher growth rate of income for the poor. They did not mention the poor quality of the used data in their work. Gini-coefficients and Quintiles' income shares are calculated by using different concepts of income. Rehman et al (2008) tested the Kuznet's hypothesis by breaking a panel of 51 countries into four sub-panels; low income, lower middle income, upper income and higher income countries over the period 1975 to 2002. The findings concluded that financial development reduces the inequalities in income distribution irrespective of stage of development, and hence counteracts the inverted U-shaped relationship between inequality and financial development.

Batuo et al. (2010) found similar results as Beck et al. (2007) and Kappel (2010); though, their study is limited to 22 African countries for the period 1990-2004. To conclude their study, they mention (without conducting any related) empirical research that the inequality could be reduced by aiming financial development in rural areas and on lower incomes. Shahbaz and Islam (2011) stated that financial development reduces income inequality while financial instability aggravates income inequality in Pakistan over the time period 1971 to 2005 by using the Auto Regressive Distributed Lag (ARDL) bounds testing approach to co-integration. Their findings suggested that financial development reduces rural-urban income inequality while financial instability worsens the income inequality. They did not provide any evidence on the causal linkage between financial development and income inequality.

Yu and Qin, (2011) also supported the fact that financial development helps to reduce rural-urban income gap in China. Similarly, Chun and Peng, (2011) reported favorable impact of financial development on income distribution. They suggested that the government should loosen financial regulations, and lower market anticipation level to ensure the whole society can take advantage of economic development.

For a set of 49 countries over the 1994-2002 periods, Gimet and Lagoarde-Segot (2011) found an inequality-increasing impact of financial development. They employed a panel Bayesian structural vector autoregressive (SVAR) model for the panel. They also commented that, the relationship is dependent on the characteristics of the financial sector, rather than on its size.

Hamori and Hashiguchi (2012) used an unbalanced panel data analysis of 126 countries for the period 1963- 2002 to investigate the effects of financial deepening on income inequality. The empirical results can be summarized as follows: (1) financial deepening reduces inequality; (2) economic growth reduces the equalizing effects of financial deepening; (3) inequality increases with an increase in trade openness. The study argued that the impact of financial development on income inequality depends on the choice of financial variables. Iyigun and Owen (2012) investigated the relationship between income inequality and variability in aggregate consumption growth. The study concluded that in low income countries, income inequality is associated with

more consumption volatility and reverse is the case in high income countries. The empirical results suggest that in the case of high income countries the level of financial development may help to explain why the distribution of income affects the short-run variability of consumption and output differently.

Tiwari et al. (2013) investigated the role of financial development on rural-urban inequality in India using annual data from 1965 to 2008 by employing ARDL bounds testing approach to co-integration. They found that in the long run financial development, economic growth, and inflation negatively affect the rural-urban inequality whereas in the context of short term, economic growth and inflation lowers rural-urban income inequality. But they did not comment on the direct of the causality between financial development indicator and rural-urban inequality.

Sehrawat and Giri (2015), examined the relationship between financial developments, rural-urban income inequality and poverty reduction in south Asian economies by using panel data from 1990 to 2012. The study confirmed that financial development and economic growth indicators are positively associated with poverty reduction variable, whereas rural-urban inequality aggravates poverty. The results of panel granger causality indicate evidence of short-run causality running from rural-urban inequality and financial development to poverty reduction variable and from economic growth to rural-urban income inequality in south Asian countries.

In this study we intend to test these alternative theories using SAARC countries panel data set for the period 1986-2012. The aim is to investigate whether the developments taking place in the financial sector as a result of financial reforms can reduce the persistent level of rural urban inequality in SAARC countries. To our knowledge, this is the first study of the relationship between financial development and rural urban inequality in SAARC courtiers by using modern econometric techniques of panel data set.

4. Data source and definitions of variables

4.1. Data source

The annual time series data is employed for six SAARC countries; Bangladesh, Bhutan, India, Sri Lanka, Nepal and Pakistan for the period 1986–2012[2]. The selection of the countries and time span is based on the data availability. All relevant data published by the World Bank, International Financial Statistics, Handbook of Statistics on Indian Economy published by the Reserve Bank of India serve as sources of data.

4.2. Definitions of variables

Financial development: To measure the financial development, two proxy variables are used, these are: (1) The ratio of private sector credit to GDP (CR) (Levine, 1992; Demirguc-Kunt and Levine, 1999; Khan and Senhadji, 2003; Levine, 2004; Shahbaz et al, 2008; Odhiambo, 2009; Kar et al. 2011); (2) The ratio of broad money to GDP (Bittencourt, 2012; Odhaimbo, 2009; Kar et al., 2011).

Rural-urban income inequality: Rural-urban income inequality (INQ) is defined by the ratio between agricultural value-added per worker and industrial value-added per worker, a measure of rural-urban income inequality. This ratio implies that if value of INQ exceeds 100 then earnings of the rural people are increasing faster than that of the urban. If INQ is less than 100, then earnings of urban individuals are rising than that of the rural. This idea of this variable is adopted from Bailiamoune-Luts and Lutz (2005), Shahbaz et al. (2007b) and Tiwari et al. (2013).

Economic growth: To measure the economic growth, we have used real GDP per capita (PGDP, constant at 2005 US$) (Odhiambo, 2009).

Beside these variables two control variables also added in the study: (1) Openness has had insightful impact on the economic growth, so trade openness (TO) (% of exports and imports of GDP) is used to represent the openness of the economies (Ang, 2008; Law and Tan, 2009; Tiwari et al., 2013) and (2) Price stability indicator affects the real output, consumer price index (LCPI) is also included in the model (Tiwari et al., 2013; Ang, 2008). For these reasons the inclusion of trade-openness (TO) and consumer prices (CPI) are justified from theoretical considerations. All the variables except rural-urban income inequality indicator, are taken in their natural logarithm and L represents the natural logarithm.

5. Econometric Methodology

5.1 Panel unit root test

Unit root tests are traditionally used to test the order of integration and to verify the stationarity of the variables. The study uses LLC (2002) test and the IPS (2003) panel unit root tests. Both of these tests are based on the Augmented Dickey-Fuller (ADF) principle. The LLC test assumes homogeneity in the dynamics of the autoregressive (AR) coefficients for all panel members. Concretely, the LLC test assumes that each individual unit in the panel shares the same AR (1) coefficient, but allows for individual effects, time effects and possibly a time trend. This test can be viewed as a pooled Dickey-Fuller test, or an ADF test when lags are included, with the null hypothesis that of non-stationarity (I (1) behavior). The model only allows for heterogeneity in the intercept and is given by:

$$\Delta X_{i,t} = a_i + \gamma X_{i,t-1} + \sum_{j=1}^{p_i} a_j \Delta X_{i,t-j} + \varepsilon_{i,t} \quad \text{..... (1)}$$

Where $X_{i,t}$, is a series for panel member (country) i over period t ((i=1,2.,N); t=1,2.,T)), p_i denotes the number of lags in the ADF regression and the error term $\varepsilon_{i,t}$ are assumed to be independently and normally distributed random variables for all i and t zero mean and finite heterogeneous variance. The lag order p_i in equation (1) is allowed to vary across the countries. Thus, the null hypothesis in all panel unit root tests assumes that each series in the panel contains a unit root, and thus is difference stationary; H0: γ = 0 while the alternative hypothesis is that all individual series in the panel are stationary; which is H1: γ < 0.

The Im-Pesaran-Shin (2003) test is not as restrictive as the Levin-Lin-Chu test, since it allows for heterogeneous coefficients. Therefore, it is described as a "Heterogeneous Panel Unit Root Test". Furthermore, the IPS test allows for individual effects, time trends, and common time effects. The IPS test has thus considered a technique, which has higher power than other tests, including the LLC test. The stationarity of all variables is considered as a prerequisite for the co-integration test. The model is given by:

$$\Delta X_{i,t} = a_i + \gamma_i X_{i,t-1} + \sum_{j=1}^{p_i} a_j \Delta X_{i,t-j} + \varepsilon_{i,t} \quad \text{.....}$$

(2)

Therefore, the null hypothesis is relaxed; H0: $\gamma_i = 0$ while the alternative hypothesis is that at least one of the individual series in the panel is stationary; H1: $\gamma_i < 0$ for all i. The alternative hypothesis simply implies that γ_i differ across countries.

5.2 Panel co-integration

Traditional co-integration tests, likes Engle and Granger (1987) and Johansen and Juselius (1990), have low power of estimation when the data points are relatively low. It is as an extension of traditional Engle and Granger two step residual-biased methods. This technique allows for heterogeneity among individual members of the panel and is thus an improvement over conventional co-integration tests. The Pedroni's method is used in this study for investigating co-integration in a heterogeneous panel data. Pedroni (2000) proposed a methodology to test for panel data co-integration. Following Pedroni, the estimated co-integration relationship is specified as follows:

Model (A):

$$INQ = \alpha_0 + \delta_i t + \beta_1 LCR_{it} + \beta_2 LTO_{it} + \beta_3 LCPI_{it} + \varepsilon_{it} \quad \text{..... (3)}$$

Model (B):

$$INQ = \alpha_0 + \delta_i t + \beta_1 LM3_{it} + \beta_2 LTO_{it} + \beta_3 LCPI_{it} + \varepsilon_{it} \quad \text{..... (4)}$$

INQ is the proxy for rural-urban income inequality, LCR, and LM3 are the variables of financial development, and LTO and LCPI are control variables, respectively (all in log form); t=1,...,T refers to the time period; i=1,...,N for each country in the panel; αi denote country-specific effects, δt is the deterministic time trend, and εit is the estimated residual. The estimated residual indicates the deviation from the long-run relationship. All variables are expressed in natural logarithms so the $\beta_i's$ parameters of the model can be interpreted as elasticities. To test the null hypothesis of no co-integration, ρ_i=1, the following unit root test is conducted on the residuals as follows:

$$\varepsilon_{it} = \rho_{it} + \varepsilon_{it-1} + \omega_{it} \quad \text{..... (5)}$$

Pedroni technique allows testing for the co-integrated relationship between financial development and poverty in four different models: Model without heterogeneous trend and ignoring the common time effect (M1); Model without common time effect and allowing heterogeneous trend (M2); Model with heterogeneous trend and allowing common time effect (M3); Model with common time effect and ignoring the heterogeneous trend (M4). Pedroni (1999) shows that there are seven different statistics for the co-integration test. They are the panel v-statistic, panel ρ-statistic, Pedroni Panel (PP)-statistic, panel Augmented Dickey–Fuller (ADF)-statistic, group rho-statistic, group PP-statistic, and group ADF- statistic. The first four statistics are known as panel co-integration statistics and are based on the within dimension approach. The last three statistics are group panel co-integration statistics and are based on the between dimension approach. In the presence of a co-integrating relationship, the residuals are expected to be stationary. There are basically five steps to obtain these co-integration statistics.

Step 1: Compute the residuals from the panel regression $\widehat{\varepsilon_{it}}$ (equation 3). The estimation involves the inclusion of all appropriate fixed effects, time trends or common time dummies.

Step 2: Compute the residuals ($\widehat{\varphi_{it}}$) from the following regression.

$$\Delta Y_{it} = \beta_{1i}\Delta X_{it} + \beta_{2i}\Delta X_{it} + \cdots + \beta_{mi}\Delta X_{mit} + \varphi_{it} \quad \text{.....(7)}$$

Step 3: Compute ($\widehat{L^2_{11\iota}}$), the long run variance of ($\widehat{\varphi_{\iota t}}$).

$$\widehat{L^2_{11\iota}} = \frac{1}{T}\sum_{t=1}^{T} \widehat{c^2_{\iota t}} + \frac{2}{T}\sum_{t=1}^{T}\left(1 - \frac{S}{(K_i - S)}\right)\sum_{t-s+1}^{T} \widehat{c_{\iota t}}\ \widehat{c_{\iota t-s}} \quad \text{.....(8)}$$

Step 4: Compute the residuals of the ADF test for $\widehat{\varepsilon_{\iota t}}$ and $\widehat{u_{\iota t}}$ compute the following variances of these residuals.

$$\widehat{S^2_{\iota}} = \frac{1}{T}\sum_{t=1}^{T} \widehat{u^2_{\iota t}} \text{ and } \widehat{S^2}_t = \frac{1}{T}\sum_{t=1}^{T} \widehat{S^2}_t \quad \text{.....(9)}$$

Step 5: Computation of panel-t and group-t statistics. These statistics are asymptotically normally distributed.

The null of no co-integration is then tested, based on the above description of standard normal distribution. The null hypothesis of no co-integration is H0: γi = 1 for ∀i against an alternative hypothesis HA: γi < 1 for ∀i , in the residuals from the panel co-integration. In contrast, the group means panel co-integration statistics test the null hypothesis of no co-integration against an alternative HA: γi < 1 for ∀i , which allows the possibility of an additional heterogeneity source across the countries. These statistics diverge to negative infinity under the alternative hypothesis. So, the left tail of the normal distribution is usually employed here to reject the null hypothesis (Pedroni, 1999).

5.2 Panel FMOLS test

Pedroni proved that the panel OLS estimator is biased when the variables are co-integrated. Given the presence of co-integration, the fully modified OLS (FMOLS) techniques for heterogeneous co-integrated panels are estimated to determine the long-run equilibrium relationship (Pedroni, 2000). Fully modified least squares (FMOLS) regression was originally designed by Phillips and Hansen (1990) to provide optimal estimates of co-integrating regressions. Co-integrating links between non-stationary series lead to endogeneity in the regressors that cannot be avoided by using vector auto-regression (VAR) as if they were simply reduced forms. The method modifies least squares to account for serial correlation effects and for the endogeneity in the regressors that result from the existence of a co-integrating relationship. Consider the following co-integrated system for a panel of i=1, 2, 3, 4… N states over time t = 1, 2, 3, 4… M.

$$Yit = \alpha_i + \beta_i Xit + \varepsilon it \quad \text{.....(10)}$$

$$Where\ Xit = Xit\text{-}1 + \vartheta it \quad \text{..... (11)}$$

Where Y is the LPOV and X represents the corresponding vector of independent variables.

Let Zit = (Yit, Xit)′ ~ I(1) and $\emptyset_{it}$ =(εit, ϑit)′ ~ I(0) with long run covariance matrix Ω = $L_i\ L_i'$ Li is the lower triangular decomposition of Ω_i , which can be decomposed as $\Omega_i = \Omega_i^0 + \Gamma_i + \Gamma_i'$.

Where, $\Omega_i{}^0$ is the contemporaneous covariance and Γ_i is a weighted sum of co-variances. We can also augment the above co-integrating regression with lead and lagged differences of the regressors to control for endogenous feedback.

This can be presented as follows:

$Yit = \alpha_i + \beta_i Xit + \sum_{k=k_i}^{k_i} \delta_{ik} \Delta Xit\text{-}k + \varepsilon it$

..... (12)

The panel FMOLS estimator of the β is:

$$\beta_{NT}{}^* = N^{-1} \sum_{i=1}^{N} \left(\sum_{i=1}^{T} (X_{it} - \bar{X}_i)^2\right)^{-1} \left(\sum_{i=1}^{T} (X_{it} - \bar{X}_i)\, Y^*{}_{it} - \Gamma\, \hat{\partial}_i\right) \quad \text{..... (13)}$$

Where $Y^*{}_{it} = (Y_{it} - \overline{Y_i}) - \frac{\widehat{L_{21i}}}{\widehat{L_{22i}}}\ \Delta Xit$ and $\hat{\partial}_i = \widehat{\Gamma_{21i}} + \widehat{\Omega_{21i}{}^0} - \frac{\widehat{L_{21i}}}{\widehat{L_{22i}}} (\widehat{\Gamma_{21i}} + \widehat{\Omega_{22i}{}^0})$

5.3 Panel causality test

The Pedroni co-integration test examines the presence of a long-run co-integrating relationship among the variables but it does not examine the causal linkages. Thus, to infer the causal relationship between the variables the panel causality test is deployed (Holtz-Eakin et al., 1988). The proposed panel VAR model is as follows:

$$\Delta INQ_{it} = a_{ij} + \sum_{k=1}^{q} \theta_{11ik} \Delta INQ_{it-k} + \sum_{k=1}^{q} \theta_{12ik} \Delta LCR_{it-k} + \sum_{k=1}^{q} \theta_{13ik} \Delta LCPI_{it-k} + \sum_{k=1}^{q} \theta_{14ik} \Delta LPGDP_{it-k} + \sum_{k=1}^{q} \theta_{15ik} \Delta LTO_{it-k} + \partial_{1i}\ \in_{it-1} + \mu_t$$

.... (14)

$$\Delta LCR_{it} = a_{ij} + \sum_{k=1}^{q} \theta_{11ik} \Delta LCR_{it-k} + \sum_{k=1}^{q} \theta_{12ik} \Delta INQ_{it-k} + \sum_{k=1}^{q} \theta_{13ik} \Delta LCPI_{it-k} + \sum_{k=1}^{q} \theta_{14ik} \Delta LPGDP_{it-k} + \sum_{k=1}^{q} \theta_{15ik} \Delta LTO_{it-k} + \partial_{1i}\ \in_{it-1} + \mu_t$$

... (15)

$$\Delta LCPI_{it} = a_{ij} + \sum_{k=1}^{q} \theta_{11ik} \Delta LCPI_{it-k} + \sum_{k=1}^{q} \theta_{12ik} \Delta LCR_{it-k} + \sum_{k=1}^{q} \theta_{13ik} \Delta INQ_{it-k} + \sum_{k=1}^{q} \theta_{14ik} \Delta LPGDP_{it-k} + \sum_{k=1}^{q} \theta_{15ik} \Delta LTO_{it-k} + \partial_{1i}\ \in_{it-1} + \mu_t$$

.... (16)

$$\Delta LPGDP_{it} = a_{ij} + \sum_{k=1}^{q} \theta_{11ik} \Delta LPGDP_{it-k} + \sum_{k=1}^{q} \theta_{12ik} \Delta LCR_{it-k} + \sum_{k=1}^{q} \theta_{13ik} \Delta LCPI_{it-k} + \sum_{k=1}^{q} \theta_{14ik} \Delta INQ_{it-k} + \sum_{k=1}^{q} \theta_{15ik} \Delta LTO_{it-k} + \partial_{1i} \ \in_{it-1} + \mu_t$$

.... (17)

$$\Delta LTO_{it} = a_{ij} + \sum_{k=1}^{q} \theta_{11ik} \Delta LTO_{it-k} + \sum_{k=1}^{q} \theta_{12ik} \Delta LCR_{it-k} + \sum_{k=1}^{q} \theta_{13ik} \Delta LCPI_{it-k} + \sum_{k=1}^{q} \theta_{14ik} \Delta LPGDP_{it-k} + \sum_{k=1}^{q} \theta_{15ik} \Delta INQ_{it-k} + \partial_{1i} \ \in_{it-1} + \mu_t$$

.... (18)

$$\Delta INQ_{it} = a_{ij} + \sum_{k=1}^{q} \theta_{11ik} \Delta INQ_{it-k} + \sum_{k=1}^{q} \theta_{12ik} \Delta LM3_{it-k} + \sum_{k=1}^{q} \theta_{13ik} \Delta LCPI_{it-k} + \sum_{k=1}^{q} \theta_{14ik} \Delta LPGDP_{it-k} + \sum_{k=1}^{q} \theta_{15ik} \Delta LTO_{it-k} + \partial_{1i} \ \in_{it-1} + \mu_t$$

.... (19)

$$\Delta LM3_{it} = a_{ij} + \sum_{k=1}^{q} \theta_{11ik} \Delta LM3_{it-k} + \sum_{k=1}^{q} \theta_{12ik} \Delta INQ_{it-k} + \sum_{k=1}^{q} \theta_{13ik} \Delta LCPI_{it-k} + \sum_{k=1}^{q} \theta_{14ik} \Delta LPGDP_{it-k} + \sum_{k=1}^{q} \theta_{15ik} \Delta LTO_{it-k} + \partial_{1i} \ \in_{it-1} + \mu_t$$

... (20)

$$\Delta LCPI_{it} = a_{ij} + \sum_{k=1}^{q} \theta_{11ik} \Delta LCPI_{it-k} + \sum_{k=1}^{q} \theta_{12ik} \Delta LM3_{it-k} + \sum_{k=1}^{q} \theta_{13ik} \Delta INQ_{it-k} + \sum_{k=1}^{q} \theta_{14ik} \Delta LPGDP_{it-k} + \sum_{k=1}^{q} \theta_{15ik} \Delta LTO_{it-k} + \partial_{1i} \ \in_{it-1} + \mu_t$$

.... (21)

$$\Delta LPGDP_{it} = a_{ij} + \sum_{k=1}^{q} \theta_{11ik}\Delta LPGDP_{it-k} + \sum_{k=1}^{q} \theta_{12ik}\Delta LM3_{it-k} + \sum_{k=1}^{q} \theta_{13ik}\Delta LCPI_{it-k} + \sum_{k=1}^{q} \theta_{14ik}\Delta INQ_{it-k} + \sum_{k=1}^{q} \theta_{15ik}\Delta LTO_{it-k} + \partial_{1i} \in_{it-1} + \mu_t$$

.... (22)

$$\Delta LTO_{it} = a_{ij} + \sum_{k=1}^{q} \theta_{11ik}\Delta LTO_{it-k} + \sum_{k=1}^{q} \theta_{12ik}\Delta LM3_{it-k} + \sum_{k=1}^{q} \theta_{13ik}\Delta LCPI_{it-k} + \sum_{k=1}^{q} \theta_{14ik}\Delta LPGDP_{it-k} + \sum_{k=1}^{q} \theta_{15ik}\Delta INQ_{it-k} + \partial_{1i} \in_{it-1} + \mu_t$$

.... (23)

Where Δ is the first-difference operator; k is the lag length; and u is the serially uncorrelated error term. With respect to Equations (14) – (23), short-run causality is determined by the statistical significance of the partial F-statistic associated with the corresponding right hand side variables. Long-run causality is revealed by the statistical significance of the respective error correction terms using a t-test.

6. Results and interpretation

The results of the LLC and IPS panel unit-root tests at levels and first difference are presented in Table 2. The order of the integration of the variables was also summarized in the table 4. The unit root test results confirm that all variables that used in the panel VAR model are non-stationary in the level data but found stationary in the first difference. This implies that all the variables are first difference stationary I(1).

Table 2: Unit Roots Test Results

Variables		At Level			At First Difference			Inference
		NIT	T	IT	NIT	T	IT	
INQ	LLC	1.0140	-1.1402	-1.0581	-2.6102	-2.9954	-2.9921	I (1)
	IPS	--	-0.1024	-0.1682	--	-1.7510	-2.9510	I (1)
LCR	LLC	1.4592	1.3124	1.7692	-1.4820	-1.4934	-1.7588	I (1)
	IPS	--	-0.0812	0.5361	--	-1.1572	-1.5483	I (1)
LM3	LLC	0.2781	-0.2107	0.5456	-2.1045	-2.1601	-1.8010	I (1)
	IPS	--	-0.3535	-0.6372	--	-2.0762	-1.4405	I (1)

LPGDP	LLC	1.7583	1.4231	0.0342	-1.8912	-1.4921	-2.1495	I (1)
	IPS	--	-1.6524	0.0541	--	-1.5652	-1.852	I (1)
LTO	LLC	0.5561	0.3354	0.7033	-2.1463	-3.1645	-2.5417	I (1)
	IPS	--	-0.1025	0.0692	--	-2.6291	-1.9266	I (1)
LINF	LLC	0.4752	0.2698	0.0672	-1.7892	-1.913	-1.951	I (1)
	IPS	--	0.8153	-0.2737	--	-1.7056	-2.0143	I (1)

Note: NIT: No trend and intercept; T: only trend and no intercept; IT: Both trend and intercept; and other notations are defined earlier.

The Pedroni's panel co-integration technique is employed to investigate the co-integration among the variables. The results of the panel co-integration, using the seven test statistics, are reported in Table 3. The results indicate that there exists a long run relationship among the variables.

Table 3: Pedroni Residual Co-integration Test

	Model A			**Model B**		
	NIT	T	IT	NIT	T	IT
Panel v-Statistic	1.7120	0.4123	0.8120	-1.6301	-2.1583*	-3.4802***
Panel rho-Statistic	0.0810	0.8510	1.4021	1.0017	0.0145	1.0125
Panel PP-Statistic	-1.7120	-0.9588	-4.3412***	-2.5213**	-1.1450	-3.8524***
Panel ADF-Statistic	-7.1024***	-0.8921	-3.8201**	-1.5920	-1.9621	-4.9812***
Group rho-Statistic	1.1250	1.5210	-3.0256***	1.0125	1.5678	1.0248
Group PP-Statistic	-1.9601	-0.3602	-2.5102**	-0.4710	-1.2768*	-3.2943***
Group ADF-Statistic	-7.4021***	-0.5480	4.5562***	-0.6146	-2.2856**	-5.4852***

Note: NIT: No trend and intercept; T: only trend and no intercept; IT: Both trend and intercept

*, **, *** Indicates significant at 10%, 5% and 1% level of significance respectively

Given that the variables in the model (A and B) are co-integrated, the study further estimates the long-run relationship in order to observe the magnitude of the long-run coefficients. The results of the panel fully modified OLS (FMOLS) are reported in Table 4. The empirical results suggest

that both financial development indicator and economic growth variable are negatively associated with rural-urban inequality variable (Liang, 2006; Hamori et al., 2012; Tiwari et al., 2013), which suggest that they increases rural-urban income inequality in the SAARC region during the study period. Whereas, the indicator of trade openness reduces rural-urban income inequality according to the model B (Ang, 2008).

Table 4: Pedroni panel FMOLS result

	Model A		**Model B**	
Regressors	Coefficient	t-Ratio	Coefficient	t-Ratio
LCR	-0.4462**	-2.5846	----	----
LM3	----	----	-0.6930***	-3.9854
LPGDP	-0.5210***	-2.9851	-0.7120***	-4.9215
LTO	0.1236	0.9856	- 0.3251**	-2.6714
LINF	0.0521**	2.0966	0.0321*	1.8210
C	3.5401**	-2.9510	3.5843***	-4.0125

Note: *, **, *** indicates significant at 10%, 5% and 1% level of significance respectively.

After knowing the status of co-integration, the next step is to examine the direction of causal linkage among the variables used in this study. The panel causality test, based on the panel VAR model, is used for this purpose. The results of panel short run and long run granger causality of both the models are presented in Table 5. The empirical results indicate evidence of short-run causality running from LPGDP, LCR and LM3 to INQ, implying that an increase in real per capita GDP and financial development may lead to the reduction in rural-urban inequality in the short run, and that the policies should focus on both economic growth and financial development. In the long run, only the estimated coefficient of ECT in the rural-urban income inequality equation is significant, implying that inequality could play an important adjustment factor as the system departs from the long-run equilibrium.

Table 5: Panel granger causality test result

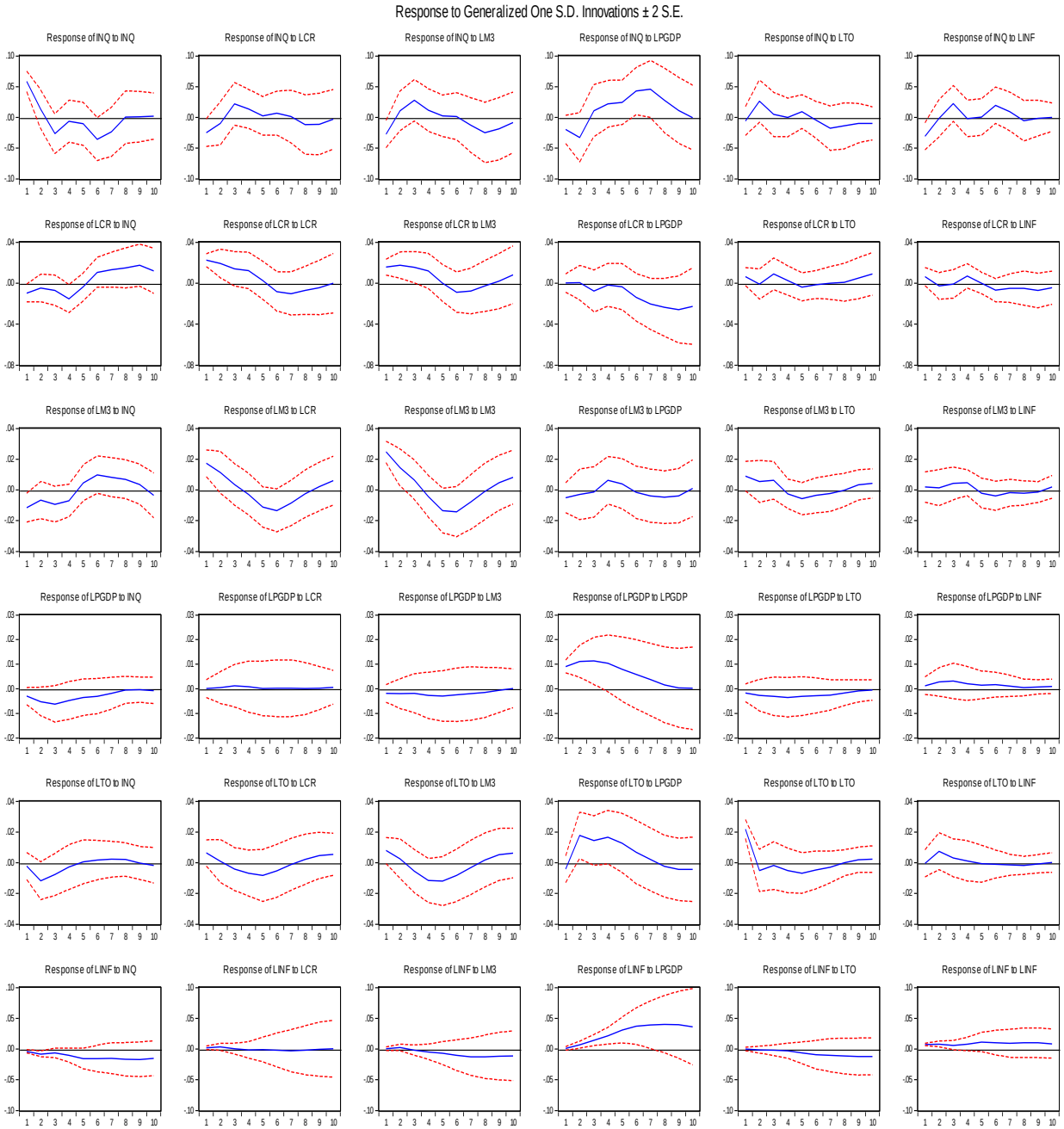
Dependent	**Sources of Causation**

Variables	Short run (F-Values)					Long-run
			Model (A)			
	ΔINQ	ΔLPGDP	ΔLCR	ΔLINF	ΔLTO	ECT (t Value)
Δ**INQ**	----	6.4404***	3.9010**	0.2015	2.9856**	-3.9582***
Δ**LPGDP**	1.6201	----	2.5952*	0.0145	0.8012	-0.3624
Δ**LCR**	0.5260	2.8801**	----	2.6820**	2.6520*	-0.9512
Δ**LINF**	2.8520*	0.5012	5.9474**	----	0.6201	-0.5846
Δ**LTO**	0.5621	0.6201	2.0579*	2.1052*	----	-1.8854
Model (B)						
	ΔINQ	ΔLPGDP	ΔLM3	ΔLINF	ΔLTO	ECT (t Value)
Δ**INQ**	----	2.0140*	2.0125*	2.9920*	0.9531	-3.5560**
Δ**LPGDP**	1.6012	----	1.0025	0.9012	0.8023	-0.2900
Δ**LM3**	1.0125	2.9012*	----	0.9210	0.9210	-1.3186
Δ**LINF**	2.0921**	2.0214**	1.1311	----	0.6201	-0.5962
Δ**LTO**	0.0125	1.0315	1.0958	2.0124**	----	-0.9213

Note: *, ** and *** indicates significant at 10%, 5% and 1% level of significance.

The estimated results are also supported by the generalized impulse response functions (GIRFs), which are very responsive to panel VAR results (see Figure 1). This suggests that financial development and economic growth cause rural-urban income inequality.

Figure 1: the Generalized Impulse Response to one SE shock in ECM



7. Conclusions and policy implications

Since theoretical views on the finance-inequality relationship are inconclusive and mixed in the literature, more empirical analysis is necessary to investigate the issue. The study explores the impact of financial development and rural urban income inequality in six SAARC countries: Bangladesh, Bhutan, India, Sri Lanka, Nepal and Pakistan for the time period 1986-2012. To measure the financial development, two proxy variables are used, these are: (1) The ratio of private sector credit to GDP (LCR); (2) The ratio of broad money to GDP. Income inequality (INQ) is the ratio between agricultural to industrial value-added as a share of GDP, a measure of rural-urban income inequality and per capita real GDP is used to represent economic growth. Beside these variables two control variables also added in the study: (1) trade openness (TO) (% of exports and imports of GDP) and (2) price stability indicator, consumer price index (CPI) is also included in the model. The Levin, Lin and Chu (2002) and Im, Pesaran and Shin (2003) panel unit

root tests are used to check for the stationarity properties of the series. The study employed Pedroni's co-integration test to examine the long run relationship among the variables; FMOLS is used to estimate the long run coefficients and panel granger test is used to investigate the direction of the causality.

The empirical results suggest that there exists a long run relationship among the variables and FMOLS results reveal that both financial development and economic growth aggravates the rural-urban income inequality, whereas trade openness reduces rural-urban income inequality. Thus, the results does not support Galor and Ziera (1993) and Newman and Bannerjee (1993) hypothesis that financial development reduces rural-urban income inequality. However, the study supports the findings of Liang, 2006; Hamori et al., 2012; Tiwari et al., 2013. The empirical results of panel granger causality indicate evidence of short-run causality running from LPGDP, LCR and LM3 to INQ, implying that an increase in real per capita GDP and financial development may lead to the rural urban income inequality in the short run.

Give the current emphasis on inclusive growth on inclusive growth objectives and the importance attached to the role played by financial development in the context, our study serves to highlight the complexities of finance-growth-inequality linkage. At the same time the results reported in this article are consistent in showing that financial development contributes to the f rural-urban income inequality in SAARC region. This study therefore, provides firm empirical evidence on which to proceed with more detailed investigation of how specific financial sector policies and interventions can be deployed as effective instruments for achieving inclusive growth in these developing countries. Financial policies geared towards agriculture sector should be adopted to provide the benefits of the financial sector to rural population to reduce the rural-urban inequality by using financial development in SAARC economies. Most of the population in these economies heavily rely on the agriculture sector, thus by making financial policies more benefitial to these people can reduce the high level of rural-urban inequalitie in these economies.

Endnote:

[1] The figures in table 1 reveal that there is a close relationship between indicators of financial development and income inequality among SAARC countries in recent years. Further, no recent study has attempted to analyze the above mentioned relationship in these developing countries.

[2] Unavailability of time series data for Maldives and Afghanistan compels us to exclude them from our study sample.

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Paper No. 13

The Causal Relationship between Foreign Direct Investment and Tourism Development:

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The Causal Relationship between Foreign Direct Investment and Tourism Development: Evidence from Sri Lanka- R.P.C.R. Rajapakse-PhD6

Abstract

Tourism is one of the most important export sectors in many developing countries. The general understanding is that it not only increases foreign exchange income, but also creates employment opportunities, stimulates the growth of the tourism industry and as a result of all this, contributes to overall economic growth. In general, there is an increasing and widely accepted belief that tourism plays a fundamental role for developing countries to achieve economic growth and development. Hence, tourism development has become an important target for most governments, especially in developing countries. Foreign Direct Investment (FDI) is an important source of capital for the development of the tourism sector in any country.

Although, Sri Lanka has always been a popular tourist destination the internal ethnic conflict which continued for thirty long years has made the foreign investment climate an extremely challenging one. With the cessation of the war in 2009, the environment is gradually changing with increased investor confidence and tourist arrivals picking up. Majority of the tourist are from Europe, and on business trips, while Indians and Japanese are the majority among the transit passengers most of whom return home from their employment overseas. The government has been awarding incentives to encourage FDI in general and specifically to the tourism sector. The Board of Investment (BOI) Sri Lanka emphasizes several priority areas in this sector and approves tourism and leisure projects in consultation with the Sri Lanka Tourism Development Authority (SLTDA)

Within the tourism sector of Sri Lanka, foreign investments are not quite popular and are channeled in favor of bigger, more established operations. The study investigated the causal relationship between foreign direct investment in tourism (FDIT) and the number of foreign tourist arrivals (TOUR) in Sri Lanka / Foreign Exchange Earnings from Tourism (FEE) using quarterly data for the period 2005:1 to 2013:4. FDIT in the tourism sector is taken as FDI in Hotels and Restaurants sector. Various time series econometric techniques such as unit root tests, cointergration and causality are used. The analysis reveals that the time series TOUR and FDIT/FEE and FDIT are not cointergrated. The VAR systems in first differences of the variables were used to investigate the causality between the variables. The results show that there is bi-directional relationship from FDIT to tourism and FDIT to FEE. That is the FDIT has a causal effect on the number of foreign tourist arrivals in Sri Lanka and foreign exchange earnings from tourism and vice versa. FDIT inflows to the tourism sector promote the growth of incoming tourism, employment and consumption and

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vice versa. This evidence emphasizes the need for appropriate policies and plans to further expand and develop tourism given that FDI flow into Sri Lanka is expected to be strong in the coming years, bringing along a demand for tourism as well. Available policies may be "soft" such as government support for eco tourism, promoting cultural heritage sites, medical tourism, Agro tourism, trade fairs and maintaining tourism internet sites or "hard" such as government providing incentives to foreign investors. Accordingly, tourist arrivals will increase making a positive influence on economic development.

Key words: FDI, Tourism, Economic Development,

JEL classification: F21

Introduction

FDI is defined as investment of assets from a foreign country to a host country. The flow of capital from the foreign country is invested in assets such as land business or the construction of new facilities. This is different from a foreign country investing in the stock market of another country, as in times of economic uncertainty; the investment can be easily withdrawn. FDI signifies a more lasting relationship between the foreign country and the host country as new facilities land and buildings cannot be easily abandoned or removed. Due to this reason FDI is considered as a better source of financing for the tourism sector.

Many countries, consider tourism as an important factor for socio-economic development. However, traditionally agriculture and production were considered as the most significant sources and suitable for generating jobs and income from the export of products or promoting development in rural areas. Tourism is a collection of activities that provide similar and unique goods and services. Transport, accommodation, food and beverages, entertainment and cultural activities, sports and recreation are the core activities which create value chain in tourism.

It can be pointed out that construction, agriculture, telecommunications, financial services, health services and other services such as electricity, water, sewage, security and operation of law are activities which affect the production as well as consumption of tourism. These can be converted into opportunities for investment and employment. Tourism has many sectors, which can make a high contribution to the socio-economic development of developing countries. Investments can be in any of these areas and can be carried out by various companies, domestic or international. New opportunities in employment can be created for semiskilled staff, particularly women, which mean the development of tourism in developing countries results in positive effects that promote economic growth, while reducing unemployment and poverty (Telce and Schroenn, 2006). Pioneering studies have highlighted its potential effects in promoting growth, creating jobs and generating revenue for the government (Lea, 1988; Sinclair, 1998).

However, tourism is an industry that requires capital, infrastructure, knowledge and access to global marketing and distribution chains. Hence, access to financial resources is significantly important for achieving tourism development and economic growth. FDI would play an important role in developing the tourism industry, particularly in developing countries, by providing the required capital and infrastructures such as international airports, highways, hotels and modern technologies which are the keystones to tourism development.

Hence, most governments in developing countries place the highest precedence on attracting FDI for further tourism arrivals and economic growth (Zhang and Chong, 1999; Andergassen and Candela, 2009). Therefore, there is a causal relationship between FDI and tourist arrivals, with FDI improving the quantum and quality of service, then the international tourist arrival numbers increase (Selvanathan et al., 2012). A further connection from FDI to tourism is via business tourists. However FDI in tourism is still rather low – in both developed and developing countries – compared to the levels of FDI in other economic activities, including other services industries. (UNCTAD (2007))But it does not mean that tourism-related FDIs are not significant FDI is definitely used as an important tool for expanding the tourism industry in developing countries. On the other hand, there is a causal relationship between tourism and FDI in that tourists usually demand goods and services such as accommodation, food, transportation facilities and entertainment in the host country. In most developing countries, to satisfy this increasing demand, the current level of production needs to increase. Since there is a shortage of facilities and infrastructure in developing countries, FDI is considered an effective channel for transferring the trade, knowledge and technologies leading to economic growth. Thus, governments prefer to attract further FDI to expand domestic products.

Tourism industry is one of Sri Lanka's oldest industries. Similar to the tea industry, since the Silk Route merchants travelled to the East, Sri Lanka has always been an ideal destination to transit and visit. Its diversity is great even as its size is small in comparison to many neighboring countries.

The significance of the tourism sector to the Sri Lankan economy can be seen from the development plan "Mahinda Chinthana" in 2005/2010 which pledged the necessity of developing tourism in the country. Emphasis was placed on developing the city of Colombo as a clean and modern place for exclusive shopping and developing other selected coastal areas and historical places and sites of tourist attraction. Extensive investment is planned for attaining this objective. The country would need investment exceeding the level of domestic savings of the country.

The Tourism Act No 38 of 2005 came into effect in October 2007. The Act provided for the setting up of the Sri Lanka Tourism Development Authority (SLTDA) which is committed to developing Sri Lanka as a tourist and travel destination. The SLTDA's target is to grow and achieve Tourism revenues from total annual tourism revenues of Rs.42, 585 million in 2006 to Rs.327 million in 2016.

The tourism sector requires investment in many forms and FDI is one such source. This introduces a causal link from FDI (to this sector and hence overall) to tourist arrivals as this attracts greater numbers of visitors due to better facilities. A further indirect link from FDI to tourism is through business tourists. These are entrepreneurs and managers from other countries who, while looking for opportunities to invest in Sri Lanka as well as to promote and sustain business in Sri Lanka visit several tourist destinations. This in turn is likely to boost FDI into this sector as well as other related sectors to improve the proportion and quality of service provided wherever lacking. Consequently there is a reverse causality that links tourism to FDI.

The nature of FDI involvement is diverse. It is wrong to assume that the relationship is bi-lateral, that the relationship is just between the foreign and host countries. It is better to think about the relationship as a web that spans several countries. Understanding the causality helps in formulating appropriate economic policies.

If there is clear-cut unidirectional causality from tourism growth to FDI, then making strides in tourism growth must be prioritized. If the outcome shows the opposite direction of causality, then every effort should be made for overall tourism-related FDI as this, in turn, will result in the expansion of the tourism industry. If there is no causal relationship between tourism growth and FDI, then there is no feedback effect between each other. Finally, if the relationship is bidirectional, and tourism and FDI have a reciprocal causal relationship, then major initiatives in both areas would benefit both. Hence the objective of this study is set as the study of causality between FDI and tourism for Sri Lanka.

Background of the Tourism Sector in Sri Lanka

Tourism has been a significant foreign exchange earner for Sri Lanka. It has been experiencing an impressive growth both in terms of tourist arrivals and in foreign exchange revenues after the restoration of peace and normalcy in the country in 2009. Tourist arrivals reached one million in 2012, an increase of 17% over 2011. On average tourist arrivals have increased by5% during the past ten years. Foreign exchange earnings exceeded US$ 1 billion, an increase of 16% over 2011. Foreign exchange earnings from tourism have increased on average around 8.5 % during the period, 2005 to 2013.This has increased to an average of 13.5 % after 2009.

Contribution of the Tourism sector to the real GDP during the last ten years has increased by 35 % on average and it has increased to 40% since 2009. Total FDI inflows to Sri Lanka has grown at an average of 6 % and shows an increase in the growth rate to 7.4% after 2009, while FDI to the tourism sector has indicated considerable increase with FDI on tourism sector in 2011 being US$ millions 215,605. The proportion of FDI in the tourism sector as a percentage of the total FDI receipts has been gradually increasing reaching a 7.5% rate in 2011.

The Board of Investment (BOI) is the agency tasked with attracting Foreign Direct Investments (FDI) to Sri Lanka. It has been playing a pivotal role in executing this strategy, by attracting top tier tourism and hotel investors to the country. IT has identified key sectors for FDI, namely, Hotels / Resorts / Villas ,Higher-end restaurants, Leisure / Entertainment and Theme Parks, Tourist transport: Domestic and International Sea & Air transport , Meeting Incentive Convention and Exhibition: MICE, Domestic and International Air transport / Water-based transport, Skill Development: Hotel / Hospitality Training Institutes and some ancillary areas such as Convention and Exhibition Centers' ,Entertainment Complex / Tourist Shopping Complex, Water Sports / Golf Course / Race Course / Angling, Spa & Wellness Centers ,Yacht Marina, Eco-Lodges, Camping, Whale & Dolphin Watching and Coastal Ferry Service & Cruise Lines and the like

Sri Lanka government has identified some key areas for tourism development and is promoting them for hotel and resort projects. These destinations are Kuchchaveli in Trincomalee district on the north-eastern coast, Passikudah on the east coast, Kalpitiya on the north western coast consisting of 14 different islands, and Dedduwa near the river Madhu Ganga located close to Bentota on the south western coast.

The government has ensured that the building blocks for economic growth are being developed simultaneously with major infrastructure projects such as expressways, airports and seaports. Sri Lanka's first ever expressway from the capital Colombo to the southern hub of Galle was opened in November 2011, greatly reducing travel time. The construction of the Colombo to Katunayake Expressway connecting to the international airport was completed in 2013. Additionally plans for

highways from Katunayake to Anuradhapura in the Cultural Triangle, Colombo to the hill capital Kandy and from Anuradhapura to Jaffna at the northern tip of the country are being finalized.

To develop the tourism sector in the South and the East of the country, a second international airport at Mattala was opened in the southern Hambantota district. The existing airport in Katunayake is being developed, with the addition of a passenger terminal and expanded cargo handling facilities. Domestic airline services are also being developed. Sri Lankan Airlines has commenced seaplane operations connecting Colombo to 12 destinations within the country to make different tourist destinations across the country more accessible.

Considering significant growth in the industry, one of the most prestigious global travel publications, the largest travel guide book and digital media publisher in the world "Lonely Planet", has ranked Sri Lanka as the Best Country to Visit in 2013. In its effusive article on Sri Lanka, Lonely Planet said, "Investment is fuelling the tourism industry and visitor numbers are steadily increasing. Prices are affordable and with affordable flights from the convenient travel hub of Bangkok, Sri Lanka is emerging as one of the planet's best value destinations." As Lonely Planet notes although Sri Lanka has traditionally been known as a predominantly a beach destination, it offers culture, nature, agro, community, religious and spiritual attractions. "Endless beaches, timeless ruins, welcoming people, oodles of elephants, killer surf, cheap prices, fun trains famous tea, and flavorful food are an experience that will fascinate any traveller."

As a very high interest among global travelers' is observed, there is a very strong opportunity for investment in this sector

The Data

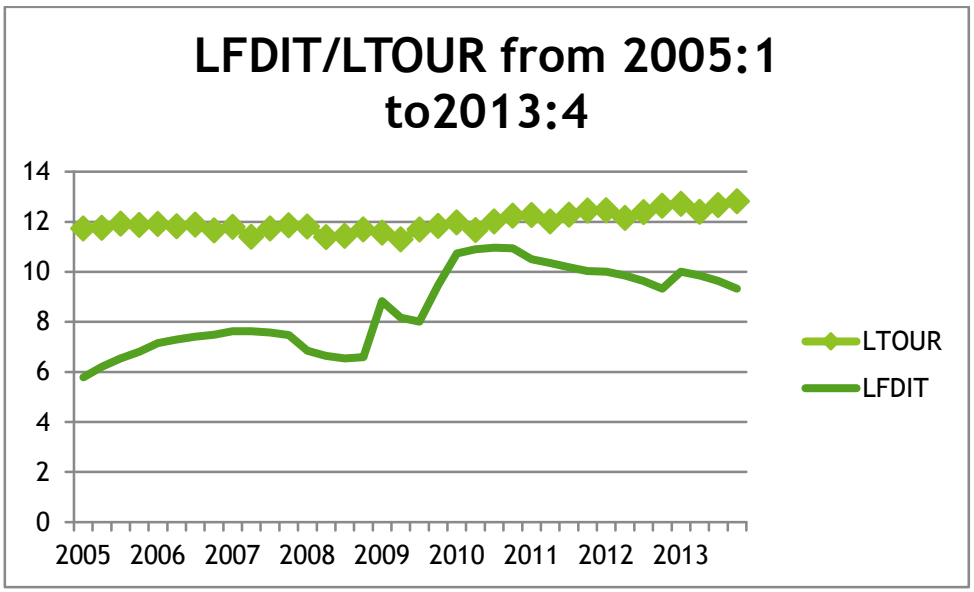
Time series analysis is carried out to investigate the possibility of two-way causality between FDI on tourism and tourism. Quarterly Data on foreign direct investment on Tourism (FDIT) and the number of foreign tourist arrivals (TOUR) and Foreign Exchange Earnings on Tourism (FEE) for the period 2005:1 to 2013:4 is utilized in this study. The restriction of the sample to 36 observations is due to non availability of data.

This study is based on secondary data obtained from the statistics maintained by the Board of Investment – Sri Lanka and Sri Lanka Tourism Development Authority. Various issues of the Annual Reports/ Monthly Bulletin published by the Central bank of Sri Lanka

A Preliminary Data Analysis

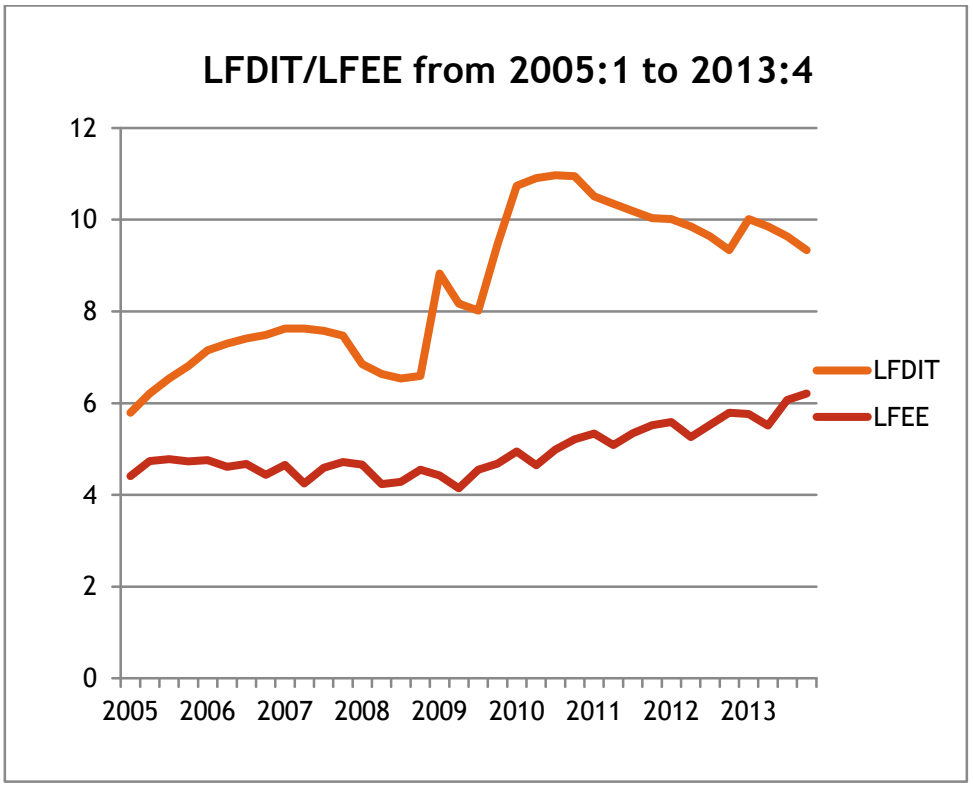
Quarterly time series data for the period 2005(1) to 2013(4) for the variables in natural log-form, namely the number of foreign tourist arrivals (TOUR) to Sri Lanka , the amount of foreign direct investment (FDIT) and Foreign Exchange Earnings from Tourism(FEE) into Sri Lanka (in US$ millions) were utilized. Figure 1 plot the two original series, FDIT and TOUR in natural logarithms, while Figure 2 plots the two series FDIT and FEE. As can be seen, all there series were relatively stable with a clear upward trend.

Figure: 1 Log of FDI on Tourism/ Log of Tourist Arrivals



Source: Authors Calculation using data from the CBSL and the BOI Sri Lanka

Figure 2: Log of FDI on Tourism/ Log of Foreign Exchange Earnings from Tourism



Source: Authors Calculation using data from the CBSL and the BOI Sri Lanka

Cointergration tests were carried out in order to ensure that the series are not cointergrated. The results are presented in Table 1 and Table 2

Table! Cointergration Test for FDIT and TOUR

Sample (adjusted): 3 36				
Unrestricted Co integration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
At most 1 *	0.121011	4.385433	3.841466	0.0362
Trace test indicates no co integration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Co integration Rank Test (Maximum Eigen value)				

The results depicted on Table 1 clearly show that both the least squares residual series are non-stationary and hence the series TOUR and FDIT are not co integrated indicating that there is no long-run equilibrium relationship between FDI and the number of foreign tourist arrivals in Sri Lanka.

Table 2 Cointergration Test for FDIT and FEE

Unrestricted Co integration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
None	0.183670	9.207248	15.49471	0.3466
At most 1	0.065614	2.307423	3.841466	0.1288
Trace test indicates no co integration at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Co integration Rank Test (Maximum Eigen value)				

The results on depicted on Table 2 also show that both the least squares residual series are non-stationary and hence the series FEE and FDIT are not co integrated indicating that there is no

long-run equilibrium relationship between FDI and foreign exchange earnings from Tourism in Sri Lanka

Testing for Granger Causality

Taking FDIT and TOUR into analysis, it was found that both series TOUR and FDIT are not co integrated. Therefore they have no long term relationship. They may nonetheless be related in the short-run. Their short-run fluctuation can be described by their first-differences, which are stationary. The interactions in the short-run fluctuations may therefore be described by a VAR system in first differences.

$$\Delta TOUR_t = \alpha_{01} + \alpha_{11}\Delta TOUR_{t-1} + \alpha_{21}\Delta TOUR_{t-2} + \alpha_{31}\Delta TOUR_{t-3} + \beta_{11}\Delta FDIT_{t-1} + \beta_{21}\Delta FDIT_{t-2} + \beta 31\Delta FDIT_{t-3} + u_{1t} \text{ ----EQ1}$$

$$\Delta FDIT_t = \alpha_{02} + \alpha_{12}\Delta TOUR_{t-1} + \alpha_{22}\Delta TOUR_{t-2} + \alpha_{32}\Delta TOUR_{t-3} + \beta_{12}\Delta FDIT_{t-1} + \beta_{22}\Delta FDIT_{t-2} + \beta_{32}\Delta FDIT_{t-3} + u_{2t} \text{ ----EQ2}$$

In equation (EQ1) the null hypothesis to test "non-causality" that "FDI does not cause TOUR" (H_0:FDI≠>TOUR) is that: H_0: $\beta_{11} = \beta_{21} = \beta_{31} = 0$

Rejection of the null hypothesis means that FDI causes TOUR in the Granger sense.

Similarly in equation (EQ2) the null hypothesis to test "non causality" that "TOUR does not cause FDI" (H_0: TOUR≠>FDI) is that H_0: $\alpha_{12} = \alpha_{22} = \alpha_{32} = 0$

The optimal lag length for the VAR system was determined by using the Schwarz (1978) Criterion (SC) and the Akaike (1974) Information Criterion (AIC). A VAR system of *k* lags was used with estimations for various lag lengths. It was found that the optimal lag lengths for both the FDIT and TOUR series to be 3 lags. Therefore the final system to be used is a VAR (3). Table 3 and Table 4 indicate the results of the Granger Causality Test

Table 3 Pair wise Ganger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.

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LTOUR does not Granger Cause LFDIT	33	2.05710	0.1305
LFDIT does not Granger Cause LTOUR		2.05656	0.1306

Rejection of the null hypotheses means that TOUR causes FDIT. The rejection of null hypotheses in both the tests implies a bi-directional causality in the Granger sense and the acceptance of either one only indicates a uni-directional causality.

Table 3 presents the results for causality between TOUR and FDIT. Row 1 shows the outcome for testing of H0: TOUR≠>FDI, for which the p-value.13. This value is larger than the level of significance 0.10. Therefore, the null hypothesisH0: "TOUR does not cause FDI" is not rejected. As shown from row 2 of the Table, for testing the null hypothesis, H0: FDIT≠>TOUR, the p-value is 0.13, which is greater than the level of significance, 0.10. Hence the null hypothesis that FDIT does not cause TOUR" is not rejected.

Consequently, Foreign Exchange Earnings from Tourism (FEE) was utilized in place of tourist arrivals, and similar tests were carried out for which the results are presented in Table 4.From the analysis, it was also found that both series FEE and FDIT are not co integrated. Therefore they have no long term relationship. They may nonetheless be related in the short-run. Their short-run fluctuation can be described by their first-differences, which are stationary. The interactions in the short-run fluctuations may therefore be described by a VAR system in first differences. Similar to the earlier case it was found that the optimal lag lengths for both the FDIT and FEE series also to be 3 lags. Therefore a VAR (3) system is used.

$$\Delta FEE_t = \alpha_{01} + \alpha_{11}\Delta FEE_{t-1} + \alpha_{21}\Delta FEE_{t-2} + \alpha_{31}\Delta FEE_{t-3} + \beta_{11}\Delta FDIT_{t-1} + \beta_{21}\Delta FDIT_{t-2} + \beta 31\Delta FDIT_{t-3} + u_{1t} \text{ -----EQ3}$$

$$\Delta FDIT_t = \alpha_{02} + \alpha_{12}\Delta FEE_{t-1} + \alpha_{22}\Delta FEE_{t-2} + \alpha_{32}\Delta FEE_{t-3} + \beta_{12}\Delta FDIT_{t-1} + \beta_{22}\Delta FDIT_{t-2} + \beta_{32}\Delta FDIT_{t-3} + u_{2t} \text{ ------EQ4}$$

In equation (EQ3) the null hypothesis to test "non-causality" that "FDI does not cause FEE" (H_0:FDI≠>FEE) is that: H_0: $\beta_{11} = \beta_{21} = \beta_{31} = 0$

Rejection of the null hypothesis means that FDI causes FEE in the Granger sense.

Similarly in equation (EQ4) the null hypothesis to test "non causality" that "FEE does not cause FDI" (H_0: FEE≠>FDI) is that H_0: $\alpha_{12} = \alpha_{22} = \alpha_{32} = 0$

Table 4 Pair wise Ganger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
LFEE does not Granger Cause LFDIT	33	1.77589	0.1765
LFDIT does not Granger Cause LFEE		1.74034	0.1834

Rejection of the null hypotheses means that FEE causes FDIT. The rejection of null hypotheses in both the tests implies a bi-directional causality in the Granger sense and the acceptance of either one only indicates a uni-directional causality.

As shown in row 1 Table 4 for the testing of hypothesis H0: FEE≠>FDI, the p-value is .17, which is larger than the level of significance 0.10. Therefore, the null hypothesis H0: FEE does not cause FDI" is not rejected. As shown in row 2 of the Table, for testing the null hypothesis, H0: FDIT≠>FEE, the p-value is 0.18, which is greater than the level of significance, 0.10. Hence the null hypothesis that "FDIT does not cause FEE" is also not rejected.

Limitations of the Study

FDIT was defined as FDI received on" Hotels and Restaurants". However, FDI inflow under other categories would have had a direct influence on Tourism which was not incorporated under the definition of FDIT.

The data set utilized in this study consisted of 36 observations of quarterly data on FDIT, in US$ millions, number of tourist arrivals (TOUR) and Foreign Exchange Earnings from Tourism(FEE) from 2005:1 to 2013:4. This was mainly due to the non-availability of quarterly data on FDIT for the period earlier than 2005. Although annual data on FDI in general was available from 1978, utilizing annual time series was prevented due to the non availability of FDI on Tourism sector. This constraint on data availability prevented carrying out the study for a longer period of time and utilizing annual data in order to confirm the outcome of the quarterly data analysis. The conclusions presented in the ensuing section are subject to the limitations stated.

Conclusions

In this study the causal relationship between Foreign Direct Investment in Tourism (FDIT) and the number of foreign tourist arrivals (TOUR) and Foreign Direct Investment and Foreign Exchange Earnings from Tourism (FEE) in Sri Lanka was investigated. Quarterly data for the period 2005:1 to 2013:4 were utilized. For this investigation various time series econometric techniques such as unit root test, co integration and causality were utilized. The analysis revealed that the two time series TOUR and FDI, FEE and FDIT are both not co-integrated. The VAR systems in first-difference of the variables were used to investigate the causality between TOUR and FDIT and FEE and FDIT.

The results show that there is bi-directional causal relationship from FDIT to tourism and FDIT to FEE. That is FDIT has a causal effect on the number of foreign tourist arrivals and Foreign Exchange Earnings in Sri Lanka and vice versa. As pointed out in the introduction, FDIT plays a significant role in expanding the tourism sector in Sri Lanka at the same time expansion in the tourism sector namely increased foreign exchange earnings from tourism and increased foreign tourist arrivals plays a significant role in increasing FDIT to Sri Lanka. This shows that appropriate policy to explore tourism resources and plans to develop new tourist venues and facilities may

need to be considered in order to meet the increasing demand of tourism in Sri Lanka expected as a result of continued strong foreign direct investment and measures to increase FDIT with a view to increasing tourist arrivals and foreign exchange earnings from tourism.

Available policies may be "soft" such as government support for eco tourism, promoting cultural heritage sites, medical tourism, Agro tourism, trade fairs and maintaining tourism internet sites or "hard" such as government providing incentives to foreign investors. Accordingly, tourist arrivals will increase making a positive influence on economic development.

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Paper No. 14

Trend, Pattern and Determinants of Foreign Direct Investment in South Asian Countries

Dr. Kabita Kumari Sahu*

Abstract

The objective of the paper is to analyse the trend and linkage of FDI net inflow and GDP growth in five south Asian countries. The study is based on secondary data collected from World Bank data base and ADB data base. South Asian countries have opened up and made their FDI policy environments conducive to foreign investment. In absolute term, India has highest net inflow of FDI followed by Pakistan, Bangladesh, Sri Lanka and Nepal. Sri Lanka has highest average FDI inflow as percentage of GDP which is 1.31 % followed by Pakistan (1.22 %), India(1.12 %) and Nepal has the least performance in this regard. In five south Asian countries, the regression coefficients are positive but it is significant in few countries. It implies that GDP has positive effect on FDI.

Key Words Determinant, Economic Growth, Foreign Direct Investment, Inflation, Pattern

JEL Code E22, F21

Introduction

Foreign direct investment (FDI) is a direct investment into production or business in a country by an individual or company of another country, either by buying a company in the target country. It has strong linkages with economic growth of a country. The urban growth and other economic activities during new round of globalization can be measured largely by the inflows and outflows of Foreign Direct Investment (FDI) which has become one of the driving forces binding countries into closer economic interdependence, and it continues to expand. The rapid increase in FDI flows has generated considerable impact on industrialization and urbanization in all south Asian Countries. The role of foreign direct investments in the growth and urbanization of five South Asian Countries has captured the attention of many researchers and analysts. There exist significant positive correlation between GDP growth and flow of FDI in five south Asian countries. In this context, the objectives of the present study is to analyze the trend and linkage between GDP growth and FDI inflow. All five South Asian countries (India, Pakistan, Bangladesh, Sri Lanka and Nepal) have been following consistent economic reform policy measures emphasizing the market economy and aimed at integrating their economies with the rest of the world. Consequently, all except Pakistan have experienced higher economic growth and an improvement in most macro economic indicators both in the domestic and external sector. Indeed, the South Asian region has been one of the fastest growing regions in the world in recent years. Overall, the FDI environment has undergone a sea change in South Asian countries during the 1990s, and more so in recent years. With their liberalized approach to FDI and constant changes in improving the FDI policy

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framework, it is certain that South Asia has become an important destination for investment. There has been a positive change in policies with regard to FDI with efforts directed more towards bilateral trade agreements and providing investment incentives to foreign investors in all South Asian countries. The basic indicators, including infrastructure, show that all five south Asian countries lack adequate infrastructure facilities and governance. Thus, more effective public investment on economic and social infrastructure, along with stable economic policies to create an enabling environment, would attract more foreign direct investment. Analyses of FDI flows to south Asian countries reveal that there has been an increasing trend of FDI into South Asian countries. However, apart from India, the share as well as the absolute volume of FDI inflow to these countries is negligible. FDI in South Asia is mostly concentrated in manufacturing and services. The study is based on secondary data from 1991 to 2013 collected from South Asia Development reports, World Bank and ADB data base, monetary policy report of Nepal and various research reports. The study has used growth rates of FDI, GDP and Inflation.

Literature Review

There is plenty of literature on inflow of FDI and GDP growth rates in different countries. Heid and Ries (1996) studied 931 joint ventures in 54 cities from 1984 to 1991. They intentionally exclude investments by overseas Chinese (Hong Kong, Macau, Singapore) which probably have a different set of location determinants due to familial, linguistic, and cultural ties. Their conditional logit regression shows that cities with good infrastructure, established industrial base and foreign investment presence are more attractive to investors. Wei (1995a) also looked at individual cities. He found clear evidence that in the late 1980s, FDIs contribute to higher growth of the cities. As mentioned by Busse and Groizard (2005), the enormous increase in FDI flows across countries is one of the clearest signs of the globalisation of the world economy over the past 20 years. Total FDI flows increased from some US $55 billion in 1985 to US $1,511 billion before falling back to US $573 billion in 2003 (World Bank, 2005). According to the study done by Pardeep Agrawal (2000) on economic impact of foreign direct investment in south Asia by under talking time -series , cross- section analysis of panel data from five south Asian countries , India , Pakistan , Bangladesh , Srilanka , and Nepal , that there exist complementarily and linkage effects between foreign and national investment . Further he argues that, the impact of FDI inflows on GDP growth rate is negative prior to 1980, mildly positive for early eighties and strongly positive over the late eighties and early nineties. The result of the analysis carried out by Archanun kohpaiboon(2008) on the impact of FDI on growth performance in investment receiving countries through a case study at Thailand for the period 1920 – 2000, shows that the growth impact of FDI tends to be greater an export promotion trade regime compared to an import substitution regime. Li and Liu (2005), by using a single equation and simultaneous equation techniques, examined the relationship between FDI and economic growth on a panel of data for 84 countries for the period 1970 – 1999, and found a positive impact of FDI on economic growth through its interaction with human capital in developing countries, but a negative impact of FDI on economic growth through its interaction with the technology gap.

Getinet and Hirut (2006) studied the nature and determinants of foreign direct investment in Ethiopia over the period 1974-2001. The study gives an extensive account of the theoretical explanation of FDI as well as reviewing the policy regimes, the FDI regulatory framework and institutional set up in the country over the study period. It also undertakes empirical analysis to establish the determining factors of FDI in Ethiopia. This paper findings show that growth rate of real GDP, export orientation, and liberalization, among others, have positive impact on FDI. On

the other hand, macro economic instability and poor infrastructure have negative impact on FDI. These findings imply that liberalization of the trade and regulatory regimes, stable macroeconomic and political environment, and major improvement in infrastructure are essential to attract FDI to Ethiopia. Kinoshita (1998) examined the data from a special survey conducted by the World Bank in 1992 on 468 firms in eight cities in China (six located in coastal provinces and two in inland cities). She investigates the possible effects of FDI on improving a firm's total factor productivity during the 1990–1992 period. She finds no evidence that foreign investment helps increase the productivity growth of local firms via foreign joint ventures, foreign linkages, and the mere presence of foreign firms in the industry. Hence, she concludes that opening up to foreign investments is not sufficient for a country to benefit from foreign technology spillovers. Hermes and Lensink (2003), Durham (2004) and Alfaro et al. (2004) all find that countries with better financial systems and financial market regulations can exploit FDI more efficiently and achieve a higher growth rate. In his important paper, Naughton (1996) points out the critical role that Hong Kong and Taiwan has played on the FDI in Guangdong and Fujian provinces, especially in the 1980s and early 1990s.

FDI Policies in South Asia

South Asian countries have opened up and made their FDI policy environments conducive to foreign investment. Initially, FDI was allowed in a restrictive manner and on mutually advantageous terms with the majority stake held by domestic firms. However, all five south Asian countries tried to encourage FDI more aggressively in the nineties, by making changes in their macroeconomic policies along with trade and FDI policies.

FDI policy in Bangladesh

In the late 1980s and the 1990s, Bangladesh announced a series of measures and liberalized its FDI policy framework. In recent years, Bangladesh has significantly improved its investment and regulatory environment, including the liberalization of the industrial policy, abolition of performance requirements and allowance of full foreign-owned joint ventures. Since 1996, new sectors have been opened up for foreign investment, including the telecommunications sector. Foreign direct investment is encouraged in all industrial activities in Bangladesh excluding those on the list of reserved industries such as production of arms and ammunitions; forest plantation and mechanized extraction within the bounds of a reserved forest, production of nuclear energy and printing and minting fresh currency notes.

FDI Policy in India

The new economic policy and the new industrial policy of 1991, a series of policy measures were announced to liberalise the FDI environment in the country. As a result, India today has one of the most attractive FDI policies in the South Asian region. The first and second generation reforms created a conducive environment for foreign investment in India. The Foreign Direct Investment (FDI) policy is reviewed on a regular basis. The restrictions have been imposed in view of sectoral requirements, security and strategic concerns and in the interest of the domestic investments. There are only a few sectors where FDI is not permitted.

FDI policy in Nepal

A comprehensive policy towards foreign investment was introduced in Nepal in the 1980s. Nepal began to encourage private foreign investment in every industrial sector (medium and large-scale), with the exception of defense activities. Joint ventures were the preferred form of investment, and limitations were set on the level of foreign equity holdings. With regard to medium sized industries, foreign equity of 50 percent was allowed. In large industries exporting more than 90% of their total production, foreign equity was allowed up to 100 percent. In other large industries, the maximum was set at 80 percent foreign equity. In a step to further liberalize its foreign investment policy, Nepal announced a new set of incentives through the 1987 Act, under which the full remittance of dividends for investments in convertible currency was allowed. Most sectors have been opened up to foreign investors, allowing 100 percent equity or joint ventures with Nepalese investors. FDI is also not permitted in the retail business; travel agencies; cigarette, tobacco and alcohol production other than for export; a range of small tourist related activities, including tourist lodging, etc. Since Nepal is a small country with a unique ecosystem, the government is sensitive to the environmental impact of industries. Projects must go through environmental impact assessments and initial environmental examinations.

FDI policy in Pakistan

Pakistan began to actually open up its economy and liberalize its FDI policies towards the end of the 1980s. A new industrial policy package was introduced in 1989 recognizing the role and importance of the private sector, and a number of regulatory measures were taken to improve the business environment in general and attract FDI in particular. In November 1997, the government of Pakistan announced the New Investment Policy that included major policy initiatives to attract FDI, which had earlier been restricted to the manufacturing sector. It was now opened up to sectors like services and agriculture, which constitute three fourths of GNP. Foreign investors are allowed to hold up to 100 percent equity of industrial projects without any permission from the government except in certain fields of activity such as: (a) arms and ammunition (b) high explosives (c) radioactive substances (d) security printing, currency and mint; and (e) alcoholic beverages and liquors. Foreign investment at 100 percent equity on a repatriable basis is allowed in the service, infrastructure and social and agricultural sectors. FDI is also actively encouraged in tourism, housing and construction, information technology, etc.

FDI policy in Sri Lanka

During post 1977 period, when Sri Lanka launched its economic reform which favoured private-sector led, export-oriented development including a greater role for FDI. The most important feature of FDI policy measure in Sri Lanka was the establishment in 1992 of the Board of Investment (BOI), with wide powers of tax relief and administrative discretion in all matters related to FDI which is permitted in most sectors but like most of its neighbouring South Asian economies such as India, Sri Lanka has a long negative list of sectors where FDI is barred completely or where foreign investors may only take a minority stake in an enterprise. However, there are regulated areas such as the growing and processing of primary commodities, mining, timber-based industries, education, etc., where foreign investment is restricted to 40 percent and approval by the BOI is required.

Trend of FDI Net Inflows to South Asia

FDI inflows in absolute value to South Asia have continuously increased over the years and particularly since 2000. The improved investment environment and the privatization of assets in Pakistan and Bangladesh contributed to increased FDI inflows to those countries. Overall, business confidence in South Asia improved. While the share of South Asia in the FDI inflows of developing countries is about 3 percent, its share in the global FDI inflows is almost negligible at 1.08 percent. The FDI net inflow in 5 south Asian countries are given in table-1.

Table-1 FDI Net Inflow (in Million USD)

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1991	1.39	73.54	NA	258.41	48.35
1992	3.72	276.51	NA	336.48	122.63
1993	14.05	550.37	NA	348.56	194.48
1994	11.15	973.27	NA	421.02	166.41
1995	1.90	2143.63	NA	722.63	56.00
1996	13.53	2426.06	19.16	921.98	119.87
1997	139.38	3577.33	23.06	716.25	430.06
1998	190.06	2634.65	12.02	506.00	193.42
1999	179.66	2168.59	4.35	532.00	176.41
2000	280.38	3584.22	-0.48	308.00	172.94
2001	78.53	5471.95	20.85	383.00	171.79
2002	52.34	5626.04	-5.95	823.00	196.50
2003	268.29	4322.75	14.78	534.00	228.72
2004	448.91	5771.30	-0.42	1118.00	232.80
2005	760.50	7269.41	2.45	2201.00	272.40
2006	728.62	20029.12	-6.65	4273.00	479.70
2007	650.18	25227.74	5.74	5590.00	603.00
2008	1023.74	43406.28	1.00	5438.00	752.20
2009	823.60	35581.37	38.18	2338.00	404.00
2010	861.74	27396.89	87.80	2018.00	477.56

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
2011	1184.78	36498.65	94.02	1308.77	955.92
2012	1474.54	23995.69	92.00	858.73	941.12
2013	1501.65	28153.03	73.63	1307.00	915.57
Mean	464.89	12485.15	26.42	1446.16	361.38
SD	491.39	13930.33	35.28	1579.34	287.42

Source- World Bank Database

In absolute term, India has highest net inflow of FDI followed by Pakistan, Bangladesh, Sri Lanka and Nepal. There is significant fluctuation in FDI net inflows in all 5 south Asian countries with high values of standard deviations. During 2002-03, there is significant fall in FDI net inflows in Bangladesh and it is negative in Nepal in 2000, 2002, 2004 and 2006. The time series of FDI inflows in all 5 countries are non stationary as per Dicky Fuller tests. The linear least square trend was computed and results are shown in table-2. There is positive coefficient which are significant at 1 percent level in Bangladesh, India, Nepal and Sri lanka but significant at 5 percent in Pakistan. The coefficient of determination is highest in Bangladesh.

Table-2 Linear least square regression coefficients and other parameters

Country	Coefficient	T value	R2
Bangladesh	66.54*	10.64	0.844
India	1736.45*	7.254	0.715
Nepal	4.283*	3.403	0.420
Pakistan	121.337**	2.798	0.272
Sri Lanka	35.347*	6.929	0.696

Source- Computed using SPSS

FDI net inflows as percentage of gross domestic product is shown in table-3.

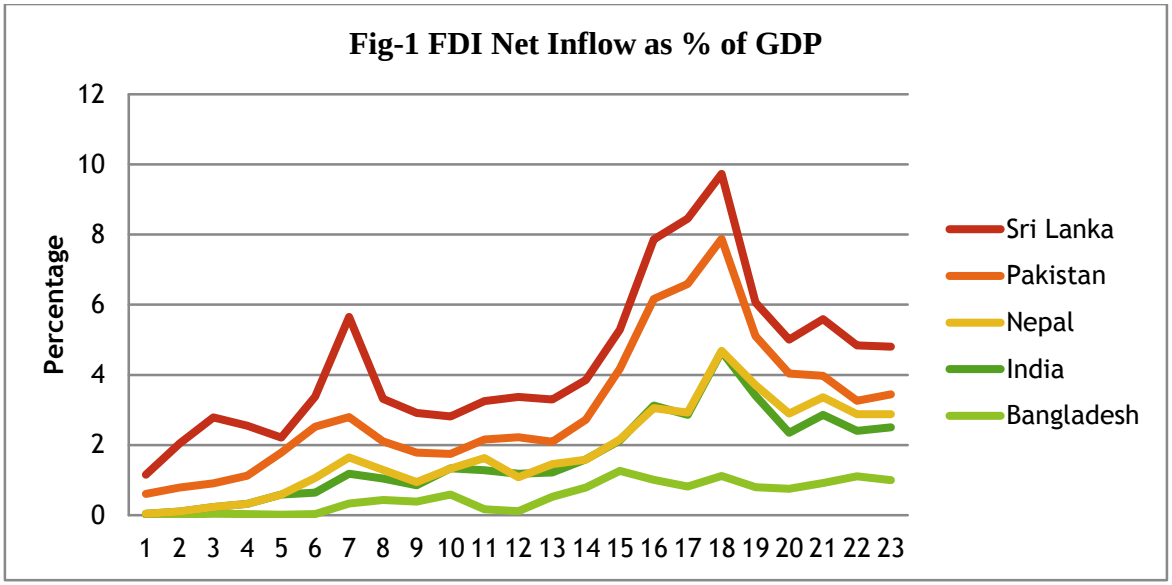
Table-3 FDI Net inflow as percentage of GDP

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1991	0.01	0.03	NA	0.57	0.54
1992	0.01	0.09	NA	0.69	1.26
1993	0.04	0.19	NA	0.68	1.88
1994	0.03	0.29	NA	0.81	1.42

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1995	0.01	0.58	NA	1.19	0.43
1996	0.03	0.61	0.42	1.46	0.86
1997	0.33	0.85	0.47	1.15	2.85
1998	0.43	0.61	0.25	0.81	1.22
1999	0.39	0.46	0.09	0.84	1.13
2000	0.59	0.75	-0.01	0.42	1.06
2001	0.17	1.11	0.35	0.53	1.09
2002	0.11	1.07	-0.10	1.14	1.15
2003	0.52	0.70	0.23	0.64	1.21
2004	0.79	0.80	-0.01	1.14	1.13
2005	1.26	0.87	0.03	2.01	1.12
2006	1.01	2.11	-0.07	3.11	1.70
2007	0.82	2.04	0.06	3.67	1.86
2008	1.12	3.55	0.01	3.20	1.85
2009	0.80	2.61	0.30	1.39	0.96
2010	0.75	1.60	0.55	1.14	0.96
2011	0.92	1.94	0.50	0.61	1.62
2012	1.11	1.29	0.48	0.38	1.58
2013	1.00	1.50	0.38	0.56	1.36
Mean	0.53	1.12	0.22	1.22	1.31
SD	0.43	0.87	0.22	0.97	0.51

Source- World bank database

Sri Lanka has highest average FDI inflow as percentage of GDP which is 1.31 % followed by Pakistan (1.22 %), India(1.12 %) and Nepal has the least performance in this regard. Fig-1 indicates that Sri Lanka and Pakistan are better performers in FDI in south Asian countries.



The South Asian countries have been making consistent efforts to attract more FDI by liberalizing their FDI policy frameworks to compete with other countries in the region. Nepal, being a least-developed country in the South Asian region, has attracted the least amount of foreign investment in the entire region. A close study of the economy indicates that it is largely dependent on its big brother neighbor, India. In fact, the major chunk of FDI in Nepal is from

India. Moreover, the Maoist struggle and other ethnic conflicts have made investors weary of investing in Nepal. The GDP growth in 5 south Asian countries are given in Table-4.

Table-4 GDP growth rate (Annual %) in South Asia

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1991	3.34	1.06	6.37	5.06	4.60
1992	5.04	5.48	4.11	7.71	4.40
1993	4.57	4.75	3.85	1.76	6.90
1994	4.08	6.66	8.22	3.74	5.60
1995	4.93	7.57	3.47	4.96	5.50
1996	4.62	7.55	5.33	4.85	3.80
1997	5.39	4.05	5.05	1.01	6.41
1998	5.23	6.18	3.02	2.55	4.70
1999	4.87	8.85	4.41	3.66	4.30
2000	5.94	3.84	6.20	4.26	6.00

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
2001	5.27	4.82	4.80	1.98	-1.55
2002	4.42	3.80	0.12	3.22	3.96
2003	5.26	7.86	3.95	4.85	5.94
2004	6.27	7.92	4.68	7.37	5.45
2005	5.96	9.28	3.48	7.67	6.24
2006	6.63	9.26	3.36	6.18	7.67
2007	7.06	9.80	3.41	4.83	6.80
2008	6.01	3.89	6.10	1.70	5.95
2009	5.05	8.48	4.53	2.83	3.54
2010	5.57	10.26	4.82	1.61	8.02
2011	6.46	6.64	3.42	2.75	8.25
2012	6.52	4.74	4.85	3.51	6.34
2013	6.01	5.02	3.78	4.41	7.25

Source-World bank database

The Karl Pearson's coefficients of correlation between FDI net inflow and GDP growth are shown in Table-5. Bangladesh has strong positive correlation (0.703) which is significant at 1 percent level and Sri Lanka has coefficient of correlation of 0.509 which is significant at 5 percent level of significance. It implies that increase in FDI increases GDP of a country. The coefficient is lowest in Pakistan, that is 0.025.

Table-5 Correlation between FDI net Inflow and GDP Growth

Country	Coefficient of correlation	Significance Level(Two tailed)
Bangladesh	0.703*	0.000
India	0.193	0.378
Nepal	0.111	0.661
Pakistan	0.025	0.909
Sri Lanka	0.509**	0.013

Significant at 1 % level, ** Significant at 5 % level

Source- Computed using SPSS

Inflation is considered as a determinant of FDI inflow to a country. The economics theory suggests that a country receives less FDI if it experiences higher rates of inflation. Hence pearson's correlation was computed between FDI net inflows and inflation rates which are shown in table-6. All countries have positive correlation but the coefficients are significant at 5 percent only in Bangladesh and Nepal.

Table-6 Correlation between FDI Net Inflow and inflation rate

Country	Coefficient of correlation	Significance Level(Two tailed)
Bangladesh	0.460**	0.026
India	0.186	0.394
Nepal	0.491**	0.039
Pakistan	0.144	0.511
Sri Lanka	0.019	0.933

Significant at 1 % level, ** Significant at 5 % level, *** Significant at 10 % level

Source- Computed using SPSS

Linkage between FDI net inflow and GDP growth

Three functional forms of regression such as linear, Logarithmic and growth equations are used by considering FDI net inflow as dependent variable and GDP growth as dependent variable. A country with higher GDP growth rate attracts more FDI than other countries. In Bangladesh, the regression coefficients in all three models are significant at 1 percent level. Hence there exist significant cause and effect relationship between FDI inflow and GDP in Bangladesh as shown in table-7.

Table-7 Model Summary and Parameter Estimates of Regression for Bangladesh

Dependent Variable: FDI Net Inflow , Independent Variable- GDP growth rate

Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Linear	.494	20.472	1	21	.000	-1610.383	383.385
Logarithmic	.469	18.518	1	21	.000	-2749.605	1919.464
Growth	.631	35.897	1	21	.000	-5.668	1.953

Source- Computed using SPSS

In India, the regression coefficients are positive but it is significant only in growth equation. It implies that GDP has positive but insignificant effect on FDI in India.(Table-8)

Table-8 Model Summary and Parameter Estimates of Regression for India

Dependent Variable: FDI Net Inflow, Independent Variable- GDP Growth

Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Linear	.037	.811	1	21	.378	5242.508	1127.373
Logarithmic	.039	.856	1	21	.365	2645.152	5565.176
Growth	.178	4.561	1	21	.045	6.609	.297

Source- Computed using SPSS

In Nepal, regression coefficients are positive but not significant as shown in table-9.

Table-9 Model Summary and Parameter Estimates of Regression for Nepal

Dependent Variable: : FDI Net Inflow , Independent Variable- GDP Growth

Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Linear	.012	.200	1	16	.661	14.436	2.864
Logarithmic	.044	.738	1	16	.403	15.644	8.511
Growtha	.	.	.	.	.	.	.

Source- Computed using SPSS

a. The dependent variable (Nepal) contains non-positive values. The minimum value is -6.65. Log transform cannot be applied.

In Pakistan, these regression coefficients are positive but not significant.(Table-10)

Table-10 Model Summary and Parameter Estimates of regression for Pakistan

Dependent Variable: FDI Net Inflow , Independent Variable- GDP Growth

Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Linear	.001	.013	1	21	.909	1363.414	20.583
Logarithmic	.000	.000	1	21	.996	1441.799	3.455
Growth	.001	.025	1	21	.875	6.769	.016

Source- Computed using SPSS

In Sri Lankla, the coefficients are positive but not significant.(Table-11)

Table-11 Model Summary and Parameter Estimates of Regression for Sri Lanka

Dependent Variable: FDI Net Inflow , Independent Variable- GDP Growth

Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Linear	.259	7.349	1	21	.013	-33.083	71.966
Logarithmica	.	.	.	.	.	.	.
Growth	.232	6.330	1	21	.020	4.500	.197

Source- Computed using SPSS

a. The independent variable (VAR00016) contains non-positive values. The Logarithmic and Power models cannot be calculated.

Conclusion

FDI has a positive and significant impact on growth (GDP) in all South Asian countries. Other significant factors contributing to growth are exports, gross domestic capital formation and infrastructure. Labor force growth is not significant, indicating that these countries are labor abundant countries, and it does not have any significant impact on growth. The impact of FDI varies from country to country. FDI in services has focused in communications in these countries. The investment scenario of South Asian countries also reveals that they are making rapid strides in the service sectors, with services contributing more that 50 percent to the GDP of each economy. The FDI flow to Nepal is comparatively low due to geographical barriers and low quality of transport infrastructure. The commitment of foreign direct investment in 2013-14 in Nepal has increased marginally by 0.9 percent whereas the number of foreign investment projects has declined by 3.8 percent. During the review period, Department of Industry granted approval to 305 joint venture projects with the foreign direct investment commitment amounting to Rs. 20.10 billion. In the previous year, 317 foreign investment projects having commitment amount of Rs. 19.94 billion received approval. The energy sector of Nepal received FDI commitment of Rs 11186.6 million in 2013-14 followed by manufacturing and service sectors. Of the total 305 approved projects, China ranks first with 119 foreign investment projects, followed by USA (28), India (22), South Korea (22), Japan (15), and UK (12) as well as 87 from other countries. If macroeconomic and investment environments of Nepal and other south Asian Countries can be further liberalised, the trends of FDI are likely to improve in the coming years. It can conclude that there has been a positive change in policies with regard to FDI in all the South Asian Countries. These low-income economies have realised that FDI is not only good debt, but also has a major role in enhancing economic development. Stepping up the economic reform process and making their economies politically stable and free from internal conflict would go a long way toward making South Asia an attractive destination for FDI. Ongoing initiatives such as the further simplification of rules and regulations and improvements in infrastructure are expected to provide the necessary impetus to

increase FDI inflows in the future. However, the image of South Asian countries as corrupt nations, with overprotective labor laws and internal law and order problems, will have to be mitigated to facilitate the entrance of much needed foreign investment.

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Paper No. 15

Devaluation and Testing the J-Curve Hypothesis: A Case of Nepal

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Abstract

This paper has attempted to explore the J-curve phenomenon in the case of Nepalese foreign trade in order to explore whether devaluation of Nepalese exchange rate can be taken as a policy tool to improve Nepalese trade imbalance with the rest of the world economies. Johansen's cointegration test, vector autoregression (VAR) model, impulse response function as well as autoregressive distributed lag (ARDL) bound testing cointegration approach has been employed in order to see the relationship between the real effective exchange rate (REER) index and trade balance (TB) of Nepal. The study found no evidence of "J-curve" in the case of Nepalese trade. On the contrary to the "J-curve" phenomenon as explained by the classical text books, the finding of the study suggest that devaluation of Nepalese exchange rate rather produces a flatter "L-curve" phenomenon indicating that there is no room for improving Nepalese trade imbalance through a exchange devaluation process.*

1. General Background

Nepal is a land-locked small and open economy. It has been engaging in foreign trade since time immemorial. India has been the largest trading partner of Nepal followed by China since the ancient period. The Nepalese trade was confined only in India and China during that period. Despite a long history of involvement in foreign trade, same phenomenon can be observed in recent days too. While, around two-third of Nepalese total trade has been concentrated to India, the share of total trade with China accounts around 10 percent (Table-3, Annex). There is a bilateral Treaty of Trade between India and Nepal to regulate the trade flow between them. Similarly, Nepal has also established an agreement with People's Republic of China for having a smooth trade between them.

The huge concentration of Nepalese trade with India can be attributed to its proximity, sharing of long and open border, historical attachment as well as linguistic, cultural and religious similarities. However, despite sharing of a long border, Nepalese trade with China has not been flourished as expected mainly due to the presence of inaccessible high Himalayas on the northern border. While, most of the Nepalese export to China takes place through Tatopani Customs point, the majority of import from China takes place through the sea route via India.

In addition to the neighboring countries- India and China, Nepal has also reached trade agreements with some other countries like Bangladesh, Bulgaria, China, Czechoslovakia, Egypt, Democratic People's Republic of Korea, Republic of Korea, Mongolia, Pakistan, Poland, Romania,

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* In this article, devaluation and depreciation as well as revaluation and appreciation have been considered equivalent to each other.

Sri-Lanka, United Kingdom, the United States of America, Soviet Union and Yugoslavia (TEPC, 2015).

Notwithstanding a long history of involvement in trade activities, the nature and composition of Nepalese exports could not have got significant shift from agro-forestry based low value added primary commodities to capital based modern manufacturing products. Even if there are a few manufactured exportable, they are incapable of providing the benefits that could have come from both the backward as well as forward linkages to the Nepalese economy (Chaulagai, 2014). Furthermore, most of the Nepalese export is import dependent in the sense that the manufacturing of the exportable items depend heavily on the imported raw materials[7], the price of which increases commensurate to either the devaluation/depreciation of Nepalese currency or increase in inflation in the countries of origin or mix of both.

The export, import and trade balance of Nepal with India and other countries has been reproduced in Table -1 (Annex). The table shows that Nepal has been facing persistent trade deficit with both India and other countries. The export performance is more or less stagnant largely due to low export base, lion's share of low-value-added agro-forestry based exportable items, low production activities and import based export. However, on the contrary, the import has been increasing exponentially each year leading to a persistent and widening trade deficit with both India and other countries. The colossal increase in import can be attributed to huge import base, which is largely comprised of the daily consumer goods to high-value-added manufactured as well as capital and luxurious goods.

The data published by Nepal Rastra Bank, the central bank of Nepal, shows that the aggregate ratio of export to import of Nepal has been declining each year mainly due to the increase in the monetary value of import compared to increase in the monetary value of export each year. Similar situation can be seen in the case of India and other countries. The aggregate export to import ratio which was accounted to 16.1 percent in 2011/12, declined to 12.7 percent in 2013/14. The share of total trade with India has been increasing each year and reached to 66.6 percent in 2013/14 from 65.1 percent in 2011/12 (Table-2, Annex). This shows that India has been the largest trading partner of Nepal and majority of Nepalese trade has been concentrated to India. Such a huge concentration of trade to a single economy may invite the problems of different types in the country. Therefore, a need of diversification of trade, both commodity-wise and country-wise, has been felt strongly in order to gain from trade. However, despite long history of involvement in trade, such a diversification has not been achieved in the true sense yet.

Table-4 (Annex) shows some important facts about Nepalese foreign trade. It shows that the import which was 6.2 fold higher in 2011/12, reached to 7.8 times higher in 2013/14. Furthermore, the total annual export which was able to finance 1.9 months of imports in 2011/12 slid down to 1.5 months in 2013/14. Similarly, the total export can only finance around 13 percent of imports as per the data of 2013/14. The astonishing fact is that total Nepalese export even falls short to finance the import of petroleum products alone. While, such shortfall was Rs. 19.68 billion in 2011/12, it increased to Rs. 42. 87 billion in 2013/14 (Table-4, Annex).

Chart-1 (Annex) shows the movement of REER index and TB of Nepal since 1975 to 2013. It is obvious that the TB does not follow the REER index up to 1990. The chart further shows that TB has been increasing rapidly irrespective of the depreciation of REER index up to 2007 (compared

[7] It is estimated that around two-third of Nepalese exportable use imported raw materials to different extents.

to the level of 1990) and speedily appreciation thereafter. This confirms that Nepalese trade balance is not much exchange rate sensitive. This scenario gives some hints about the absence of the J-curve in the case of Nepal.

2. Literature Review

The basic elasticity approach to balance of payments states that devaluation of home currency leads to an increase in exports, decrease in imports and thereby improvement in the balance of payments situation of the devaluing country. However, on the contrary, the popular J-curve hypothesis states that devaluation of the home currency leads to deteriorate the balance of payments of the devaluing country initially due to the increase in the value of imports compared to the increase in the value of exports; the balance of payments improves only in the long-run due to the operation of lag effects8 coming from devaluation.

Many researchers have studied the J-curve phenomenon since a long back. The evidences that come out in the view from the literature are rather mixed. While, Ng, Har and Tan (2008) and Umoru and Eboreime (2013) found no evidence of J-curve phenomenon, Gupta-Kapoor and Ramakrishnan (1999), Bahmani-Oskooee and Kantipong (2001) and Petrović and Gligorić (2010) found little evidence of such phenomenon. Still Ahmad and Jing (2004), Baek, Mullik and Koo (2006) and Hsing (2008) found a mixed result.

Gupta-Kapoor and Ramakrishnan (1999) have empirically tested the J-curve phenomenon using quarterly data for Japan between 1975:1 and 1996:4. The effect of an appreciation of yen on the ratio of imports to exports (M/X) was analyzed using an error correction model. The impulse response function indicated that the J-curve phenomenon was found to be true for Japan during the flexible exchange rate regime.

Bahmani-Oskooee and Kantipong (2001) investigated the J-Curve phenomenon between Thailand and her large trading partners that included Germany, Japan, Singapore, U.K and the U.S. Using quarterly data over 1973I-1997IV period and cointegration analysis they found the evidence of the J-Curve at least in the cases of U.S. and Japan.

Utilizing cointegration and causality tests the paper by Ahmad and Yang (2004) has tried to ascertain the long-run relatedness, and the short-run dynamics, between the real exchange rate, national income, and the trade balance using time series data on China's bilateral trade with the G-7 countries. The paper found some evidence that a real depreciation eventually improved the trade balance with some countries. But there was no indication of a negative short-run response which characterizes the J-curve.

Using autoregressive distributed lag (ARDL) model the study by Baek, Mullik and Koo (2006) examined the J-curve phenomenon for the U.S. agricultural trade and compared the effect on agricultural trade relative to the U.S. non-agricultural trade. For this purpose, bilateral trade data between the U.S. and her three major trading partners — Japan, Canada and Mexico had been used. The study found little evidence of the J-curve for the U.S. agricultural trade with Japan, Canada and Mexico. For the non-agricultural trade, on the other hand, the behavior of the U.S.

[8] There may be a various type lags. Some of them may be recognition lag, decision lag, implementation lag, impact or response lag etc.

trade with industrialized economies such as Japan and Canada followed the J-curve, but not with developing economies such as Mexico.

The study by Hsing (2008) found the evidence of a J-curve for Chile, Ecuador, and Uruguay. However, there was lack of support for a J-curve for Argentina, Brazil, Colombia, and Peru.

The paper by Ng, Har and Tan (2008) attempts to identify the relationship between the real exchange rate and trade balance in Malaysia from year 1955 to 2006 by using Unit Root Tests, Cointegration techniques, Engle-Granger test, Vector Error Correction Model (VECM), and impulse response analyses. The study found a long run relationship between trade balance and exchange rate. However, it failed to indicate any J-curve effect in Malaysia case.

The paper by Petrović and Gligorić (2010) showed that exchange rate depreciation in Serbia improved the trade balance in the long run despite it established a J-curve effect in the short run. Johansen’s cointegration approach, autoregressive distributed lag approach, error correction models as well as impulse response functions were used to arrive at the conclusion.

Umoru and Eboreime (2013) have used the Bounds testing approach on time series data of over 40 years to explore the J-curve phenomenon on the Nigerian oil sector. However, this study reached at the conclusion that the standard J-curve hypothesis could not be validated for the Nigerian oil sector as the trade balance contemporaneously gained the improvement in the short-run.

3. Methodological Framework

This paper uses Nepalese trade balance (TB) as the dependent variable and the index of Nepalese real effective exchange rate (REER) as the independent variable. This paper does not include any other variable as the independent variable except REER for the purpose of observing the pure effect of REER on Nepalese trade balance and to exclude any possible interference that would come out as a result of including more independent variables. This paper uses unit root testing, Johansen's cointegration analysis, vector autoregression (VAR) model, impulse response function as well as ARDL bounds testing approach to test the presence of J-curve phenomenon in the case of Nepalese foreign trade sector.

Unit Root Test

Let us assume a simple random walk model (RWM) as:

$$Yt = \rho Yt-1 + ut \qquad -1 \leq \rho \leq 1 \quad \ldots\ldots 1$$

Where ut is a white noise error term.

If ρ equals 1, we face what is known as the unit root problem, that is, a situation of nonstationarity. If, however, |ρ| ≤1, then the time series Yt is said to be stationary. In practice, then, it is important to find out if a time series possesses a unit root.

By subtracting Yt−1 from both sides of equation 1 we obtain:

$$Yt - Yt-1 = \rho Yt-1 - Yt-1 + ut = (\rho - 1)Yt-1 + ut \quad \ldots\ldots 2$$

Which can be alternatively written as:

$\Delta Yt = \delta Yt-1 + ut$ 3

Where $\delta = (\rho - 1)$ and Δ is the first-difference operator.

If $\delta = 0$, then $\rho = 1$, that is we have a unit root. It may be noted that if $\delta = 0$, then

$\Delta Yt = (Yt - Yt-1) = ut$..... 4

Since ut is a white noise error term, it is stationary, which means that the first differences of a random walk time series are stationary.

The unit root is tested using Augmented Dicky-Fuller (ADF) test. The ADF test here consists of estimating the following regression:

$$\Delta Yt = \beta 1 + \beta 2t + \delta Yt-1 + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon t \quad \text{..... 5}$$

Where εt is a pure white noise error term and where $\Delta Yt-1 = (Yt-1 - Yt-2)$, $\Delta Yt-2 = (Yt-2 - Yt-3)$, etc. The number of lagged difference terms to include is often determined empirically, the idea being to include enough terms so that the error term in 5 is serially uncorrelated. In ADF we still test whether $\delta = 0$ and the ADF test follows the same asymptotic distribution as the DF statistic, so the same critical values can be used.

If the computed absolute value of the tau statistic ($|\tau|$) exceeds the DF or MacKinnon critical tau values, we reject the hypothesis that $\delta = 0$, in which case the time series is stationary. On the other hand, if the computed $|\tau|$ does not exceed the critical tau value, we do not reject the null hypothesis, in which case the time series is nonstationary. Make sure that you use the appropriate critical τ values Gujarati (2003).

Cointegration Analysis

Suppose a regression model like 6, where personal consumption expenditure (PCE) and personal disposable income (PDI) are individually I(1), that is they contain a unit root.

$PCEt = \beta 1 + \beta 2PDIt + ut$ 6

Let us write this equation as:

$ut = PCEt - \beta 1 - \beta 2PDIt$..... 7

Suppose we now subject ut to unit root analysis and find that it is stationary; that is I(0), then we can say that the two variables PCE and PDI are cointegrated.

Two variables will be cointegrated if they have a long-term, or equilibrium, relationship between them. A regression presented by equation 6 is known as a cointegrating regression and the slope parameter β2 is known as the cointegrating parameter (Gujarati, 2003).

The Model

The VAR Model

The general form of the VAR model takes of the form (Gujrati 2003)-

$$M1t = \alpha + \sum_{j=1}^{k} \beta_j M_{t-j} + \sum_{j=1}^{k} \gamma_j R_{t-j} + u1t \quad \ldots\ldots 8$$

$$Rt = \alpha' + \sum_{j=1}^{k} \theta_j M_{t-j} + \sum_{j=1}^{k} \gamma_j R_{t-j} + u2t \quad \ldots\ldots 9$$

Where, M1 stands for money and R stands for interest rate and the u's are the stochastic error terms, called impulses or innovations or shocks.

Lag Selection

The VAR lag order selection criterion has been used to determine the length of lag to be chosen for the model. The lag length has been chosen using Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), Hannan-Quinn Information Criterion (HQ) etc. The lag order selection criteria advised to take three lags of TB and REER for the building the model. Therefore, only three lags of the variables are taken to construct the VAR model. Therefore, the VAR system generated the following VAR models for the purpose of analysis-

$$\log(TB) = \alpha 0 + \alpha 1 \log(TB)t\text{-}1 + \alpha 2 \log(TB)t\text{-}2 + \alpha 3 \log(TB)t\text{-}3 + \alpha 6 \log(REER)t\text{-}1 + \alpha 7 \log(REER)t\text{-}2 + \alpha 8 \log(REER)t\text{-}3 \quad \ldots\ldots 10$$

Where, TB stands for Nepalese trade balance and,

$$TB = M - X \quad \ldots\ldots 11$$

Where, M stands for Nepalese total import and X stands Nepalese total export.

The ARDL Model

The general form of ARDL(p,q) model takes of the following form (Pesaran and Shin, 1997)-

$$yt = \alpha 0 + \alpha 1 t + \sum_{i=1}^{p} \phi_i Y_{t-i} + \beta' Xt + \sum_{i=1}^{p} \beta_i^{*'} \Delta X_{t-i} + ut \quad \ldots\ldots 12$$

$$\Delta Xt = P1\Delta Xt\text{-}1 + P1\Delta Xt\text{-}2 + \ldots\ldots + Ps\Delta Xt\text{-}s + \varepsilon t \quad \ldots\ldots 13$$

Where Xt is the k-dimensional I(1) variables that are not cointegrated among themselves, ut and εt are serially uncorrelated disturbances with zero means and constant variance-covariances, and Pi are k×k coefficient matrices such that the vector autoregressive process in ΔXt is stable.

Using three lags as advised by the lag selection criterion, the basic ARDL model for the purpose of this analysis takes of the form-

$$\Delta\log(TB) = \beta 0 + \beta 1\Delta\log(TB)t\text{-}1 + \beta 2\Delta\log(TB)t\text{-}2 + \beta 3\Delta\log(TB)t\text{-}3 + \beta 4\Delta\log(REER)t + \beta 5\Delta\log(REER)t\text{-}1 + \beta 6\Delta\log(REER)t\text{-}2 + \beta 7\Delta\log(REER)t\text{-}3 + \beta 8\log(TB)t\text{-}1 + \beta 5\log(REER)t\text{-}1 \quad \ldots\ldots 14$$

Where, TB stands for Nepalese trade balance (deficit) and the REER stands for Nepalese real effective exchange rate index. The REER index is calculated using the following formula-

$$REER = Ti*(CPIn/CPIi)*Ei + Tw*(CPIn/CPIw)*Ew \quad \ldots\ldots 15$$

Where,

Ti = Nepalese trade share with India,

Tw = Nepalese trade share with countries other than India.

CPIn = Nepalese consumer price index

CPIi = Indian consumer price index

Ei = Amount of IC per unit of NC

CPIw = World consumer price index

Ew = Amount of USD per unit of NC

The Data

The data for Nepalese trade balance, share of trade, exchange rate and the consumer price indices (CPIn) has been derived from different publications like Quarterly Economic Bulletin (QEB) and Current Macroeconomic Situation published by the Nepal Rastra Bank. The data for Indian consumer price index (CPIi) and the world consumer price index (CPIw) have been derived from the International Financial Statistics (IFS) CD Rom, 2014. The REER index is calculated by using the formula represented by equation 15. Increase in the REER index implies the real appreciation (Thapa, 2002) of the Nepalese Currency (NC) and vice-versa. The data series constitutes 36 observations ranging from 1975 to 2013.

4. Analysis of the Results

Unit root testing

The ADF unit root testing procedure shows that both the series suffer from the unit root problem. However, both the series have been found to be stationary at first difference, implying that they are found to be integrated of the order one, i.e., I(1) (Table-5, Annex).

Cointegration Analysis

Johansen Cointegration approach has been employed to test the cointegration between the variables. The result of the Johansen cointegration test has been reproduced in Table-6 (Annex). The table shows that both the trace and max-Eigen statistic show no cointegration between TB and REER index at 0.05 level. This confirms that there is no long-run relationship between TB and REER.

VAR Analysis

The lag length for the purpose of analysis is chosen using Akaike information criterion (AIC). The result from the VAR analysis shows that all the coefficients excluding the lag one of the TB are insignificant. However, in the case of REER, all the lags are found to be insignificant individually. Similarly, the result of the Wald test (Table-7) shows that all the lags of REER (from lag one to lag three) cannot influence TB jointly. It ascertains that there is no short-run causality running from REER to TB.

log(TB) = 1.09log(TB)t-1* - 0.02log(TB)t-2 - 0.07log(TB)t-3 - 0.33log(REER)t-1 - 0.06log(REER)t-2+0.62log(REER)t-3 - 0.87..... 17

* denotes significant at 5 % level.

As the residuals of the VAR model are normally distributed and they are also free from the problem of serial correlation as well as Heteroskedasticity (Table-8, Annex), the result is acceptable. The result from the CUSUM test further shows that the model is stable (Chart-2, Annex). The impulse response function (Cholesky dof adjusted method) shows that when a shock of one standard deviation is given to REER, the TB responses negatively and it lasts up to 10 periods/years (Chart-3, Annex). That is, when REER is increased/appreciated, TB decreases continuously up to 10 years. Or saying in another way around, when REER decreases/depreciated, TB increases continuously in the future. This gives rise to a flatter "L" shaped curve in response to the devaluation in contrary to the textbook type "J- curve" phenomenon to devaluation. To sum up, the result from the cointegraton analysis and VAR analysis show that there is neither long-run and nor short-run causality running from REER to TB.

ARDL Analysis

Δlog(TB)= -0.93 + 0.11Δlog(TB)t-1 + 0.08Δlog(TB)t-2 + 0.19Δlog(TB)t-3 + 1.54Δlog(REER)* - 0.74Δlog(REER)t-1 - 0.04Δlog(REER)t-2

-0.50Δlog(REER)t-3 - 0.01log(TB)t-1+0.23log(REER)t-1 18

* denotes significant at 5 % level.

The result from the ARDL model demonstrates that none of the short-run coefficients, except the REER at current time "t", are individually significant. The positive sign of REER indicates that the TB increases/decreases with the appreciation/depreciation of REER at the current time "t". This is theoretically consistent and hence acceptable. However, all the lag values of REER are insignificant individually implying that they do not have any influence on TB. Furthermore, as the computed Wald F-statistic is below the lower critical bound of 3.15 (Table-9), the Bounds test indicates that there is no steady-state long-run relationship between TB and REER.

As the residuals of the ARDL model are normally distributed and they are also free from the problem of serial correlation as well as Heteroskedasticity (Table-10, Annex), the result is acceptable. The result from the CUSUM test (Chart-4, Annex) further shows that the model is stable. Therefore, the result came out from the ARDL model is also acceptable.

V. Conclusion

The cointegration analysis and the ARDL model show that there is no cointegration or the long-run relationship between the REER and TB. Similarly, the result of the VAR Wald test suggests that there is no short-run causality running from REER to TB. The graphical representation of REER index and TB also shows that Nepalese trade is not sensitive to the exchange rate. Furthermore, the result from the impulse response function demonstrates that there is no "J-curve" phenomenon in the case of Nepalese foreign trade in response to the depreciation of REER; rather it gives rise to a flatter "L-curve" phenomenon: a divergence from the conventionally accepted view in the arena of the International Economics. This is not implausible in the situation where Nepal needs to import everything to fulfill its domestic demand and the volume of Nepalese annual import accounted around eight times higher than its total annual exports.

The results from the analysis show that devaluation of Nepalese real effective exchange rate never improves Nepalese trade deficit, rather it exacerbates further. Therefore, the results suggest, on the contrary to the long established view, Nepalese trade deficit will improve with the appreciation of the Nepalese REER. This is not also implausible in the sense that appreciation of Nepalese exchange rate makes the import cheaper requiring less amount of payment to be made. This can also helps to nullify the effect of imported inflation. However, this has to be done phase to phase but not at one go. Therefore, a strong discussion and workouts should be carried out in this field from the side of the concerned authority. Finally, this study observes that the presence of J-curve is a prerequisite for the adoption of the policy of devaluation in any country.

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Annexes

Table-1 Direction of Nepalese Foreign Trade

Rs in Million

FY	Exports, f.o.b.			Imports, c.i.f.			Trade Balance		
	Total	India	Other	Total	India	Other	Total	India	Other
1974/75	889.6	746.7	142.9	1,814.6	1,475.7	338.9	-925.0	-729.0	-196.0
1975/76	1,185.8	893.7	292.1	1,981.7	1,227.1	754.6	-795.9	-333.4	-462.5
1976/77	1,164.7	779.6	385.1	2,008.0	1,343.5	664.5	-843.3	-563.9	-279.4
1977/78	1,046.2	498.1	548.1	2,469.6	1,534.1	935.5	-1,423.4	-1,036.0	-387.4
1978/79	1,296.8	650.1	646.7	2,884.7	1,581.7	1,303.0	-1,587.9	-931.6	-656.3
1979/80	1,150.5	520.9	629.6	3,480.1	1,786.4	1,693.7	-2,329.6	-1,265.5	-1,064.1
1980/81	1,608.7	992.4	616.3	4,428.2	2,179.0	2,249.2	-2,819.5	-1,186.6	-1,632.9
1981/82	1,491.5	994.4	497.1	4,930.3	2,280.9	2,649.4	-3,438.8	-1,286.5	-2,152.3
1982/83	1,132.0	843.3	288.7	6,314.0	2,499.6	3,814.4	-5,182.0	-1,656.3	-3,525.7
1983/84	1,703.9	1,160.7	543.2	6,514.3	3,058.0	3,456.3	-4,810.4	-1,897.3	-2,913.1
1984/85	2,740.6	1,601.7	1,138.9	7,742.1	3,895.8	3,846.3	-5,001.5	-2,294.1	-2,707.4
1985/86	3,078.0	1,241.1	1,836.9	9,341.2	3,970.9	5,370.3	-6,263.2	-2,729.8	-3,533.4
1986/87	2,991.4	1,302.6	1,688.8	10,905.2	4,262.0	6,643.2	-7,913.8	-2,959.4	-4,954.4
1987/88	4,114.5	1,567.6	2,546.9	13,869.6	4,595.7	9,273.9	-9,755.1	-3,028.1	-6,727.0
1988/89	4,195.3	1,034.9	3,160.4	16,263.7	4,238.7	12,025.0	-12,068.4	-3,203.8	-8,864.6
1989/90	5,156.2	602.5	4,553.7	18,324.9	4,674.5	13,650.4	-13,168.7	-4,072.0	-9,096.7
1990/91	7,387.5	1,552.2	5,835.3	23,226.5	7,323.1	15,903.4	-15,839.0	-5,770.9	-10,068.1

FY	Exports, f.o.b.			Imports, c.i.f.			Trade Balance		
	Total	India	Other	Total	India	Other	Total	India	Other
1991/92	13,706.5	1,450.0	12,256.5	31,940.0	11,245.5	20,694.5	-18,233.5	-9,795.5	-8,438.0
1992/93	17,266.5	1,621.7	15,644.8	39,205.6	12,542.1	26,663.5	-21,939.1	-10,920.4	-11,018.7
1993/94	19,293.4	2,408.9	16,884.5	51,570.8	17,035.4	34,535.4	-32,277.4	-14,626.5	-17,650.9
1994/95	17,639.2	3,124.3	14,514.9	63,679.5	19,615.9	44,063.6	-46,040.3	-16,491.6	-29,548.7
1995/96	19,881.1	3,682.6	16,198.5	74,454.5	24,398.6	50,055.9	-54,573.4	-20,716.0	-33,857.4
1996/97	22,636.5	5,226.2	17,410.3	93,553.4	24,853.3	68,700.1	-70,916.9	-19,627.1	-51,289.8
1997/98	27,513.5	8,794.4	18,719.1	89,002.0	27,331.0	61,671.0	-61,488.5	-18,536.6	-42,951.9
1998/99	35,676.3	12,530.7	23,145.6	87,525.3	32,119.7	55,405.6	-51,849.0	-19,589.0	-32,260.0
1999/00	49,822.7	21,220.7	28,602.0	108,504.9	39,660.1	68,844.8	-58,682.2	-18,439.4	-40,242.8
2000/01	55,654.1	26,030.2	29,623.9	115,687.2	54,700.9	60,981.3	-60,028.1	-28,670.7	-31,357.4
2001/02	46,944.8	27,956.2	18,988.6	107,389.0	56,622.1	50,766.9	-60,444.2	-28,665.9	-31,778.3
2002/03	49,930.6	26,430.0	23,500.6	124,352.1	70,924.2	53,427.9	-74,421.5	-44,494.2	-29,927.3
2003/04	53,910.7	30,777.1	23,133.6	136,277.1	78,739.5	57,537.6	-82,366.4	-47,962.4	-34,404.0
2004/05	58,705.7	38,916.9	19,788.8	149,473.6	88,675.5	60,798.1	-90,767.9	-49,758.6	-41,009.3
2005/06	60,234.1	40,714.7	19,519.4	173,780.3	107,143.1	66,637.2	-113,546.2	-66,428.4	-47,117.8
2006/07	59,383.1	41,728.8	17,654.3	194,694.6	115,872.3	78,822.3	-135,311.5	-74,143.5	-61,168.0
2007/08	59,266.5	38,555.7	20,710.8	221,937.7	142,376.5	79,561.2	-162,671.2	-103,820.8	-58,850.4
2008/09	67,697.5	41,005.9	26,691.6	284,469.6	162,437.6	122,032.0	-216,772.1	-121,431.7	-95,340.4
2009/10	60,824.0	39,993.7	20,830.3	374,335.2	217,114.3	157,220.9	-313,511.2	-177,120.6	-136,390.6

FY	Exports, f.o.b.			Imports, c.i.f.			Trade Balance		
	Total	India	Other	Total	India	Other	Total	India	Other
2010/11	64,338.5	43,360.4	20,978.1	396,175.5	261,925.2	134,250.3	-331,837.0	-218,564.8	-113,272.2
2011/12	74,261.0	49,616.3	24,644.7	461,667.7	299,389.6	162,278.1	-387,406.7	-249,773.3	-137,633.4
2012/13	76917.1	50999.8	25917.3	556740.3	367031.3	189709.0	-479823.2	-316031.5	-163791.7
2013/14	90292.3	59417.3	30875.0	708761.8	472730.6	236031.2	-618469.5	-413313.3	-205156.2

Source: NRB (2014) Quarterly Economic Bulletin, 48(4), Nepal Rastra Bank.

Table 2 Some Important Ratios of Nepalese Trade

Some Important Ratios	2011/12	2012/13	2013/14
1. Ratio of Exports to Import	16.1	13.8	12.7
India	16.6	13.9	12.6
Other Countries	15.2	13.7	13.1
2. Share in Total Exports			
India	66.8	66.3	65.8
Other Countries	33.2	33.7	34.2
3. Share in Total Imports			
India	64.8	65.9	66.7
Other Countries	35.2	34.1	33.3
4. Share in Trade Balance			
India	64.5	65.9	66.8
Other Countries	35.5	34.1	33.2
5. Share in Total Trade			
India	65.1	66.0	66.6
Other Countries	34.9	34.0	33.4
6. Share of Exports and Imports in Total Trade			

Some Important Ratios	2011/12	2012/13	2013/14
Exports	13.9	12.1	11.3
Imports	86.1	87.9	88.7

Source: NRB(2014) Current Macroeconomic Situation, Based on Annual Data 2013/14, Nepal Rastra Bank.

Table-3 Direction of Foreign Trade (First Five Months)

(Rs. in million)

PARTICULARS	2012/13	2013/14	2014/15	Percent Change	
				2013/14	2014/15
TOTAL EXPORTS	32875.6	37366.5	36912.4	13.7	-1.2
To India	20617.7	24212.8	22804.3	17.4	-5.8
To China	1123.0	1026.5	1421.5	-8.6	38.5
To Other Countries	11134.9	12127.2	12686.6	8.9	4.6
TOTAL IMPORTS	225392.4	270354.1	318523.3	19.9	17.8
From India	144487.6	178003.2	203994.7	23.2	14.6
From China	29230.2	30900.3	43034.2	5.7	39.3
From Other Countries	51674.6	61450.6	71494.4	18.9	16.3
TOTAL TRADE BALANCE	-192516.8	-232987.6	-281610.9	21.0	20.9
With India	-123869.9	-153790.4	-181190.4	24.2	17.8
With China	-28107.2	-29873.8	-41612.7	6.3	39.3
With Other Countries	-40539.7	-49323.4	-58807.8	21.7	19.2
TOTAL FOREIGN TRADE	258268.0	307720.6	355435.7	19.1	15.5
With India	165105.3	202216.0	226799.0	22.5	12.2
With China	30353.2	31926.8	44455.7	5.2	39.2

PARTICULARS	2012/13	2013/14	2014/15	Percent Change	
				2013/14	2014/15
With Other Countries	62809.5	73577.8	84181.0	17.1	14.4

Source: NRB (2015), Current Macroeconomic Situation, Based on Five Month's Data of 2014/15, Nepal Rastra Bank.

Table-4Some Important Facts about Nepalese Foreign Trade

Particulars	2011/12	2012/13	2013/14
Import-Export Ratio	6.2	7.2	7.8
Import financed by total exports (months)	1.9	1.7	1.5
Import financed by total exports (%)	16.1	13.8	12.7
Total exports- Imports of petroleum products (Rs. in million)	-19676.7	-32483.4	-42872.1

Source: NRB (2014), Current Macroeconomic Situation, Based on Annual Data 2013/14, Nepal Rastra Bank.

Table 5 Results of the Unit Root Testing

Variable Name	T statistic	1%	5%	10%	Max. lag	Prob	Decision
Log(REER) at Label and Intercept	-1.072740	-3.621023	-2.943427	-2.610263	9	0.7162	Unit Root
Log(REER) at First Difference and Intercept	-5.586099	-3.621023	-2.943427	-2.610263	9	0.0000	No Unit Root
Log(TB) at Level and Intercept	-1.280893	-3.621023	-2.943427	-2.610263	9	0.6281	Unit Root
Log(TB) at First Difference and Intercept	-6.264713	-3.621023	-2.943427	-2.610263	9	0.0000	No Unit Root

Table 6 Results of the Cointegration Analysis

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic			Max-Eigen Statistic		
		Value	0.05 Critical Value	Prob.	Value	0.05 Critical Value	Prob.
None	0.193743	7.675040	15.49471	0.5008	7.106626	14.26460	0.4766
At most 1	0.017077	0.568414	3.841466	0.4509	0.568414	3.841466	0.4509

Table 7 Wald Test for VAR

Variables	Null Hypothesis	F Statistic	Chi-square	Decision
TB	C(1)=C(2)=C(3)=0	767.4559 (0.0000)	2302.368 (0.0000)	Short-run Causality
REER	C(4)=C(5)=C(6)=0	0.596874 (0.6222)	1.790623 (0.6170)	No Short-run Causality

Table 8 Residual Diagnostic Test for VAR Model

Test Statistic	Tests		
	Breusch-Godfrey Serial Correlation (LM Test)	Breusch-Pagan-Godfrey Heteroskedasticity Test	Jarque-Bera Normality Test
F Statistic	0.401569 (0.6732)	0.151014 (0.9874)	
Obs*R-squared	1.039917 (0.5945)	1.090716 (0.9819)	0.796142 (0.671614)

Note: Values in parentheses are the corresponding probability values.

Table 9 Bound Wald F-Test Results Wald Test

Variables	Null Hypothesis	Critical Values		Wald F Statistic	Decision
		I(0)	I(1)		

logTBt-1 and logREERt-1	C(9)=C(10)=0	3.15	4.11	0.585868	No Cointegration
5% critical values cited from Pesaran, shin and Smith (2001), Table CI (iii), Case I, No Intercept and no Trend					

Table 10 Residual Diagnostic Test for ARDL Model

Test Statistic	Tests		
	Breusch-Godfrey Serial Correlation (LM Test)	Breusch-Pagan-Godfrey Heteroskedasticity Test	Jarque-Bera Normality Test
F Statistic	1.006455 (0.3810)	1.131968 (0.3779)	
Obs*R-squared	2.816620 (0.2446)	10.13336 (0.3398)	3.634652 (0.162460)

Note: Values in parentheses are the corresponding probability values.

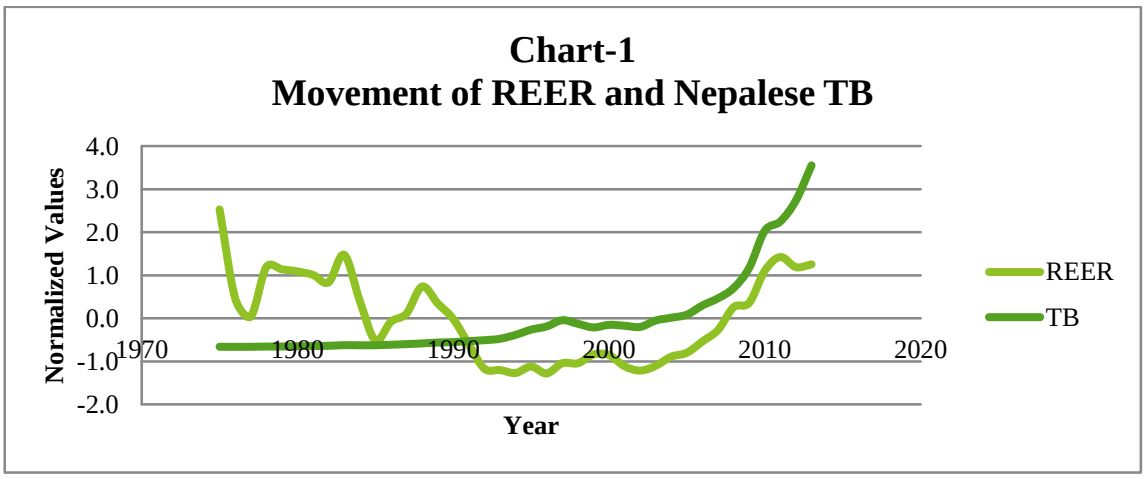
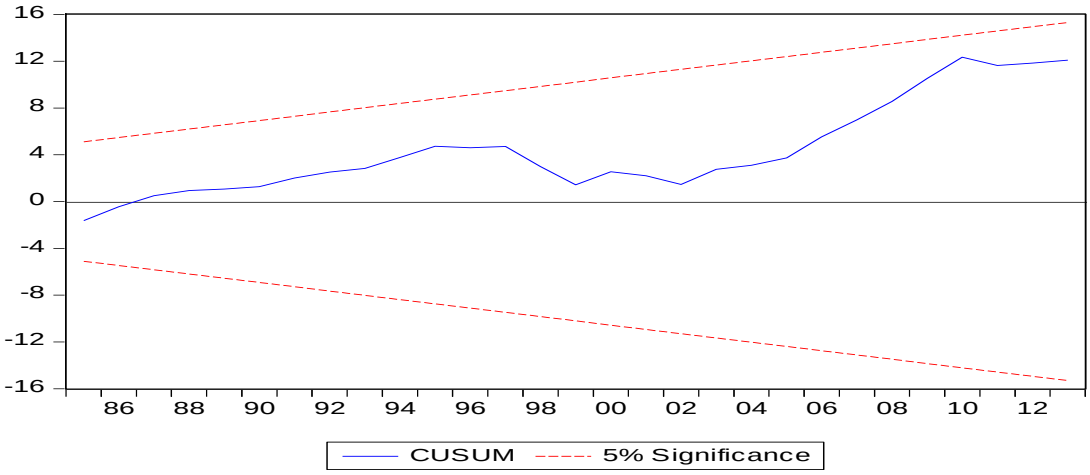


Chart-2 CUSUM TEST for VAR Model


16
12
8
4
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-4
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86
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CUSUM
5% Significance

Chart-3

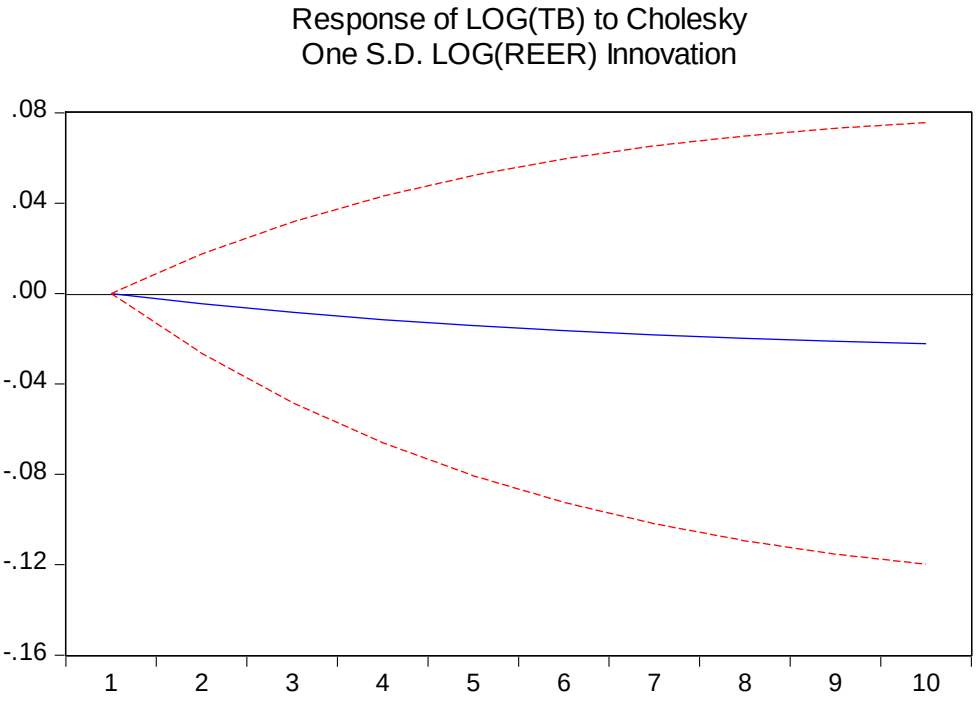
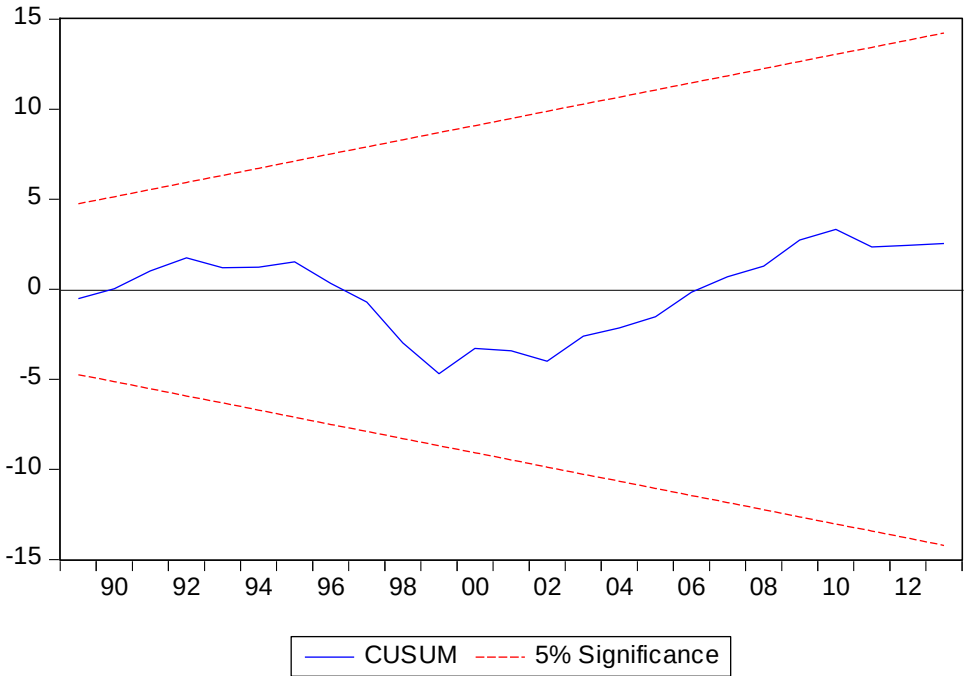

Response of LOG(TB) to Cholesky
One S.D. LOG(REER) Innovation
.08
.04
.00
-.04
-.08
-.12
-.16
1
2
3
4
5
6
7
8
9
10

Chart-4 CUSUM Test for ARDL Model



Paper No. 16

Financial Literacy among the College Students of Nepal

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Surendra Raj Nepal**

Abstract

This paper attempts to examine the financial literacy of college students in Nepal. A comprehensive questionnaire was surveyed among 436 college students from four leading Universities of Nepal in October 2014. Frequency, percentage, mean and standard deviation were used to describe the four components of financial literacy namely financial behavior, influence, attitude and knowledge. Financial literacy was tested using ANOVA to find significant difference among the Universities, ages and incomes. Similarly, logistic regression was used to test the impact of gender, education, type, stream, behavior, influence and attitude on financial knowledge. Though most of the students have basic level of financial knowledge, it was found that students have poor understanding of credit, taxes, financial statement and insurance. It was also found that students are highly influenced by their parents at home and they have positive attitude towards savings. The study further identified income, age, stream of education, types of college, and attitude of students as determinants of financial knowledge; and financial knowledge is unaffected by gender, university affiliation, financial behavior and influence. Finally, financial sector regulators are suggested to provide awareness programs to students in taxation, bank lending, share markets, insurance and the universities are recommended to incorporate a course even to non-management students that enables students to understand basic concepts of finance.

Key Words: Financial Literacy, Financial Behavior, Influence, Financial Attitude, Financial Knowledge, Nepal.

JEL Classification: A20, D14

Introduction

In the course of everyday life, people make a variety of financial decisions about saving, investing and borrowing. The global marketplace is increasingly risky and is becoming more vulnerable day by day. One of its main implications include rising costs of goods and services that push people to be able to make well-informed financial decisions (Lusardi & Mitchell, 2011). This phenomenon requires individuals to be equipped with some knowledge and skills relating to personal financing, or simply financial literacy. In academia, financial literacy can be defined as "one's understanding and knowledge of financial concepts" (Lee, 2005; and Hogarth & Hilgert, 2002). Financial literacy

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can have important implications for financial behavior. For instance, people with low financial literacy are more likely to have problems with debt (Lusardi & Turfano, 2009), less likely to participate in the stock market (Rooij et al., 2007), less likely to choose mutual funds with lower fees, less likely to accumulate and manage wealth effectively and less likely to plan for retirement (Lusardi & Mitchell, 2006). In recent times, concern for the levels of financial literacy in society as a whole has grown considerably and is expected to grow even more important in the future (Fox et al., 2005).

According to Mahdzan and Tabiani (2013), increasing financial literacy and capability promotes better financial decision-making, thus, enabling better planning and management of life events such as education, housing purchase, or retirement. This is particularly more relevant for college students. Peng et al. (2007) stated that university students take on higher levels of personal financial responsibility. These students face more financial challenges in conjunction with relevant instruction. It is also more likely that college students are experiencing more challenges with finances as they pay bills, use credit cards, working, saving, budgeting monthly expenses, and manage debt. Thus, there is paramount importance of the study in financial literacy.

The awareness of the importance of financial education is gaining momentum among policy makers in economies the world over. Moreover, helping young people understand financial issues is important, as younger generations are likely to face ever-increasingly complex financial products and services. They are also more likely to bear more financial risks in adulthood than their parents, especially in saving, planning for retirement and covering their healthcare needs (OECD, 2011). The need of financial literacy has become increasingly significant with the deregulation of financial markets and the easier access to credit, the ready issue of credit cards and the rapid growth in marketing financial products. Recognizing the importance of financial literacy, a growing number of countries have developed and implemented national strategies for financial education in order to improve the financial literacy of their populations in general, often with a particular focus on younger generations (Grifoni & Messy, 2012).

In younger generations, school and college students are focal point for the study. In Nepal, to promote financial literacy, there are many programs held by government, non-government organization (NGOs) and private sector. Nepal Rastra Bank launched a program 'NRB with Students' for enhancing the Financial Literacy among Students (NRB, 2014). In enhancing financial literacy, NRB Strategic Plan 2012-2016 focuses on Financial Literacy Programs for women, victims of conflict, ethnic minorities, and deprived and marginalized section of population. Similarly, since 2012 monetary policy of NRB has emphasized on the financial awareness programs stating "because of low financial literacy financial services are not effective so appropriate strategy should be developed". However, hardly any study has been conducted on financial literacy in Nepal. This paper, therefore, aims at identifying the financial literacy among the college students of Nepal.

Specifically, this study has two purposes. First, it provides the evidence of financial literacy among the college students. Second, it examines the financial knowledge of different types of students based on their demographic, educational and personality (such as financial behavior, financial attitude and financial influence) characteristics. To address these purposes, following hypotheses are stated:

H01: There is no significant difference in financial knowledge in demographic variables (Gender and Age)

H02: There is no significant difference in financial knowledge in education (Level, Stream, University and Type)

H03: There is no significant difference in financial knowledge among different level of income.

H04: There is no significant relationship of financial attitude, financial influence and financial behavior on financial knowledge.

The remainder of the paper is organized as such: Section II reviews the relevant literature on financial literacy; Section III discusses the data and methodology; Section IV analyses the data, provides results and makes a discussion on the results; and Section V summarizes and concludes the study.

Literature Review

There is no such a definition of financial literacy satisfying all types of readers. The Organisation for Economic Cooperation and Development (2005) defines financial literacy as: "the process by which financial consumers/investors improve their understanding of financial products and concepts and, through information, instruction, and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities to make informed choices, to know where to go for help, and to take other effective actions to improve their financial wellbeing. However, The United States Financial Literacy and Education Commission (2007) describes financial literacy as "the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial well-being". Similarly, Lusardi (2008) defines financial literacy as the knowledge of basic financial concepts, such as the working of interest compounding, the difference between nominal and real values, and the basics of risk diversification. And, Huston (2010) describes financial literacy as a measuring how well an individual can understand and use personal finance-related information. In addition, financial literacy includes the ability and confidence of an individual to use his/her financial knowledge to make financial decisions. Thus, in this study, financial literacy is defined as the understanding and knowledge of basic economic and financial concepts, as well as the ability to use that knowledge to manage financial resources.

There are many studies carried out among the youths including school and college students on financial literacy. Some of them used pure demographic variables for evaluation while others analyzed based on stream of education and other personal characteristics. Ibrahim et al (2009) concluded that student's demographic variable including social background, financial attitude, financial knowledge and family sophistication significantly affect the financial literacy level of students. In the USA, Danes and Hira (1987) surveyed 323 college students from Iowa State University, using questionnaire covering knowledge of credit card, insurance, personal loans, record keeping, and overall financial management. They found that the participants have a low level of knowledge regarding overall money management, credit cards, and insurance. They also found that male knows more about insurance and personal loan, but females know more about issues covered in the section of overall financial management knowledge. Married students were found more knowledgeable about personal finance. Britt et al. (2004) examined financial behavior of university and college students. Among 1500 students surveyed, they found that 90% were interested in learning about specific topics in financial education, where the highest percentage of them were found the need of counseling services, followed by learning about savings and investment, budgeting, how to increase their income and financial management. They further found those female students were more tended to enjoy shopping and bought items that were on

sale than male, and males however, tended to hide their spending habits from their families. Similarly, Shaari et al. (2013) examined the financial literacy among 384 university students from local Universities of Malaysia using primary data by questionnaires. The results of this study revealed that the spending habit and year of study have a significant positive relationship with the financial literacy, whereby the age and gender are negatively associated with the financial literacy. It has concluded that financial literacy can prevent the university students from engaging in extensive debt especially credit card debt.

Jorgensen (2007) investigated the personal financial literacy of a sample of undergraduate and graduate college students using the personal characteristics of gender, class rank, and socioeconomic status and examined parental and peer influences on the level of financial literacy of college students. It found that financial knowledge, attitude, and behavior scores were low but that they significantly increased each year from freshman to masters. Further, it also revealed that students who were financially influenced by their parents had higher financial knowledge, attitude, and behavior scores, and students with higher financial knowledge also had higher financial attitude and behavior scores. Likewise, Lusardi et al. (2010) examined financial literacy among the youth in Germay and showed that financial literacy is low; less than one-third of young adults possess basic knowledge of interest rates, inflation, and risk diversification. However, financial literacy was strongly related to socio-demographic characteristics and family financial sophistication.

Age, gender, language, race and income level do have an impact on the level of financial literacy among the undergraduate level students (Clercq et al., 2009). Nidar and Bestari (2012) investigated the level and factors influencing the personal financial literacy of 400 students in Padjadjaran University of Indonesia and found that level of personal financial literacy was within the low category, especially in investment, credit, and insurance. They also found that level of education, faculty, personal income, knowledge from parents, parents income, and ownership of insurance factors have significant impact on personal financial literacy. They used personal financial literacy in: basic personal finance, income & spending, credit & debt, saving & investment and insurance. In Srilankan context, Heenkenda (2014) explored the existing pattern and the levels of disparity of the functional financial literacy. It used quantitative data from urban, rural and state sector the study found that the socio-economic-demographic characteristics have a very strong association with the financial literacy of individuals. It was also found that the majority of the respondents demonstrated a modest financial knowledge and the functional financial literacy was quite diverse across respondents depending on the levels of education, income, gender, age, etc. Institute of Microfinance (InM, 2011), in Bangladesh, conducted a survey covering nearly 9000 households and found very low and inadequate financial literacy in the country, particularly it is more serious in rural areas. VISA (2012) study ranked India at the 23rd position among the 28 countries surveyed. Following this study, Agarwalla et al. (2013) identified that there is the influence of various socio-demographic factors on different dimensions of financial literacy among the working young in urban India. A few factors specific to India, such as joint-family and consultative decision making process were found to significantly influence financial literacy in urban Indian youths.

Some of the studies suggested that the stream of the education is one of the indicators for determining financial literacy of the students (Chen & Volpe, 1998; Peng et al., 2007; Robb & Sharpe, 2009; Ramasawmy et al., 2013, and Fatoki, 2014). In Mauritius, Ramasawmy et al. (2013) examined the level of awareness of financial literacy by survey among management students at the University of Mauritius. Four fundamental aspects in financial literacy were considered: level

and importance, definitions and theories, constraints and measures to improve financial literacy. They found that management students at the University of Mauritius attached a sound level of importance to financial literacy to their subject of study. However, according to the results, most students had a medium level of knowledge and skills in financial literacy and in savings and borrowings. They did not find the significant difference in the financial literacy level between male and female respondents while male and female's ability to read, analyze, manage and communicate was found significantly different. Similarly, their study also stated that age, gender, language, race and income level did not have an impact on the level of financial literacy. Similar type of the study was carried in South Africa, by Fatoki, (2014). Fatoki assessed the level of financial literacy surveying amongst the non-business students of two universities located in Gauteng and Limpopo province of South Africa and found that financial literacy impacts on an individual's financial decisions especially in the area of savings, borrowing, retirement planning, or portfolio choice. It was also found that non-business students have a low level of financial literacy in comparison to business students.

Financial behavior, attitude and influence are related to financial knowledge (Jorgensen, 2007). Hathaway and Khatiwada (2008) provided critical analysis of the impact of financial education programs on consumer financial behavior but the empirical relationship between financial knowledge and behavior was not found. It may be that savings behaviors are associated with factors other than financial knowledge and attitudes. However, Hilgert et al. (2003) provided some support for a link between financial knowledge and better financial practices. They used monthly survey data from the University of Michigan's Surveys of Consumers and constructed indexes that represent the level of households' participation in each of four financial management practices: cash flow management, credit management, saving, and investment.

A review of the literature on financial literacy shows that most of the studies focused on demographic variables of the students. Though some of the studies dealt with the college students, however, sample students are taken from a single University or two only. Further, they are limited within one level of students such as undergraduate or graduate. Very few of these studies covered selected areas in personal finances, such as financial behavior, attitude and influence. In Nepalese context, studies are rarely found that have examined the financial literacy of college students using various areas of assessments. This study, therefore, tries to fill this gap using Nepalese data.

Methodology

This study is entirely based on survey. It describes the characteristics of sampled respondents with their responses on the various aspects of financial literacy. Stratified sampling method was used to collect data from four leading universities of Nepal. According to Economic Survey 2013/14, there are 678,047 students studying under the different colleges in University system of Nepal. Out of them, Tribhuvan, Kathmandu, Purbanchal and Pokhara University constitute of 668,776 (99%) students. From 23 colleges of these universities, 500 students from management and non-management stream were selected and questionnaire was administered among them. Only 436 respondents responded well thus the response rate was 87.20.

A full-fledged questionnaire was constructed covering five areas namely personal information of respondents, financial behavior, financial influence, financial attitude and financial knowledge with reference to Jorgensen (2007). There are 53 questions in this survey including multiple choice, Likert scale and multiple answers. The Cronbach's alpha of 39 questions was 0.719 which is more than 0.6 thus the data seem to be reliable.

In analyzing data, first of all responses were coded and entered in to SPSS. To describe the data frequency, percentage, mean and standard deviation were used by presenting data in Tables. Similarly, scores on the basis of correct answers regarding financial literacy was converted into percentage and was tested by ANOVA to find significant difference among the universities, ages and incomes. Level of knowledge is divided into three categories following Chen and Volpe (1998). Students having correct percentage score below 60 is considered as low, 60 to 80 as medium and above 80 as high level of knowledge.

The participants are classified into two subgroups using the median percentage of correct answers of the sample. Students with scores higher than the sample median are classified as those with relatively more knowledge. Students with scores equal to or below the median are classified as students with relatively less knowledge. This dichotomous variable is then used in the logistic regression as the dependent variable, which is explained simultaneously by the independent variables (Gender, Education, Type, Stream, Financial Behavior, Influence and Attitude).

The logistic model takes on the following form:

$$\log [p/(1-p)] = B0 + B1(\text{Gender}) + B2(\text{Education}) + B3(\text{Type}) + B4(\text{Stream}) + B5(\text{Behavior}) + B6(\text{Influence}) + B7(\text{Attitude}) + ei \quad \ldots\ldots(1)$$

Where,

p = the probability of a student who is more knowledgeable about finance.

Gender = 1 if the participant is a male, 0 otherwise.

Education = 1 if the participant is studying in bachelor level, 0 otherwise

Type = 1 if the participant is studying in private college, 0 otherwise

Stream = 1 if the participant's stream is management, 0 otherwise

Behavior = Financial Behavior measured in 4-point scale

Influence = Financial Influence measured in 4-point scale

Attitude = Financial Attitude measured in 4-point scale

ei = Error term

Analysis and Findings

Characteristics of the Sample

Table 1 shows the characteristics of the sample. It shows about 60 percent of the respondents are male and the same percentage go with private college students in the sample. About half of the respondents are from age group of 21 to 24 years followed by 18 to 20years group (35%). Two third of the respondents come from bachelor level and equally from management stream. Similarly, half of the respondents constitute from Tribhuvan University followed by Pokhara (20%), Purbanchal (15%) and Kathmandu (14%) University. As far as monthly family income of the respondents is concerned, respondents from each category are equally distributed.

Table 1 Respondents Profile

Demographic Characteristics		
Gender	**Frequency**	**Percentage**
Male	271	62.2
Female	165	37.8
Age (In years)		
Below 18	8	1.8
18 to 20	156	35.8
21 to 24	232	53.2
25 to 29	33	7.6
30 and above	7	1.6
Education		
Level		
Bachelor	291	66.7
Master	145	33.3
Stream		
Management	291	66.7
Non-Management	145	33.3
Types of Institution		
Government	169	38.8
Private	267	61.2
University Affiliation		
Tribhuvan	219	50.2
Kathmandu	62	14.2
Purbanchal	66	15.1

Demographic Characteristics		
Gender	**Frequency**	**Percentage**
Pokhara	89	20.4
Income		
Monthly Family Income (In NPR)		
Below 20,000	107	24.5
20,000 to 30,000	126	28.9
30,000 to 50,000	108	24.8
50,000 and above	95	21.8

Analysis of Financial Knowledge

Respondents were asked 11 questions from basic to advance level of finance covering numeracy, inflation, compound interest, time value of money, money illusion, financial statement, share market, banking, insurance, taxes and credit, and finding is presented in Table 2. Most of the respondents (81%) correctly answered the question regarding numeracy followed by banking (78%), inflation (63%), share market (60%) and credit (59%) while very few respondents were familiar with taxes (29%), financial statement (29%) and insurance (39%). Thus, students have high level of knowledge on numeracy while it is medium in banking, inflation and share market, and low in credit, taxes, financial statement and insurance.

Table 2 Frequency and Percentage of Components of Financial Knowledge

Concepts	**Frequency**	**Percentage**
Numeracy	354	81.2
Compound Interest Rate	230	52.8
Inflation	276	63.3
Time Value of Money	222	50.9
Money Illusion	276	63.3

Net Worth	130	29.8
Share Market	262	60.1
Banking	340	78
Insurance	174	39.9
Taxes	129	29.6
Credit	259	59.4

Overall financial knowledge was divided into basic and advance categories. Basic financial literacy index was constructed by numeracy, compound interest rate, inflation, time value of money and money illusion questions (Rooij et al., 2007) and advance financial literacy index was developed by constituting questions related to financial statement, insurance, banking, taxes, credit and share markets. As presented in Table 3, the mean percentage score of basic category is 62 while in advance it is only 49.50. Mean percentage scores of each section of sample characteristics are presented in Annex (Table 1).

Table 3 Mean and Standard Deviation of Percentage Correct Answers According to Level of Financial Literacy

	Basic	Advance	Overall
Mean	62.30	49.50	55.30
SD	26.23	22.84	20.07

Financial Behavior

Spending habit, maintaining records, use of saving, managing money in problem, financial services taken and use of additional income are major aspects of financial behavior. Despite the different level of financial knowledge, most of the students are somewhat economical, maintain minimal records, deposit their savings into bank account, use their savings at the time of low income and prefer to deposit into fixed account when they have excess money (Annex Table 2). The result also shows students do not like to use their money in buying jewelry, lending friends and investing in share markets. In the time of crisis, students do not like to take bank loan. They also neither like to buy insurance policy nor go for vacation if they have additional money. Among the five different financial services, bank saving was taken by most of the students while investment in commodities and insurance were least taken.

Table 4 presents the 10 different aspects of financial behavior. Students opined that all are important except investment in IPO for overall and more knowledgeable students group. Less knowledgeable students mostly plan and implement regular saving/investment but they do not like to invest in IPO which is also supported by overall and more knowledgeable students. On the other hand, more knowledgeable students mostly compare the price while shopping. In aggregate, students spend less than what they get most of the time.

Table 4 Mean and Standard Deviation in Financial Behavior According to Level of Students' Financial Knowledge

	Less Knowledgeable		More Knowledgeable		Overall	
Items	Mean	SD	Mean	SD	Mean	SD
I budget and track my spending	2.43	0.988	2.52	1.00	2.49	0.995
I contribute to a bank saving account regularly	2.29	0.997	2.39	0.975	2.35	0.984
I compare prices when shopping for purchases	2.9	1.027	3.13	0.996	3.04	1.013
I have a life insurance policy	2.19	1.241	2.08	1.306	2.12	1.281
I invest in the shares under IPO	2.09	1.132	1.86	1.117	1.95	1.126
I read to increase my financial knowledge	2.78	1.043	3.01	0.981	2.92	1.011
I maintain adequate financial records	2.56	1.029	2.82	0.931	2.72	0.978
I spend less than income	2.99	0.985	3.1	0.991	3.06	0.989
I maintain adequate insurance coverage	2.51	0.996	2.31	1.046	2.39	1.03
I plan and implement a regular savings/investment program	3.05	1.011	2.98	0.977	3	0.99

Financial Influence

Table 5 (a) shows that all of the influential variables affect somehow in financial knowledge of the students as mean value is more than 2 in 4 point scale while parents followed by life experience influence most. However, friends and internet are least influential factors in each category. According to Table 5 (b), most students learn about saving and budgeting while least students learn about taxes and insurance at home.

Table 5 (a) Mean and Standard Deviation in Financial Influence According to Level of Students' Financial Knowledge

	Less Knowledgeable	More Knowledgeable	Overall

Factors	Mean	SD	Mean	SD	Mean	SD
Parents	3.23	.970	3.38	.926	3.32	.945
Friends	2.31	.984	2.35	.909	2.33	.938
School	2.54	.947	2.47	1.000	2.50	.979
Books	2.79	.989	2.75	.927	2.77	.951
Media	2.59	.992	2.59	.953	2.59	.968
Job	2.68	1.131	2.66	1.205	2.67	1.175
Life experiences	3.13	1.027	3.36	.873	3.27	.942
Internet	2.42	1.100	2.45	1.014	2.44	1.047

Table 5 (b) Frequency and Percentage in Financial Influence According to level of Students' Financial Knowledge

Learning at Home	Less Knowledgeable		More Knowledgeable		Overall	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Budgeting	45	26.3	78	29.4	123	28.2
Investing	38	22.2	71	26.8	109	25.0
Taxes	25	14.6	33	12.5	58	13.3
Insurance	37	21.6	53	20	58	13.3
Loan	44	25.7	75	28.3	90	20.6
Saving	109	63.7	188	70.9	297	68.1
Interest Rates	35	20.5	55	20.8	90	20.6
Keeping Records	33	19.3	68	25.7	101	23.2

Table 6 shows that finance is discussed openly in the family of most of the students and parents do not argue about finance in the family as its mean score is lowest. However, the lowest score of the mean value of more knowledgeable students shows that they think that they are not explicitly taught by their parents.

Table 6

Frequency and Percentage in Financial Influence According to level of Students' Financial Knowledge

Handling Finance in Family	Less Knowledgeable		More Knowledgeable		Overall	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
My parents usually argued about the finances	22	12.9	39	14.7	61	14.0
Within the family we openly discussed our finances	58	33.9	115	43.4	173	39.7
My parents explicitly taught me about finances	29	17	35	13.2	64	14.7
We didn't' talk much about finances but I learned from their examples	50	29.2	77	29.1	127	29.1
My parents included me in various financial decisions	47	27.5	89	33.6	136	31.2

Financial Attitude

Financial attitude is one of the most important factors affecting financial literacy. The result of the analysis in financial attitude is presented in Table 7. All factors of financial attitude are somehow true for them as mean values are greater than 2 in 4 point scale. Among 11 items, most of the students opined that they give importance to saving followed by capacity to use future income to achieve their financial goal. This is consistent with the perception of more knowledgeable students. However, students feel that they are uncertain about where their money is spent and worried to manage their finance. In disaggregate level, less knowledgeable students have high level of saving and insurance attitude but they feel that they are unable to control financial situation and uncertain about spending money.

Table 7

Mean and Standard Deviation in Financial Attitude According to Level of Students' Financial Knowledge

Items	Less Knowledgeable		More Knowledgeable		Overall	
	Mean	SD	Mean	SD	Mean	SD
I feel in control of my financial situation	2.57	1.08	2.91	0.91	2.78	0.99
I feel capable of using my future income to achieve my financial goals	2.80	0.91	3.18	0.85	3.03	0.89

I worry to manage my finance	2.63	1.06	2.51	1.01	2.56	1.03
I am uncertain about where my money is spent	2.54	1.11	2.36	1.06	2.43	1.09
I feel credit cards are safe and risk free	2.73	1.07	2.72	1.07	2.72	1.07
I feel capable of handling my financial future (e.g. buying insurance)	2.69	1.00	2.87	0.98	2.80	0.99
I am afraid of credit and credit cards	2.74	1.05	2.63	1.05	2.67	1.05
I give importance to saving money from my monthly income	2.96	1.03	3.21	0.93	3.11	0.98
I feel having life insurance is an important way to protect loved ones	2.91	1.02	3.04	1.00	2.99	1.01
I enjoy thinking about and have interest in reading about money management	2.81	0.89	3.14	0.92	3.01	0.92
I enjoy talking to my peers about money related issues (i.e. taxes)	2.70	1.07	2.63	1.09	2.66	1.08

Analysis of Financial Literacy

Analysis of Variance (ANOVA)

ANOVA is used to test whether there is significance difference in financial knowledge among different universities, ages and incomes, and the result is shown in Table 8. It indicates that university affiliation is found to be insignificant, which means there is no significant difference in knowledge among universities. However, income and age are found significant at 10 percent and 1 percent level of significance respectively. This implies that there is significant difference in knowledge among various age and income groups. Financial knowledge increases as students get older till 30 and their family income increases up to NPR 50,000.

Table 8 Results of ANOVA

Characteristics	F-Statistic	Sig.
University Affiliation	1.4	0.240
Monthly Family Income (In NPR)	2.34	0.072
Age (In years)	16.08	0.000

Logistic Regression Analysis

Logistic regression is used to test whether there is significant relationship of gender, education, type, stream, behavior, influence and attitude on financial knowledge. In this case number of cases to independent variables is 62:1.

Table 9 Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	95.681	7	0.00
	Block	95.681	7	0.00
	Model	95.681	7	0.00

-2 Log likelihood	Nagelkerke R Square
488.317	0.267

Table 9 presents the result of Omnibus test of model and model summary. The model is well fitted. So, simultaneous relationship between dependent and all independent variables exists in the fitted model. Nagelkerke R Square shows that.70 percent of variation in level of knowledge is explained by gender, educational level, type, stream, behavior, influence, and attitude.

Table 11 Logistic Regression Results of Impact of Students' Gender, Education Level, Type, Stream, Behavior, Influence and Attitude on Financial Knowledge

	B	S.E.	Wald	Df	Sig.	Exp(B)
Gender	-0.128	0.239	0.287	1	0.592	0.88
Education Level	-1.324	0.299	19.642	1	0.000	0.266
Type	0.455	0.268	2.897	1	0.089	1.577
Stream	1.372	0.253	29.363	1	0.000	3.945
Behavior	-0.038	0.283	0.018	1	0.892	0.962
Influence	-0.376	0.257	2.142	1	0.143	0.686
Attitude	0.793	0.316	6.299	1	0.012	2.21
Constant	-0.793	1.033	0.59	1	0.443	0.452

To examine the impact of some demographic variables and few personal characteristics of students on financial knowledge, logistic regression was performed and the results are shown in Table 11. The result indicated that gender, financial behavior and influence are statistically insignificant which means these variables have no significant impact on the financial knowledge. Whereas, level and stream of education are significant at 1 percent; financial attitude at 5 percent; and type of

educational institution at 10 percent level of significance. Moreover, the odd of more knowledge is likely to be 0.266 times lower for bachelor level students than masters. Similarly, the odd of more knowledge is likely to be 3.95 times higher for management students than non-management students. When financial attitude increases by 1 point, the odd of financial knowledge is likely to increase by 2.21. The odd of more knowledge is likely to be 1.58 times higher for the students studying in private colleges than government colleges.

Since standard error of each of independent variables is less than 2, there is no problem of multicolinearity in this model. The proportion of accuracy by chance is 65.40% which is less than the accuracy computed by SPSS (74.50%). Thus, criteria for accuracy are also maintained.

Section 5. Summary, Conclusion and Implications

The main objective of this study is to examine the financial literacy among college students in Nepal. This study was mainly focused on the student's financial behavior, influence, attitude and knowledge. From 23 colleges in four leading universities, 436 students were selected and a questionnaire was surveyed among them. Collected data were analyzed by frequency, percentage, mean, standard deviation, coefficient of variation and four hypotheses were tested by ANOVA and logistic regression.

Students have high level of knowledge on numeracy while it is medium in banking, inflation and share markets, and low in credit, taxes, financial statement and insurance. This finding is consistent with the finding of Nidar and Bestari (2012), in which they found low level of literacy in credit and insurance. However, most of the students have basic knowledge of finance.

Instead of buying insurance policy, investing in stock markets, buying jewelry and lending friends, most of the students are involved in bank saving. Similar to Jorgensen (2007), this is because students are influenced by their parents in bank saving and have positive attitude towards saving. Financial knowledge is determined by income, age, stream of education, types of college, and attitude of students while it is unaffected by gender, university affiliation, financial behavior and influence. In terms of age and income, this study supports De Clercq et al., (2009) while it refutes their findings in case of gender and the findings related to gender is consistent with Ramasawmy, et al (2013). Findings of education level, type and stream are quite similar to previous studies such as Hilgert et al (2003), Lusardi (2008), Shaari, et al (2013) and Fatoki (2014). As by Hathaway and Khatiwada (2008), this study also does not find relationship between financial behavior and knowledge and find significant relationship between attitude and financial knowledge (Ibrahim, at el. 2009).

Findings of this study have some policy implications. First, government and financial sector regulators should provide awareness program to students in taxation, bank lending, share markets and insurance. Second, universities are recommended to incorporate a course even to non-management students that enables students to understand basic concepts of finance. Finally, since financial attitude plays key role in enriching financial literacy, it is suggested to educators to design programs that develop financial attitude of the students.

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Annexure

Table 1 Mean Percentage of Correct Responses to Each Section by Characteristics of Sample

Characteristics	Basic	Advance	Total
University Affiliation			
Tribhuvan	61.46	48.86	54.59
Kathmandu	63.55	52.96	57.77
Purbanchal	58.79	46.46	52.07
Pokhara	66.07	50.75	57.71

Monthly Family Income (In NPR)			
Below 20,000	57.9439	45.3271	51.0620
20,000 to 30,000	63.3333	50.5291	56.3492
30,000 to 50,000	64.2593	52.6235	57.9125
50,000 and above	63.5789	49.1228	55.6938
Age (In years)			
Below 18	57.5000	31.2500	43.1818
18 to 20	55.0000	39.6368	46.6200
21 to 24	65.4310	54.5259	59.4828
25 to 29	72.7273	63.6364	67.7686
30 and above	77.1429	54.7619	64.9351
Gender			
Male	62.2878	49.1390	55.1157
Female	62.3030	50.0000	55.5923
Education Level			
Bachelor	58.4880	43.5281	50.3280
Master	69.9310	61.3793	65.2665
Stream			
Management	67.3540	55.6701	60.9809
Non-Management	52.1379	37.0115	43.8871
Types of Institution			
Government	58.8166	50.0000	54.0075
Private	64.4944	49.1261	56.1117

Annexure

Table 2 Frequency and Percentage in Financial Behavior According to level of Students' Financial Knowledge

	Financial Knowledge					
Financial Behavior	**Less**		**More**		**Overall**	
Spending Habit	Frequency	Percent	Frequency	Percent	Frequency	Percent
Very economical	26	15.2	19	7.2	45	10.32
Somewhat economical	46	26.9	92	34.7	138	31.65
Neither economical nor spending	40	23.4	66	24.9	106	24.31
Somewhat spending-oriented, rarely saving money	39	22.8	67	25.3	106	24.31
Very spending-oriented, hardly ever saving money	20	11.7	21	7.9	41	9.40
Total	171	100	265	100	436	100.00
Maintaining Records						
Maintain no records	60	35.1	106	40	166	38.07
Maintain minimal records	82	48	133	50.2	215	49.31
Maintain very detailed records	29	17	26	9.8	55	12.61
Total	171	100	265	100	436	100.00
Use of Savings						
Spend it on consumer goods	17	9.9	31	11.7	48	11.01
Keep it in cash	33	19.3	41	15.5	74	16.97

	Financial Knowledge					
Financial Behavior	**Less**		**More**		**Overall**	
Deposit it into bank account	76	44.4	127	47.9	203	46.56
Invest it in the capital market	8	4.7	15	5.7	23	5.28
Lend it to friends or relatives	4	2.3	5	1.9	9	2.06
Invest it in our own business	26	15.2	27	10.2	53	12.16
Buy gold and jewelry	6	3.5	10	3.8	16	3.67
Others	1	0.6	9	3.4	10	2.29
Total	171	100	265	100	436	100.00
Managing Money in Problem						
Cut down expenses and save	43	25.1	73	27.5	116	26.61
Borrow money from relatives, friends and acquaintances	43	25.1	70	26.4	113	25.92
Spend our saving	49	28.7	80	30.2	129	29.59
Use a credit card or bank loan	14	8.2	23	8.7	37	8.49
Work extra hours or do additional jobs	20	11.7	18	6.8	38	8.72
Other	2	1.2	1	0.4	3	0.69
Total	171	100	265	100	436	100.00
Use of Additional Income						
Purchasing of household goods like furniture, clothes etc.	16	9.4	24	9.1	40	9.17
Fixed deposit for future	54	31.6	80	30.2	134	30.73
Saving for meeting contingency	16	9.4	27	10.2	43	9.86

	Financial Knowledge					
Financial Behavior	**Less**		**More**		**Overall**	
Repay earlier debts	17	9.9	31	11.7	48	11.01
Go for travel or vacation	19	11.1	12	4.5	31	7.11
Investment in own business	41	24	57	21.5	98	22.48
Buy an insurance policy	4	2.3	2	0.8	6	1.38
Buy shares	4	2.3	32	12.1	36	8.26
Total	171	100	265	100	436	100.00
Financial Services Taken						
Bank loan	38	22.2	59	22.3	97	22.25
Insurance	20	11.7	37	14	57	13.07
Investment in Shares	28	16.4	40	15.1	68	15.60
Bank saving	91	53.2	169	63.8	260	59.63
Investment in commodities	15	8.8	34	12.8	49	11.24
Others	7	4.1	10	3.8	17	3.90

Paper No. 17

Financial Inclusion Index: A Case of SAARC Countries

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Abstract

The South Asian Association for Regional Cooperation (SAARC) provides a level playing field for South Asian Countries to work together in a cooperative manner towards accomplishing certain common goals which can help to accelerate the economic and social development in the region. Financial inclusion is one such important common objective for the SAARC countries. Financial exclusion refers to the lack of access to financial services. Financial inclusion refers to the ability of individuals to access appropriate financial products and services. The main objective of this study is to construct financial inclusion index for the SAARC countries. The secondary data for a period of 10 years (2004-2013) are used to construct the overall financial inclusion index (FII) for the eight SAARC countries. There data were collected from IMF's 'Financial Access Survey, 2013' and the World Bank's 'Global Financial Development Report 2014.'

Financial inclusion index (FII) calculated in this study is based on two dimensions i.e. Availability and Usage of financial services. We have calculated separately Financial Services Availability Index (FSAI), which includes 7 variables, and Financial Services Usage Index (FSUI), which includes 4 variables. And then the availability and usage indices were combined to obtain the financial inclusion index (FII).

On the basis of the overall financial inclusion, SAARC countries have been ranked. India got the highest financial inclusion index of 0.752 and ranked first among the countries under study, followed by Bangladesh (0.547), Maldives (0.393), Sri Lanka (0.286), Bhutan (0.250), Nepal (0.192), Pakistan (0.123), and Afghanistan (0.006). One main conclusion is that the financial inclusion in SAARC countries in general is not impressive except countries like India and Bangladesh due to lack of financial literacy and knowledge of financial products. Our data reveals that the FII for SAARC countries such as Bhutan, Nepal, Pakistan and Afghanistan is low Perhaps due to low income, poverty and illiteracy from demand side and distance from branch, documentation and procedures, unsuitable products and language from supply side.The financial service providers (FSPs) in SAARC countries need to redesign their business strategies to incorporate specific plans for promoting access of their services to low income group treating it

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both a business opportunity as well as a corporate social responsibility in order to promote financial inclusion. Apart from formal banking institutions the role of self-help groups and microfinance instruments (MFIs) is also important to improve financial inclusion.

Key words: Financial Services, Availability, Usage, Inclusion Index

1. Introduction

Financial inclusion is the recent concept which helps to achieve the sustainable economic development of the country, through available financial services to the unreached people with the help of financial institutions. Financial inclusion can be defined as easy access to formal financial services or systems and their usage by all members of the economy. Current development theories suggest that greater financial inclusion can have a positive impact on the lives of the poor. On the contrary, financial exclusion refers to the lack of access to financial services. It limits opportunities for employment and enterprise development and imposes a premium on the cost of basic services. Financial exclusion thus makes it difficult to reduce inequalities and alleviate poverty. Financial inclusion providing access to financial services for all has gained prominence in the past few years.

The United Nations designated 2005 the international year of microcredit, adopting the goal of building inclusive financial systems. Pradhan Mantri Jan-Dhan Yojana (PMJDY) is a scheme for comprehensive financial inclusion launched by the Prime Minister of India, Narendra Modi on 28 August 2014 (Press Information Bureau, Govt. of India). He had announced this scheme on his first Independence Day speech on 15 August 2014. It is National Mission for Financial Inclusion to ensure access to financial services, namely, Banking / Savings & Deposit Accounts, Remittance, Credit, Insurance, Pension in an affordable manner. Account can be opened in any bank branch or Business Correspondent (Bank Mitr) outlet. PMJDY accounts are being Zero balance. However, if the account-holder wishes to get cheque book, he / she will have to fulfill minimum balance criteria (Department of Financial Services, Ministry of Finance).

In a short period of 100 days, over 12.5 crore families have been brought into the financial mainstream under the scheme of Jan-Dhan Yojana (The Economics Times, 01 March 2015).

Well-functioning financial systems serve a vital purpose by offering savings, payment, credit, and risk management services to individuals and firms. Inclusive financial systems are those with a high share of individuals and firms that use financial services. Without inclusiveness in financial systems, people must rely on their own limited savings to invest in education or become entrepreneurs. Newly founded enterprises must likewise depend on their constrained earnings to take advantage of promising growth opportunities. This can contribute to persistent income inequality and slow economic growth.

While the importance of financial inclusion has been widely accepted, the literature on financial inclusion lacks a comprehensive measure that can be used to indicate the extent of financial inclusion across economies (Mandira Sarma, 2010). Individual indicators (such as number of bank accounts, number of bank branches and so on) that are generally used as measures of financial inclusion can provide only partial information on the level of financial inclusion in an economy. A comprehensive measure of financial inclusion should be able to incorporate information on several aspects (dimensions) of financial inclusion, preferably in one single number. Many people now propose financial inclusion index (FII), which incorporates information on two or more aspects of financial inclusion; is easy and simple to compute; is comparable across countries; has values

between '0' and '1', zero indicating lowest financial inclusion and '1' indicating complete financial inclusion.

2. Definition of Financial Inclusion

Rangarajan Committee (2008) has defined financial inclusion as the process of ensuring timely access to financial services and adequate credit where needed by vulnerable groups such as the weaker sections and low income groups at an affordable cost.

Demirguc-Kunt and Klapper (2012) stated that, financial inclusion is most commonly thought of in terms of access to credit from a formal financial institution, but the concept has more dimensions. Formal accounts include both loans and deposits, and can be considered from the point of view of their frequency of use, mode of access, and the purposes of the accounts. There may also be alternatives to formal accounts, such as mobile money via mobile telephones. The main other financial service besides banking is insurance, especially for health and agriculture.

Raghuram Rajan (the Governor of the Reserve Bank of India), has defined Financial Inclusion as the process of ensuring access to appropriate financial products and services needed by all sections of the society in general and vulnerable groups such as weaker sections and low income groups in particular at an affordable cost in a fair and transparent manner by mainstream institutional players.

Hence, from above we can say that financial inclusion is multidimensional in nature offering quality financial services in a convenient way, extending access to all segments of the population and providing equal opportunities and reducing inequalities in an economy.

In the present study, we proposed Financial Inclusion Index (FII) which is a multidimensional measure similar to the well known development indexes such as Human Development Index (HDI) and Gender Development Index (GDI). The Financial Inclusion Index (FII) can be used to compare the extent of financial inclusion across different economies and to monitor the progress of the economies with respect to financial inclusion over time. With the available data we can calculate the financial inclusion at different time points and at different levels of economic aggregation (village, province, state, nation and so on). In the present study, due to data unavailability regarding village, province and state from SAARC countries the illustration given in the study is at the country level. Regular annual data on different aspects of financial inclusion such as availability and usage are available for SAARC countries. Further data on affordability, timeliness and quality of financial services are not available from any source. The authentic data available towards international organizations like World Bank, International Monetary Fund, and UN organizations like UNDP with their experience and reach are rightly placed to collect and disseminate these data. IMF's recent initiative on "Financial Access Survey" to collect periodic data on financial inclusion indicators will go a long way in computing the financial inclusion index on a periodic basis.

3. Review of Literature

Financial Access Survey (2012) has clearly revealed the present scenario on the financial inclusion. It has been noted that half of the adult-population around the world does not have an account at a formal financial institution. Moreover, 75 per cent of poor people are unbanked. The 2.2 billion of these unserved adults live in Africa, Asia, Latin America and the Middle East. The 1.2 billion adults who use formal financial services in Africa, Asia and Middle East, at least two-thirds, a little

more than 800 million, live on less than $5 per day. The Financial Access Survey data show that greater financial inclusion (measured by deposit penetration) correlates with higher income levels (GDP per capita and GDP per capita growth) and a reduction in income inequality. Higher financial inclusion is associated with less inequality, though a certain degree of financial access and usage and financial sector depth is required before inequality improves; for a country with low levels of financial inclusion and financial depth, inequality increases at first, then decreases as the financial system becomes deeper and more inclusive. A growing body of literature suggests a positive relationship between financial inclusion and financial stability; however, empirical evidence does not yet confirm this. Although financial stability overall has a low correlation with access, depth, and efficiency, financial access and financial stability correlate better in low-income and lower-middle-income countries, where access issues are more acute. Lastly, greater financial inclusion is associated with more developed financial infrastructure, and a sounder institutional and legal environment. A stronger business environment is linked to greater deposit and loan penetration.

Global Financial Development Report (2014) show that, the Sri Lanka has highest share of adults with formal financial accounts (68%) in South Asia, which is much higher than in India, Pakistan, Nepal, and Afghanistan. Bangladesh has the highest share of adults borrowing from formal financial institutions, followed by Sri Lanka.

Mohi-UD- Din Sangmi's (2013), paper on 'Financial Inclusion Strategies in Developing Countries with Special Reference to India' on the basis of IMFs Financial Access survey and world Economic forum data showed that there is a wide variation among countries in the South Asian region in terms of deposit account penetration and access to credit. The deposit account per 1000 population varies from 83 bank accounts in Afghanistan to 1891 bank accounts in Sri Lanka. Similarly, in terms of loan account penetration, it varies from only 3 bank loans per 1000 adults in Afghanistan to 137 bank loans per 1,000 adults in India. The ATM location equally varies from as low as 1 in 100,000 populations in Nepal to 12.29 in Sri Lanka.

According to the Joseph Massey (2010) the role of the financial institutions in a developing country is vital in promoting financial inclusion. The efforts of the government to promote financial inclusion and deepening can be further enhanced by the pro-activeness on the part of capital market players including financial institutions. Financial institutions have a very crucial and a wider role to play in fostering financial inclusion. National and international forums have recognized this and efforts are seen on domestic and global levels to encourage the financial institutions to take up larger responsibilities in including the financially excluded lot.

Mandira Sarma and Jesim Pais (2008) suggest that the issue of financial inclusion is a development policy priority in many countries. Using the index of financial inclusion developed in levels of human development and financial inclusion in a country move closely with each other, although a few exceptions exist. Among socio-economic factors, as expected, income is positively associated with the level of financial inclusion. Further physical and electronic connectivity and information availability, indicated by road network, telephone and internet usage, also play positive role in enhancing financial inclusion.

Hom Nath Gaire (2013) had written a research note on Financial Inclusion Must for Inclusive Growth of Nepal. He explained that, Nepal is one of the LDCs with economically challenged huge rural population. Financial Inclusion is indispensible in its case for the sustainable growth of its economy. However, even in such scenarios, many businesses have been successful in showing consistent as well as continued development. One of the most important sectors of this kind is the

financial services sector. With just 2 commercial banks in the early days, the country has actually managed to expand this sector, which at present includes 31 commercial banks. Similarly in the past 30 years, different development banks, co-operatives, finance companies, insurance companies have grown by more than 10 fold.

The latest figures indicate that the financial services are used only by a section of the population (around 40%) in Nepal. There is demand for these services but it has not been provided. The excluded regions are rural, poor regions and also those living in harsh climatic conditions where it is difficult to provide these financial services. The excluded population then has to rely on informal sector for availing finance that is usually at exorbitant rates. This leads to a vicious cycle. First, high cost of finance implies that first poor person has to earn much more than someone who has access to lower cost finance. Second, the major portion of the earnings is paid to the money lender and the person can never come out of the poverty.

Peter J. Morgan & Victor Pontines (2014) have examined the relationship between financial stability and financial inclusion in their study. This study suggests that the greater financial inclusion could be either positive or negative for financial stability. Positive effects include: diversification of bank assets, thereby reducing their riskiness; increased stability of their deposit base, reducing liquidity risks; and improved transmission of monetary policy. Negative effects include the erosion of credit standards (e.g., sub-prime), bank reputational risk, and inadequate regulation of micro finance institutions.

The financial inclusion index based studies conducted so far were confined to individual countries (Bangladesh, Nepal and India) by using one or two year's data and by taking few variables i.e. commercial bank, no of ATM's). No comprehensive study for the SAARC countries was conducted by taking a long time series data. So the present study is an attempt to fill up this gap.

4. Objective of the Study

To measure the financial availability index and financial usage index for SAARC countries.

To measure the extent of overall financial inclusion in SAARC countries with financial inclusion index and to rank SAARC countries according to financial inclusion index.

To suggest measures to improve overall financial inclusion in SAARC countries.

5. Research Methodology

The present study is based on secondary data. The secondary data for a period of 10 years (2004-2013) are used to construct the overall financial inclusion index (FII) for the eight SAARC countries (India, Bangladesh, Maldives, Sri Lanka, Pakistan, Bhutan, Nepal and Afghanistan). There data were collected from IMF's 'Financial Access Survey, 2013' and the World Bank's 'Global Financial Development Report 2014.' The comprehensive measure such as the index is used for measuring financial inclusion. This measure is able to incorporate information on several aspects (dimensions) of financial inclusion preferably in one single number. A good measure of financial inclusion in our view should be constructed based on the following criteria: it should incorporate information on as many aspects (dimensions) of financial inclusion as possible; it should be easy and simple to compute; and it should be comparable across countries.

In constructing the present financial inclusion index (FII) we have adopted two- dimensional approach unlike human development index (HDI) by UNDP which adopts three-dimensional approach. The FII was calculated on the basis of the two dimensions which are availability and usage for each country selected in the sample.

Empirical Estimation of Financial Inclusion Index (FII) and Cross Country Comparisons:

In the empirical analysis we have considered two basic dimensions of financial inclusion, as follows:

Availability Dimension

The availability dimension includes the following variables related to commercial banks, credit unions and financial cooperatives, other depository corporations, and all micro finance institutions (Deposit taking + Non deposit taking).

No. of banks.

No. of bank branches.

No. of bank branches per 100,000 adults.

No. of bank branches per 1000 km2.

No. of country wide ATMs.

No. of ATMs per 100,000 adults.

No. of ATMs per 1000 km2.

Usage Dimension:

The usage dimension includes the following variables related to commercial banks, credit unions and financial cooperatives, other depository corporations, and all micro finance institutions (Deposit taking + Non deposit taking).

Number of deposit accounts.

Number of loans accounts.

Outstanding deposits with bank

Outstanding loans with bank

First, index is calculated for each variable listed above, and later on grouped accordingly to get two dimensional indices, namely Financial Services Availability Index (FSAI) and Financial Services Usage Index (FSUI).

The formula for FII is as follows:

$$V_i = \frac{A_i - m_i}{\text{----------}}$$

Mi – mi

Where,

Vi = Index of a variable.

Ai= Actual value of variable i.

m = Minimum value of variable i during the study period.

M = Maximum value of variable i during the study period.

The final value of FII for SAARC countries using average of two dimensions (availability and usage) for 2004 to 2013 periods was obtained. Eight SAARC countries are covered in this study. Then, countries are placed in following three categories:

1. $0.5 \leq FII \leq 1.0$ = high financial inclusion.

2. $0.3 \leq FII < 0.5$ = medium financial inclusion.

3. $0.0 \leq FII < 0.3$ = low financial inclusion.

6. Limitations of the Study

The common rule "no research study is comprehensive and without limitations" is applicable to this study also. Thus, the present study suffers from the following limitations:

Though the source of data is authentic, i.e. from International Monetary Fund (IMF), the study is purely based on secondary data.

The number of variables differs in each of the two dimensions, which might have affected the overall FII.

All variables data in all countries are not available from authentic sources. Therefore, financial inclusion index value in this study is depended on calculated value.

7. Results and Discussion

7.1 Financial Inclusion in SAARC Countries

Inclusive finance is not a new concept in SAARC countries. These countries have a long policy history of developing inclusive banking systems. Historically, however, their interventions have been on the supply side, such as nationalizing private banks, prescribing branch regulations, placing interest rate ceilings on credit to low-income households, and providing credit at subsidized rates to priority sectors etc. South Asian Association for Regional Cooperation (SAARC) provides a platform for South Asian countries to work together in a cooperative manner towards accomplishing certain common goals which can help accelerate the economic and social development in the region.

Financial inclusion in select SAARC countries is measured with the help of an index which is on par with the HDI. For arriving at the final FII, we have calculated separately Financial Services

Availability Index (FSAI), which includes 7 variables, and Financial Services Usage Index (FSUI), which includes 4 variables. Then, the average of availability and usage indices gave us Financial Inclusion Index (FII). Finally on the basis of the overall financial inclusion, countries have been ranked among the SAARC countries.

7.2 Financial Services Availability Index (FSAI)

Financial Services Availability Index FSAI is calculated with the 7 variables. The average Indices are calculated from each variable and then the average for all these variables constitutes FSAI.

Table 1 exhibits the indices for 7 different variables independently and also the average of these forms the availability index. The index value 1.00 means that financial inclusion is the highest and index value 0.00 implies that financial inclusion is lowest. But, the index value of 1.00 doesn't mean that the country has achieved 100 per cent financial inclusion.

In the group of SAARC countries for which FII has been computed using two dimensions (availability and usage), India has the high average Financial Services Availability Index (FSAI) (0.57) which is closely followed by Bangladesh (0.53). It means availability of financial services or banking services in India are high when compared to other SAARC countries under study over the period. However, under the variables number of commercial banks, number of commercial bank branches, number of country wide ATMs, number of credit unions & financial cooperatives branches, India has an index score of '1'. It means India has attained high financial inclusion in those particular variables. Bangladesh is the next best country with regard to FSAI with 053. However, number of all MFI, number of all MFI branches, number of other depository corporations, number of other depository corporations branches has an index score of '1'. It means Bangladesh has also achieved highest financial inclusion in those particular variables. But, number of credit unions and financial cooperatives and number of credit unions and financial cooperatives branches has an index score of '0' it meaning that Bangladesh suffers lowest in those variables during the study period. Sri Lanka, Pakistan, Bhutan, Nepal and Afghanistan have a financial services availability index score of 0.26, 0.12, 0.11, 0.10 & 0.01 respectively. It means available financial services are lowest in these countries during the study period.

7.3 Financial Services Usage Index (FSUI)

The FSUI is calculated with 4 variables, namely deposit accounts, loan accounts, outstanding deposits and loans such as (commercial banks, credit unions and financial cooperatives, other depository corporations, all MFI (deposit taking + non deposit taking MFIs). Table 2 depicts the FSUI for 2004-2013 periods. From the table, it is understood that India has got the highest consolidated usage index average of 0.933 followed by Bangladesh (0.564). However, Bhutan (0.390), Maldives (0.345), Sri Lanka (0.312), Nepal (0.284) and Pakistan (0.125) have got lowest average usage index. But Afghanistan has average usage index score of '0.002'. It means financial services usage is minimum or lowest in this country.

However, number of deposit accounts and loan accounts of commercial banks has an index score of '0' in Bhutan, Nepal, Pakistan and Afghanistan. It means the uses of the financial services are minimum or lowest in these countries. The main reason from the demand side are lack of awareness, low income, poverty and illiteracy; and from the supply side is lack of branch, distance from branch, branch timings, cumbersome documentation and procedures, unsuitable products, language, staff attitudes, etc. Due to all these procedural hassles people feel it easier to take money from informal credit sources.

7.4 Financial Inclusion Index (FII)

Financial inclusion index is calculated with two dimensions as per the research methodology that was planned for this study. The dimensions are availability of banking services and usage of banking services. Table 3 depicts that India has got the highest financial inclusion index of 0.752 and ranked first among the countries under study. Bangladesh is the second effective country with regard to financial inclusion index of 0.547 and third Maldives closely follows Bangladesh with average financial inclusion index of 0.393 and Sri Lanka, Bhutan, Nepal, Pakistan and Afghanistan have been the lowest in achieving financial inclusion, with index of 0.289, 0.250, 0.192, 0.123 and 0.006, respectively. But Afghanistan has the very low financial inclusion nearest to '0', during the study period.

It is observed that only supply side factors are not responsible for the financial exclusion. Demand side factor are also equally responsible. In fact, the main reasons for financial exclusion, from the demand side are lack of awareness, low income, poverty and illiteracy; and from the supply side is distance from branch, branch timings, cumbersome documentation and procedures, unsuitable products, language, staff attitudes, etc. Due to all these procedural hassles people feel it easier to take money from informal credit sources, but it results in compromised standard of living, higher costs, and increased exposure to unethical and unregulated providers and vulnerability to uninsured risks.

8. Conclusion and Policy Measures

It is evident that this study has only scratched the surface in terms of two dimensions of financial inclusion. From the above discussion, it may be concluded that financial inclusion index of India is highest and ranked first. It is followed by Bangladesh ranked second among the SAARC countries during study period. It is also observed that the achievement of the financial inclusion in some SAARC countries i.e. Sri Lanka, Bhutan, Nepal, Pakistan, and Afghanistan is very low. Although some improvement in respect of some parameters might have taken place, this is not sufficient to conclude that financial inclusion has taken place in these SAARC countries.

Ensuring financial inclusion is an arduous task. Addressing financial exclusion requires a holistic approach encompassing effective approaches to awareness raising, technical advice on different dimensions of money management, financial education, saving mobilization, debt counseling, research and development, provision of affordable credit services. In order to promote financial inclusion, financial service providers (FSPs) need to develop and apply specific strategies to expand the outreach of their services using combinations of lending methodologies, market led approaches to new product development, fostering linkages with local communities and promoting the use of technologies.

In view of this future work in financial inclusion, the financial service providers (FSPs) in SAARC countries need to redesign their business strategies to incorporate specific plans for promoting access of their services to low income group treating it both a business opportunity as well as a corporate social responsibility in order to promote financial inclusion. There is need to use all available resources including technology and expertise for the cause of financial inclusion. Though apparently, taking financial services to the sections constituting "the bottom of the pyramid" may not be profitable but the fact that even the relatively low margins on high volumes can be a very profitable proposition should be carefully capitalized. There exists potential that financial inclusion

may emerge as commercial and profitable business but this requires that financial service providers (FSPs) should think access to finance outside the conventional thinking and in an innovative way.

Thus, there is a need to solve both of these problems with the help of appropriate policies. Banks should look at financial inclusion, both as business opportunity and as social responsibility. In fact, providing the banking services is not sufficient. Many rural people are still not aware of banking products and they are reluctant to take the advantage of banking facilities. Therefore, financial literacy among the rural people is important. Apart from formal banking institutions the role of self-help group and microfinance instrument (MFIs) is also important to improve financial inclusion.

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Table 1 Financial Services Availability Index 2004-2013

Countries	No. of Commercial Banks	No of Commercial Bank Branches	No. of Commercial Bank Branches per 100,000	No. of Commercial Bank Branches per 1000 km2	No. of Country Wide ATMs	No. of ATMs per 100,000 Adults	No. of ATMs per 1000 km2	Credit unions and financial cooperatives	Credit unions and financial cooperatives: Number	Credit unions and financial cooperative branches	Credit unions and financial cooperative branches	Other Depository Corporations	Other Depository Corporations: Number of	All MFI	All MFI: Number of Branches	All MFI branches per 1,000 km2	Average Financial Services Availability Index
India	1	1	0.57	0.24	1	0.33	0.13	1	1	0.01	0.01	NA	NA	NA	NA	NA	0.57
Bangladesh	0.24	0.09	0.39	0.5	0.05	0.08	0.1	0	0	1	1	1	1	1	1	1	0.53
Maldives	0.01	0	0.96	1	0	1	1	NA	NA	NA	NA	0	0	NA	NA	NA	0.44
Sri Lanka	0.1	0.03	0.85	0.29	0.03	0.61	0.2	NA	NA	NA	NA	NA	NA	NA	0	NA	0.26
Pakistan	0.19	0.11	0.46	0.1	0.17	0.17	0.04	NA	NA	NA	NA	NA	NA	0	0	0	0.12
Bhutan	0	0	0.85	0.01	0	0.27	0	0	NA	0	0	NA	NA	NA	NA	NA	0.11
Nepal	0.11	0.01	0.22	0.05	0.01	0.31	0.05	NA	NA	NA	NA	NA	NA	NA	0.02	NA	0.10
Afghanistan	0.06	0	0	0	0	0.01	0	NA	NA	NA	NA	0.02	0	NA	NA	NA	0.01

Notes: 1. NA – Not available, 2. MFI = Deposit taking + Non deposit taking.

Source: Calculated with Data from IMF Financial Access Survey 2013.

Table 2 Financial Services Usage Index 2004-2013

Countries	Commercial banks: Number of Deposit Accounts	Commercial banks: Number of loan accounts	Outstanding loans from commercial banks	Outstanding deposits with commercial banks	Credit unions and financial cooperatives: Number of Deposit Accounts	Credit unions and financial cooperatives: Number of loan accounts	Outstanding loans from credit unions and financial cooperatives	Outstanding deposits with credit unions and financial cooperatives	Other Depository Corporations: Number of Deposit Accounts	Other Depository Corporations: Number of loan accounts	All MFIs: Number of Deposit Accounts	All MFIs: Number of loan accounts	Average Financial Services Usage Index
India	1	1	0.71	0.89	NA	NA	1	1	NA	NA	NA	NA	0.933
Bangladesh	0.06	0.08	0.72	0.78	NA	NA	0	0	1	1	1	1	0.564
Bhutan	0	0	0.6	0.96	NA	NA	NA	NA	NA	NA	NA	NA	0.390
Maldives	0.13	0.26	0.96	0.72	NA	NA	NA	NA	0	0	NA	NA	0.345
Sri Lanka	0.03	0.04	0.63	0.55	NA	NA	NA	NA	NA	NA	NA	NA	0.312
Nepal	0	0	0.61	0.81	NA	NA	NA	NA	NA	NA	NA	0	0.284
Pakistan	0.01	0	0.36	0.38	NA	NA	NA	NA	NA	NA	0	0	0.125
Afghanistan	0	0	0	0	NA	NA	NA	NA	0.01	0	NA	NA	0.002

Notes: 1. NA- Not available, 2. MFI = Deposit taking + Non deposit taking.

Source: Calculated with Data from IMF Financial Access Survey 2013.

Table 3 Average Financial Inclusion Index (2004-2013)

Countries	Average Availability Index	Average Usage Index	Average Financial Inclusion Index	Rank	FII Categories
India	0.57	0.93	0.752	1	High FII
Bangladesh	0.53	0.56	0.547	2	
Maldives	0.44	0.35	0.393	3	Medium FII
Sri Lanka	0.26	0.31	0.286	4	Low FII
Bhutan	0.11	0.39	0.250	5	
Nepal	0.10	0.28	0.192	6	
Pakistan	0.12	0.13	0.123	7	
Afghanistan	0.01	0.00	0.006	8	

Source: Calculated with Data from IMF Financial Access Survey 2013.

Paper No. 18

Three Years Ahead Dynamic GDP Forecasting For Nepal

Mani Raj Shrestha*

Abstract

To address the scanty GDP forecasting literature in the context of Nepal, this paper attempts to forecast real GDP growth rates of Nepal for FY 2014/15 (2071/72 B.S.), 2015/16 (2072/73 B.S.), and 2016/17 (2073/74 B.S.) using pure time series models with 39 yearly observations, covering the period from 1976 to 2014. Whilst the government of Nepal's has set a GDP growth target of

6%, and Asian Development Bank (ADB), International Monetary Fund (IMF), and World Bank

(WB) have forecasted Nepal's GDP to grow by 4.7%, 4.5%, and 4.8% respectively for FY 2014/15, this paper attempts to provide an independent forecast of GDP for Nepal from a noncorporate level, for three consecutive years starting from FY 2014/15. The univariate forecasting model (MA (3) model) of real GDP growth rates resulted in forecasts of 4.47%, 4.03%, and 4.70% for 2014/15, 2015/16, and 2016/17 respectively. Similarly, with growth in total government expenditures (GTE) as an additional regressor in univariate model, the resulting ARMAX (3,4) model, it produced real GDP growth forecasts of 5.1%, 4.64%, and 3.84% respectively. Then, VARX forecasting model with two endogenous variables (growth in real GDP and annual inflation) and an exogenous variable (GTE) resulted in real GDP growth forecasts of 4.17%, 4.02%, and 4.75% respectively. The final forecast is a simple average of the three models, which produced real GDP growth forecast of 4.58%, 4.23%, and 4.43% respectively. On testing stationarity of the variables, real GDP growth rate, total government expenditures growth rate, and annual inflation are all stationary to start with. All the three models are robust as they passed several model diagnostic tests.

JEL classification: E17

Key words*:* GDP forecast, total government expenditure, inflation, pure time series models, Nepal.

Background

Gross domestic product (GDP) is one the most important indicators when it comes to measure development. To achieve this measure of national well being, a lot of national and international resources are employed. Several policies and programs are attuned towards attaining GDP goals, and Nepal is not an exception in doing such. Setting GDP goals and working towards realization of such goals is even more relevant for an underdeveloped country like Nepal. In line with such, Nepal had set GDP growth target of 6% for FY 2014/15

(Government of Nepal, Ministry of Finance, 2014).

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Then, forecasting has been one of the important aspects of econometrics. Even more, GDP forecasting has been a widely studied area. Forecasts of GDP are also expected to be a monitoring tool so that necessary corrective measures can be undertaken towards achieving the desired GDP goals. GDP forecasting is also expected to contribute in setting a better GDP growth targets for next periods. Although it might seem that GDP forecasting is only relevant at government level, a more detailed understanding of this would certainly benefit all the stakeholders of a society; this is because GDP is the reflection of all the economic agents' production, consumption and/or distribution/income generating activities.

The theory of economics posits that Government policies try to influence the economy's growth rate in many ways: by encouraging saving and investment, encouraging investment from abroad, fostering education, promoting good health, maintaining property rights and political stability, allowing free trade, and promoting the research and development of new technologies (Mankiw, 2009). Fiscal policy and monetary policy are two major government policies that can affect economic growth. Monetary policy, fiscal policy, and shocks to the money and goods markets are often responsible for year-to-year changes in output and employment (Mankiw, 2010). One of the reflections of fiscal policy is government spending and that of monetary policy is inflation.

Though abundant literature exists for GDP forecasting at an international level, such is very scarce in the context of Nepal. Some of the regular forecasters of Nepal's GDP include

Asian Development Bank (ADB), International Monetary Fund (IMF), and World Bank (WB).

For the fiscal year 2014/15, ADB, IMF, and WB have forecasted Nepal's GDP growth of 4.7%, 4.5%, and 4.8% respectively. These forecasters provide the end figures of the forecasts but do not publish the detailed methodological procedure involved in arriving at such forecasts.

To fill this gap, the study has been undertaken to provide an independent, non-corporate forecast of Nepal's GDP with details on methodological aspects. The study is based on purely time series model. More specifically, this paper aims to provide three periods ahead out-ofsample dynamic forecasts of real GDP growth rates starting from 2014/15.

The next section of the paper presents some of the major literature in GDP forecasting, followed by methodology section, which describes the data set and variables and three pure time series models for forecasting real GDP models employed in the study. Then, results and discussion section provide the forecasted GDP growth rates for three periods (the details on methodology separately provided in appendices). Finally, conclusions and avenues for future research conclude the paper.

Literature Review

Davis and Fagan (1997) analyzed the usefulness of financial spreads as indicators of future inflation and output growth in European Union nations, placing a particular focus on outof-sample forecasting performance. They found that for some countries, financial spread variables do contain some information about future output growth and inflation, with the yield curve and the reverse yield gap performing best.

Schunk (2001) provided evidence on the forecasting performance of the Divisia monetary aggregates relative to the traditional simple sum monetary aggregates. They found that the forecasts of U.S. real GDP from a four variable vector autoregression were most accurate when a Divisia aggregate was included rather than a simple sum aggregate, particularly at broad levels of aggregation. Further, the two M1 aggregates, relative to the broader aggregates, were found to

be superior predictors of the GDP deflator, with a slight edge going to Divisia M1 over simple sum M1.

Camba-Mendez, Kapetanios, Smith, and Weale (2001) proposed an automatic leading indicator model, using a dynamic factor model to summarize the information content of a pool of variables. Using quarterly data for France, Germany, Italy and the United Kingdom, they showed that the overall forecasting performance of the automatic leading indicator model appeared better than that of more traditional VAR and BVAR models.

Hamilton and Kim (2002) analyzed the yield spread's usefulness for predicting future real GDP growth. They found that the contribution of the spread can be decomposed in to expectations effect and term premium effect. Though both the factors were found to be relevant in predicting real GDP growth, their respective contributions were different.

Afzal, Rehman, and Butt (2002) compared the effectiveness of theory based approach (regression model) and theory free approach (univariate non-seasonal ARIMA model) in forecasting. They found that the estimates obtained by using ARIMA model were closer to the actual values of the variables of that period than the forecast estimates obtained by using regression model. Then, measures of forecasting power also indicated that forecasts obtained by regression models were inferior to those obtained by ARIMA model. They concluded that the performance of ARIMA model was better than the regression model for future decision-making.

Aron and Muellbauer (2002) forecasted output in South Africa with multistep vector error correction model for presence of structural breaks in the country. They found important and persistent effects of high real interest rates, which significantly constrained growth in the 1990s, and significant potential growth benefits from fiscal discipline. Then, they also concluded that South African growth appear to have become more responsive to the exchange rate with increasing trade openness in the 1990s.

Chow and Li (2002) forecasted GDP growth rates for China up to 2010. They studied

China's economic growth in terms of labor, capital, and total factor productivity by estimating a Cobb-Douglas production function.

Koenig, Dolmas, and Piger (2003) forecasted current quarter GDP using monthly jobs, industrial production, and retail sales data. They found that a substantial improvement in out-ofsample performance can be achieved if the forecasting equation was estimated with real-timevintage data on its right-hand side, rather than end-of-sample-vintage data. They also concluded that a further improvement can be achieved if first-release GDP growth was used as the left-side variable.

Koop and Potter (2004) studied the problem of forecasting GDP and inflation in dynamic factor models using Bayesian model averaging using quarterly U.S. data on 162 time series. They found appreciable gains in using Bayesian model averaging in comparison to forecasting methods based on a single model.

Gokal and Hanif (2004) found a weak correlation between inflation and growth for Fiji, but they found a unidirectional causality from GDP growth to inflation.

DeJong, Liesenfeld, and Richard (2005) presented a nonlinear forecasting model designed to map future trajectories of GDP growth and to anticipate business cycle turning points. The model was an adaption of an ECM specification that included regime-switching behavior. They found their model to be adept in detecting movements between regimes alternately featuring general periods of accelerating and decelerating growth. Such regime change tended to lead National Bureau of

Economic Research (NBER) turning points, and then provide valuable guidance in tracking business-cycle activity.

Elliott and Timmermann (2005) proposed a new forecast combination method that let the combination weights be driven by regime switching in a latent state variable. An empirical application that combined forecasts from survey data and time series models found that the proposed regime switching combination scheme perform well for a variety of macroeconomic variables. They also showed how time variations in the combination weights arise when the target variable and the predictors share a common factor structure driven by a hidden Markov process.

Loizides and Vamvoukas (2005) studied the relationship between government spending and economic growth for Greece, UK, and Ireland countries. The results for all countries showed that public expenditure Granger causes growth in national income either in the short or the long run.

Arpaia and Turrini (2008) studied the relationship between government expenditure and potential output for fifteen EU countries and found the long-term elasticity coefficient is close to unity.

Athanasopoulos and Vahid (2008) argued against restricting the class of multivariate models considered for macroeconomic forecasting to vector autoregressive (VAR) models, given the recent advances in vector autoregressive moving average (VARMA) modeling methodology and improvements in computing power. Using real macroeconomic data, and they showed that VARMA models forecast macroeconomic variables more accurately than VARs.

Bhuiyan, Ahmed, and Jahan (2008) used ARIMA modeling to forecast the GDP of manufacturing industries in Bangladesh. On testing the stationarity of the data with correlogram, second difference of the series was stationary. Then, using Akaike Information Criteria(AIC) and Bayesian Information Criteria (BIC), smallest values of standard error (SE), absolute mean error

(AME), root mean square error (RMSE), and mean absolute percent error (MAPE), ARIMA

(2,2,1) was selected. Then, they forecasted manufacturing GDP of Bangladesh for 13 years (from 2002-03 to 2014-15). They also compared the selected model for testing in-sample forecasting and found that the data fits very well.

Clements and Galvao (2008) studied whether a mixed data-frequency sampling (MIDAS) approach can improve forecasts of output growth. The MIDAS specification used in the comparison included an autoregressive term in a noble way. They found that the use of monthly data on the current quarter lead to significant improvement in forecasting current and next quarter output growth, and that MIDAS was an effective way to exploit monthly data compared with alternative methods.

Dib, Gammoudi, and Moran (2008) assessed the out-of-sample forecasting accuracy of New Keynesian Model for Canada. They estimated a variant of the model on a series of rolling sub samples, computing out-of-sample forecasts one to eight quarters ahead at each step. They compared these forecasts with those arising from vector autoregression (VAR) models, using econometric tests of forecasting accuracy. They showed that the forecasting accuracy of the New Keynesian Model performed favorably with that of the benchmarks, particularly as the forecasting horizon increases.

Berardi (2009) analyzed U.S. data over a 1960 to 2005 period, and provided reliable estimate for the implicit term structures of real interest rates, expected inflation rates, and inflation risk premia, as well as for expectations of macroeconomic variables. They found that their model have better out-of-sample forecasting properties than a number of alternative models.

Bezurcko (2010) forecasted Latvian GDP with ARMA model using quarterly frequency data ranging from first quarter of 1996 to first quarter of 2009 (57 observations). The author used two GDP series of the data, GDP in log form and in percentage growth form. For both series, the author used information criteria to select the appropriate ARMA order and then performed residual test for diagnostic checking of the selected model. Finally, out-of-sample forecasting was computed for Latvia for the last three quarters of 2009.

Asari, Mohamad, Alias, Shamsudin, Baharuddin, and Jusoff (2011) found a unidirectional causality from inflation to GDP in Malaysia. Moreover, such causality is evident only for the short run. In the long run the inflation rate does not affect GDP.

Maity and Chatterjee (2012) forecasted GDP growth rates of India for 10 years from 2012-2021 using ARIMA methodology using data from 1959 to 2011. GDP series was

differenced twice to make it stationary. Then based on autocorrelation function (acf) and partial autocorrelation function (pacf), they selected ARIMA (1,2,2). After undertaking the diagnostic test of the residuals, the correlogram test, the selected model was found to be a satisfactory one as the errors followed white noise pattern.

Medel (2013) compared out-of-sample performance, using the Chilean GDP dataset. The result showed that Akaike and Schwarz information criteria are better for forecasting when using actual series, and Schwarz and Hannan-Quinn are better with seasonally adjusted data.

Alshahrani and Alsadiq (2014) empirically investigated government spending and economic growth. They found that private domestic and public investments, and healthcare expenditure stimulate growth in the long-run; whereas, openness to trade and spending in the housing sector can boost short-run economic growth.

Poudel (n.d.) in "Macroeconomic Outlook of Nepal for 2013/14" forecasted GDP, agricultural GDP, industrial GDP, service sector GDP, inflation, and budget deficit for 4 years from 2013 to 2016, employing four time series models viz. one ARIMA model, two ARIMAX models, and one VAR model. The final forecast comprised of an average from such four models.

The order of ARIMA and ARIMAX was selected based on ACF and PACF criteria. For ARIMAX models, firstly, recurrent expenditure was added as an exogenous variable and then it was replaced by capital expenditure. To forecast the dependent variables in ARIMAX models, future values of these exogenous variables (recurrent expenditure and capital expenditure) were filled in, which were produced from their respective univariate forecasting. For VAR model (actually a VARX model), four endogenous variables viz. GDP, agricultural GDP, inflation, and budget deficit/surplus and two exogenous variables viz. recurrent expenditure and capital expenditure were used. Then, to produce the forecasts for industrial and service sector GDP from the VAR model, agricultural GDP was substituted by industrial GDP and service sector GDP, one at a time.

Methodology

Data Set and Variables

The source of data for the study is purely secondary. Data has been collected from the website of central bank of Nepal (Nepal Rastra Bank) and Ministry of Finance of Nepal.

Annual time series data has been collected starting from fiscal year end 1974/75 (2031/32

B.S.) to fiscal year end 2013/14 (2070/71 B.S.) covering 40 years period on the variables viz. GDP, total government expenditure, consumer price index. Since, the variables were transformed into growth series, it resulted in 39 yearly observations for each variables.

Though several other measures of GDP were also available viz. real GDP at producer's price, nominal GDP at producer's price, and nominal GDP at current price; real GDP at base price of 2000/01 has been considered in this paper. The reason behind such is that the

Government of Nepal and international agencies viz. ADB, IMF, and WB usually compute real

GDP growth rate as a measure of economic growth. The source of data on real GDP growth is Ministry of Finance of Nepal, Economic Survey (various issues).

Total government expenditure is sum of total government recurrent expenditure and total government capital expenditure. Since, the research aims to forecast GDP growth rates, growth series of total government expenditure (GTE) have been computed. The source of this data is

Ministry of Finance of Nepal, Economic Survey (various issues).

Year end consumer price indices have been used to compute yearly inflation rate (INF).

The source of such data is Nepal Rastra Bank, Quarterly Economic Bulletin (various issues).

Since, time series variables are a-theoretical in nature (Brooks, 2008), no attempt has been made to justify selection of the variables from the theoretical aspect. The selection of the mentioned variables has been guided by some of the studies in the field viz. Davis and Fagan (1997), Berardi (2009), and Poudel (n.d.). Our model draws from the model of Poudel (n.d.), restricting in some instances to make the model more simple and extending where appropriate.

Dynamic forecasting have been made for 3 years starting from 2014/15 meaning that multi-step forecasting have been done unlike the static forecasting, where a sequence of onestep-ahead forecast is made, rolling the sample forward one observation after each forecast to use actual rather than forecasted values for lagged dependent variables (Brooks, 2008: 256).

The Model

Three time series models viz. univariate model (ARMA), univariate model with an additional regressor (ARMAX), and VARX model have been considered to arrive at out-ofsample multistep real GDP forecasts for fiscal years 2014/15, 2015/16, and 2016/17 (hereafter 2015, 2016, and 2017 respectively). The final forecast has been done by taking simple average of the forecasts made from these three models.

ARMA Model.

Autoregressive moving average (ARMA) model is a uni-variate time series model, which is a class of specification where one attempts to model and predict financial variables using only the information contained in their own past values and possibly current and past values of an error term (Brooks, 2008). ARMA model is also known as Box-Jenkins model. The ARMA model for forecasting real GDP growth is:

$$GGDP_t = c + \alpha_1 GGDP_{t-1} + \alpha_2 GGDP_{t-2} + \cdots + \alpha_p GGDP_{t-p} + \varepsilon_t + \beta_1 \varepsilon_{t-1} + \beta_2 \varepsilon_{t-2} +$$

$$\cdots \beta_q \varepsilon_{t-q}$$

ARMAX Model.

ARMAX model is a logical extension of ARMA model in which other regressor(s) are added. Here, GTE has been considered as an additional regressor. The ARMAX model for forecasting real GDP growth is:

$$GGDPt = c + \alpha 1 GGDPt-1 + \alpha 2 GGDPt-2 + \cdots + \alpha p GGDPt-p + \varepsilon t + \beta 1 \varepsilon t-1 + \beta 2 \varepsilon t-2 +$$

$$\cdots \beta q \varepsilon t-q + GTEt$$

VARX Model.

Vector autoregressive model (VAR) was popularized in econometrics by Sims (1980) as a natural generalization of uni-variate autoregressive models. VAR can be considered a kind of hybrid between the uni-variate time series models and the simultaneous equations models. VARs have often been advocated as an alternative to large-scale simultaneous equations structural models (Brooks, 2008). In pursuit of law of parsimony, a simplest form of VAR has been considered for this study viz. bi-variate VAR with GDP growth (GGDP) and INF as two endogenous variables and GTE as an exogenous variable viz. (hence the name "VARX"). The

VARX model of real GDP growth forecasting is as follows:

$$GGDPt = c1 + \sum_{j=1}^{k} \alpha 1j \, GGDPt-j + \sum_{j=1}^{k} \beta 1j \, INFt-j + GTEt + \varepsilon 1t$$

$$INFt = c2 + \sum_{j=1}^{k} \alpha 2j \, GGDPt-j + \sum_{j=1}^{k} \beta 2j \, INFt-j + GTEt + \varepsilon 2t$$

Where,

GGDP = Annual Growth of real GDP (in percentage).

GTE = Annual Growth of Total Government Expenditures (in percentage).

INF = Annual Inflation Rate (in percentage).

c is incercept term, α and β are regression coefficients, p is lag of AR process, q is lag of

MA process and, ε is error term.

Results and Discussion

The data, descriptive statistics, correlation matrix, and a plot against time of the variables are provided in appendix – A. During the entire sample period, GGDP was highest in year 1984

i.e. 9.68%, whist it was lowest in year 1983 i.e. -2.98% (the decline of 2.98%), and the mean value of GGDP is 4.2%. GGDP has been found to have correlation coefficient of -0.0415% and

-0.0114% respectively with GTE and INF.

A formal test of stationarity viz. Augmented Dickey-Fuller (ADF) test has been conducted (detail in appendix – B), which suggests that all the three variables viz. GGDP, GTE and INF variables are stationary at their level form. Hence, following Gujarati et al. (2012), all the variables are suitable to start with at their level form.

To produce a final out-of-sample forecasts of multistep (three years ahead) GGDP, simple average of forecasting produced by three different models viz. univariate ARMA model,

ARMAX model, and VARX has been computed.

ARMA Model of GGDP Forecasting

ARMA (0,3) (or more appropriately, just MA (3)) has been selected based on information criteria viz. Akaike Information Criterion (AIC), Schwarz-Bayesian Information Criterion (SBIC) and Hannan-Quinn Information Criterion (HQIC), details provided in appendix – C. All the coefficients of MA terms are significant at 1% and higher level of significance except MA(2), which is significant only at 16% or higher level. However, the overall model is significant at 1% or higher level of significant as revealed from F-statistic of the model. Model diagnostic tests viz. the residual test (Ljung-Box Q-statistic) and ARMA structure test both show that the selected ARMA model is appropriate to work for forecasting, meaning that the selected univariate forecasting model of GGDP is robust. The following is the GGDP forecasts (GGDPF):

Year	GGDPF
2015	4.4664
2016	4.0275
2017	4.7029

ARMAX Model of GGDP Forecasting

After forecasting GGDP from ARMA, forecasting from ARMAX model has been done, where GTE represents "X" in the ARMAX model. For incorporating GTE in the model, univariate forecasting of GTE has been done for three years viz. 2015, 2016, and 2017. ARMA(4,3) model has been selected to forecast GTE, based on information criteria (AIC, SBIC, and HQIC). GTE has been forecasted to be 26.6379%, 22.1392%, and 4.6778% for 2015, 2016, and 2017 respectively. Thenafter, ARMAX(3,4) model has been selected to forecast GGDP based on information criteria (AIC, SBIC, and HQIC). The output of the model suggested that the overall model is significant as revealed from its F-statistic though individually AR(2), MA(1) and MA(3) coefficients are not significant at 10% and lower level. Furthermore, for the robustness of the model, residual test of the ARMAX model (Ljung-Box Q-statistic) and ARMA structure test suggested that the selected ARMAX model is suitable enough to work for forecasting GGDP. The following GGDP forecasts form the ARMAX model (detailed results in appendix – D):

Year	GGDPF
2015	5.0953
2016	4.6419
2017	3.8385

VARX Model of GGDP Forecasting

VARX model of GGDP forecasting consists of two endogenous variables viz. GGDP and INF, and one exogenous variable viz. GTE (for our purpose). For the collected time series data, the maximum possible lag is 11 (for 39 time series observations) and following information criterion viz. SBIC, 2 lags has been selected for the VARX model (for the sake of parsimony). Among the two VARX equations, overall model significance as implied by F-statistic is significant at 12.1134% and above for the model with GGDP as dependent variable. However, INF as dependent variable is significant only at 16.9898% and higher level of significance (detailed result in appendix – E). Diagnostic testing of the VARX model viz. VAR inverse roots shows that all the inverse roots are within the unit circle, meaning that the selected model robust one. GGDP forecasts from VARX model is:

Year	GGDPF
2015	4.16668
2016	4.02376
2017	4.74510

Finally, the following is the final real GGDP forecasts (GGDPF) for three periods ahead, which is simple average of GGDP forecasts made from ARMA, ARMAX, and VARX model:

Year	GGDPF
2015	4.57612
2016	4.231043
2017	4.42885

As presented above, the final forecast shows that Nepal's real GDP is expected to grow by 4.58%, 4.23%, and 4.43% respectively in 2015, 2016, and 2017. Comparing our forecast for

2015 with the Government of Nepal's target of 6%, and ADB's, IMF's and WB's forecast of 4.7%, 4.5% and 4.8% respectively, our forecasted GDP of 4.58% seems to be conservative as compared

to that of government of Nepal, ADB, and WB. However, it is slightly higher than IMF's forecast. For 2016 and 2017, WB has forecasted GGDP of Nepal to be 4.6% and 4.5% respectively (forecasts from ADB and IMF are not available). Comparing such here, our forecast of 4.23% for 2016 and 4.43% for 2017 are again conservative for both the years.

Conclusion

Nepal's real GDP growth forecasts have been forecasted for three years ahead starting from 2015 to 2017. All the three models employed for forecasting viz. ARMA, ARMAX, and VARX are purely time series models, and simple average of such models has been taken to compute GDP growth forecast of 4.58%, 4.23%, and 4.43% respectively for 2015, 2016, and 2017. All the models have undergone the required econometric procedures viz. stationarity test, lag selection, and finally model diagnostic. Then, the computed forecasts are compared with forecasts from the government of Nepal (the target), ADB, IMF and WB; which showed that our forecasts are slightly conservative in major instances. Since, the models are purely time series models, no attempts have been made to provide macroeconomic justification of the results.

Overall, this paper is expected address the scanty literature of GDP forecasting in Nepal.

Avenues for Future Research

Since, Nepal has also undergone significant regime changes during the study period, a regime switching time series model is expected to improve the forecasting. Then, additions of several other macroeconomic variables in VAR system are also expected to aid in arriving at a better estimate. These and other possible extensions are left for future modeling exercises.

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Appendix - A

1. The Data

Year	GGDP	INF	GTE	Year	GGDP	INF	GTE
1976	4.3993	(0.6452)	26.1923	1996	5.6930	8.1081	20.7728
1977	3.0173	2.5974	20.8315	1997	5.0061	8.1000	8.4606
1978	4.4047	11.3924	14.0633	1998	3.3368	8.3256	12.1283
1979	2.3701	3.4091	12.4117	1999	4.5437	11.3578	13.4216
1980	(2.3205)	9.3407	13.5434	2000	6.0924	3.3742	11.1465
1981	8.3414	13.5678	19.1259	2001	4.8709	2.4481	21.4293
1982	3.7801	10.6195	31.7002	2002	0.1604	2.8965	(0.6854)
1983	(2.9780)	14.0000	30.7070	2003	3.7692	4.7678	1.1004
1984	9.6812	6.3158	4.0092	2004	4.4112	3.9798	5.6431
1985	6.1450	3.9604	11.1950	2005	3.2343	4.5220	13.1973
1986	4.6601	15.8730	13.7522	2006	3.7287	7.9728	8.5337
1987	1.9672	13.4247	17.5306	2007	2.7508	6.4110	20.9346
1988	7.0319	10.8696	26.6008	2008	5.7954	7.6923	24.0566
1989	5.4293	8.2789	28.7691	2009	3.9046	13.2368	38.5374
1990	4.9198	9.6579	8.1696	2010	4.2582	10.4985	20.1311
1991	6.4416	9.7248	20.2777	2011	3.8488	9.6000	19.4694
1992	4.8385	21.0702	3.3805	2012	4.4837	5.2471	2.2977
1993	2.9498	8.8398	16.4276	2013	3.5903	9.8549	2.443
1994	8.2726	9.0102	9.1320	2014	5.1540	9.10	45.1785
1995	2.7295	7.6834	14.7323				

2. Descriptive Statistics

	GGDP	GTE	INF
Mean	4.223418	16.17303	8.371370
Median	4.404668	14.06327	8.325624
Maximum	9.681234	45.17846	21.07023
Minimum	-2.978011	-0.685418	-0.645161
Std. Dev.	2.420798	10.30276	4.241100
Skewness	-0.741727	0.656085	0.443412
Kurtosis	5.049243	3.346336	3.733818
Jarque-Bera	10.40005	2.992821	2.153036
Probability	0.005516	0.223933	0.340780
Sum	164.7133	630.7483	326.4834
Sum Sq. Dev.	222.6899	4033.582	683.5034
Observations	39	39	39

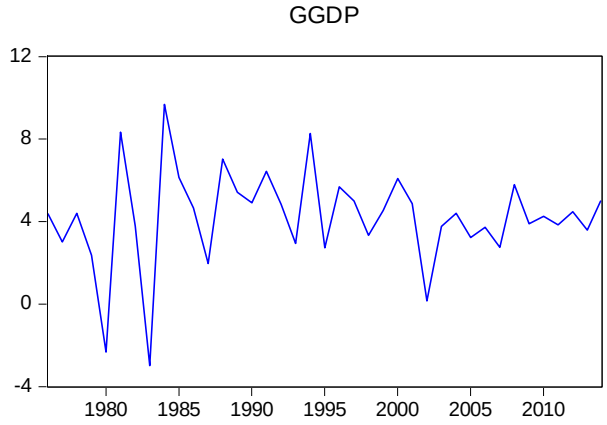
3. Correlation Matrix

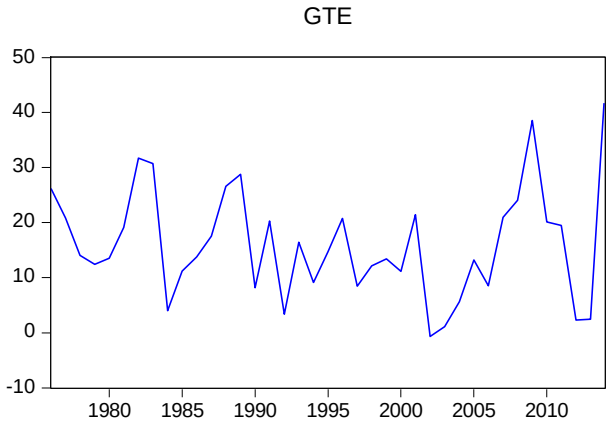
Correlation coefficients, using the observations 1976 - 2014

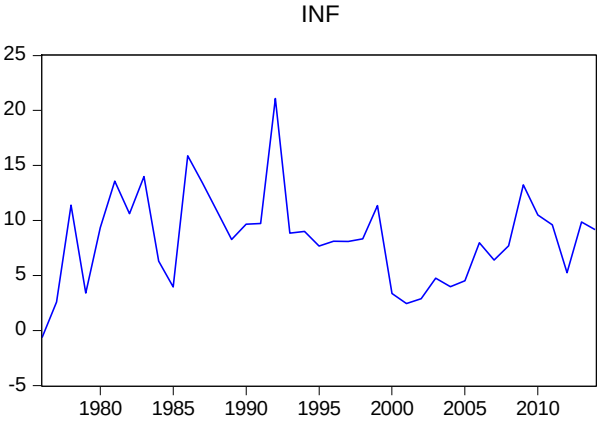
5% critical value (two-tailed) = 0.2973 for n = 44

GGDP	INF	GTE	
1.0000	-0.0114	-0.0415	GGDP
	1.0000	0.1562	INF
		1.0000	GTE

4. Plot of Variables Against Time







Appendix - B: Test of Stationarity (The Augmented Dickey-Fuller Test)

1. GGDP

Null Hypothesis: GGDP has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=13)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.830218	0.0000
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GGDP)

Method: Least Squares

Date: 02/18/15 Time: 11:41

Sample (adjusted): 1977 2014

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GGDP(-1)	-1.262043	0.161176	-7.830218	0.0000
C	5.319091	0.780796	6.812400	0.0000

R-squared	0.630057	Mean dependent var	0.019861
Adjusted R-squared	0.619781	S.D. dependent var	3.892829
S.E. of regression	2.400393	Akaike info criterion	4.640338
Sum squared resid	207.4279	Schwarz criterion	4.726526
Log likelihood	-86.16642	Hannan-Quinn criter.	4.671003
F-statistic	61.31231	Durbin-Watson stat	2.154572
Prob(F-statistic)	0.000000		

Decision: Since p-value is significant, GGDP is stationary at its level form.

2. GTE

Null Hypothesis: GTE has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=13)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.494687	0.0009
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GTE)

Method: Least Squares

Date: 02/18/15 Time: 11:42

Sample (adjusted): 1977 2014

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GTE(-1)	-0.823603	0.183239	-4.494687	0.0001
C	13.19113	3.282407	4.018737	0.0003

R-squared	0.359456	Mean dependent var	0.499637
Adjusted R-squared	0.341663	S.D. dependent var	12.71547
S.E. of regression	10.31707	Akaike info criterion	7.556674
Sum squared resid	3831.913	Schwarz criterion	7.642862
Log likelihood	-141.5768	Hannan-Quinn criter.	7.587339
F-statistic	20.20221	Durbin-Watson stat	1.719705
Prob(F-statistic)	0.000070		

Decision: Since p-value is significant, GTE variable is stationary.

3. INF

Null Hypothesis: INF has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=13)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.843446	0.0003
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INF)

Method: Least Squares

Date: 02/18/15 Time: 11:43

Sample (adjusted): 1977 2014

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	-0.722833	0.149239	-4.843446	0.0000
C	6.293692	1.397854	4.502396	0.0001

R-squared	0.394540	Mean dependent var	0.256452
Adjusted R-squared	0.377722	S.D. dependent var	4.944112
S.E. of regression	3.900143	Akaike info criterion	5.611099
Sum squared resid	547.6001	Schwarz criterion	5.697288
Log likelihood	-104.6109	Hannan-Quinn criter.	5.641765
F-statistic	23.45897	Durbin-Watson stat	2.099593
Prob(F-statistic)	0.000024		

Decision: Since, p-value is significant, it can be concluded that INF is stationary.

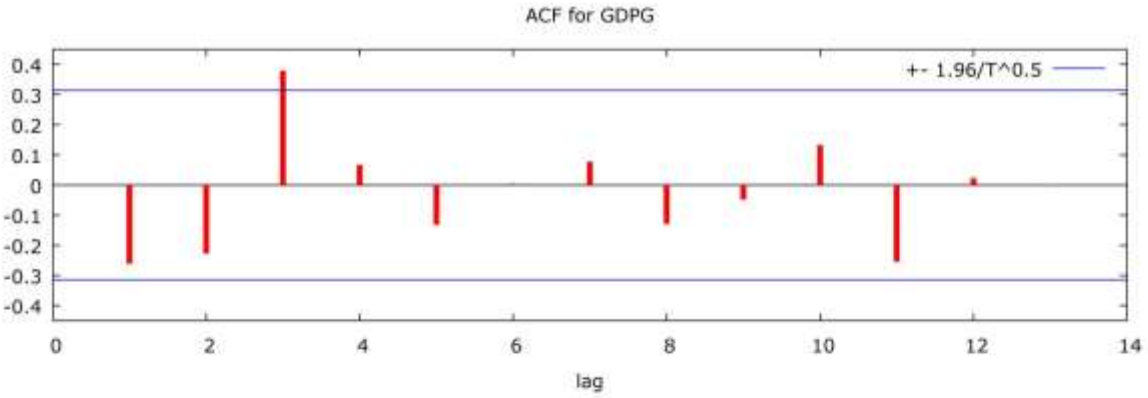
R-squared	0.394540	Mean dependent var	0.256452
Adjusted R-squared	0.377722	S.D. dependent var	4.944112
S.E. of regression	3.900143	Akaike info criterion	5.611099
Sum squared resid	547.6001	Schwarz criterion	5.697288
Log likelihood	-104.6109	Hannan-Quinn criter.	5.641765
F-statistic	23.45897	Durbin-Watson stat	2.099593
Prob(F-statistic)	0.000024		

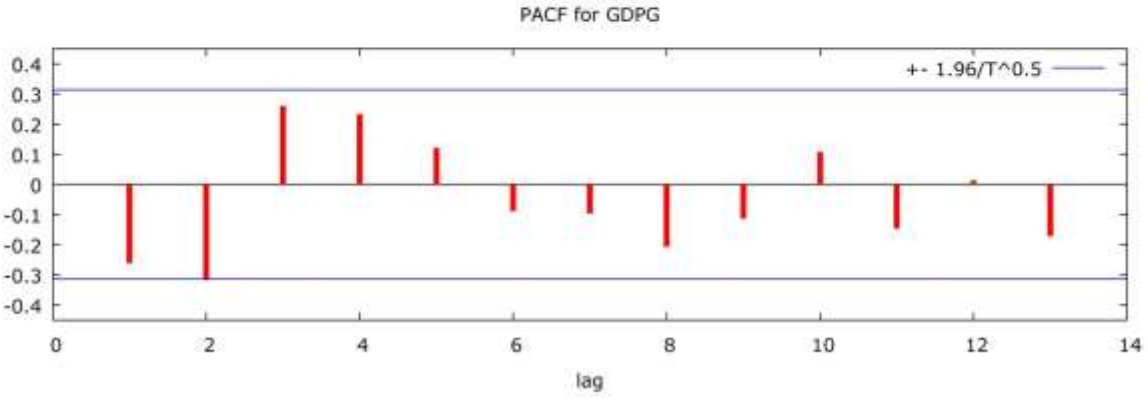
Decision: Since, p-value is significant, it can be concluded that INF is stationary.

Appendix - C: Univariate Time Series Model for GGDP Forecasting

1. Model Identification

Autocorrelation Function (ACF) and Partial Autocorrelation (PACF) of GGDP





Autocorrelation function for GGDP

LAG	ACF		PACF		Q-stat.	[p-value]
1	-0.2610		-0.2610		2.8660	[0.090]
2	-0.2272		-0.3168	**	5.0960	[0.078]
3	0.3788	**	0.2601		11.4689	[0.009]
4	0.0663		0.2322		11.6699	[0.020]
5	-0.1314		0.1210		12.4824	[0.029]
6	0.0038		-0.0882		12.4831	[0.052]
7	0.0767		-0.0964		12.7774	[0.078]
8	-0.1284		-0.2064		13.6272	[0.092]
9	-0.0479		-0.1130		13.7495	[0.132]
10	0.1323		0.1072		14.7142	[0.143]
11	-0.2543		-0.1463		18.4080	[0.073]
12	0.0230		0.0128		18.4394	[0.103]
13	0.0015		-0.1714		18.4396	[0.142]

The above visual plots (ACF and PACF) suggest the following possible models: MA (3), AR (2) or ARMA (2,3). Lets confirm this from the information criteria.

Information Criteria

Akaike Information Criterion (AIC)
Schwarz-Bayesian Information Criterion (SBIC)
Hannan-Quinn Information Criterion (HQIC)

p\q	0	1	2	3
0	4.631378 4.674033 4.646682	4.581789 4.667100 4.612398	4.627810 4.755777 4.673724	**4.285228** **4.455850** **4.346446**
1	4.640338 4.726526 4.671003	4.661432 4.790715 4.707430	4.678286 4.850663 4.739617	4.397368 4.612840 4.474031
2	4.610750 4.741365 4.656798	4.634815 4.808969 4.696213	4.287108 4.504800 4.363855	4.379224 4.640454 4.471320
3	4.626689 4.802635 4.688099	4.550185 4.770118 4.626948	4.464827 4.728747 4.556942	4.500161 4.808067 4.607628

Decision: All three criteria are in favor of MA(3) process. Hence, it can be concluded that MA(3) univariate forecasting is suitable for GGDP.

2. The Output of the Model

Dependent Variable: GGDP
Method: Least Squares
Date: 02/18/15 Time: 12:08
Sample: 1976 2014
Included observations: 39
Convergence achieved after 19 iterations
MA Backcast: 1973 1975

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.307697	0.421147	10.22850	0.0000
MA(1)	-0.408659	0.134493	-3.038509	0.0045
MA(2)	0.210320	0.144553	1.454963	0.1546
MA(3)	0.695407	0.129526	5.368863	0.0000

R-squared	0.393467	Mean dependent var	4.223418
Adjusted R-squared	0.341478	S.D. dependent var	2.420798
S.E. of regression	1.964461	Akaike info criterion	4.285228
Sum squared resid	135.0688	Schwarz criterion	4.455850
Log likelihood	-79.56194	Hannan-Quinn criter.	4.346446
F-statistic	7.568339	Durbin-Watson stat	2.067741
Prob(F-statistic)	0.000498		

Inverted MA Roots	.56-.83i	.56+.83i	-.70

Decision: As revealed from the F-statistic, the overall model is significant.

3. Model Diagnostic of MA (3)

Residual Test (ACF and PACF)

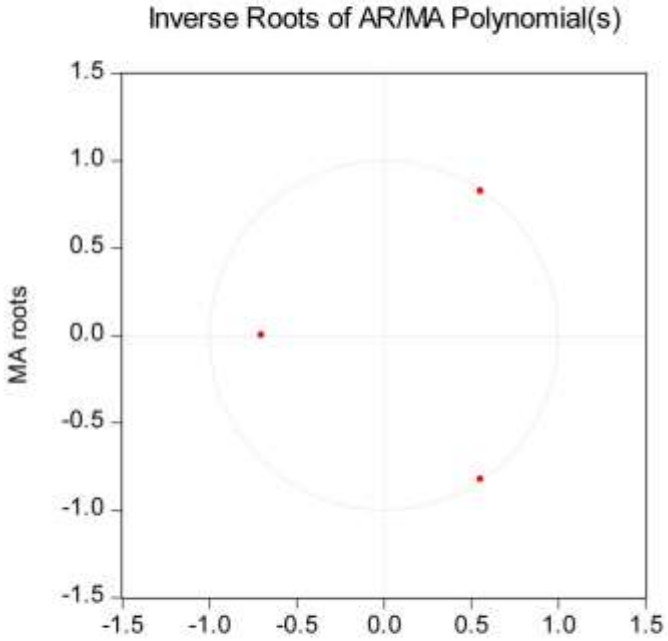
Date: 02/18/15 Time: 12:09
Sample: 1976 2014
Included observations: 39
Q-statistic probabilities adjusted for 3 ARMA term(s)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. | . |	. | . |	1	-0.040	-0.040	0.0681	
.*| . |	.*| . |	2	-0.147	-0.149	1.0054	
. | . |	. | . |	3	-0.035	-0.049	1.0605	
. |*. |	. | . |	4	0.079	0.055	1.3486	0.246
. | . |	. | . |	5	-0.017	-0.023	1.3625	0.506
. | . |	. | . |	6	0.052	0.070	1.4933	0.684
. | . |	. | . |	7	-0.024	-0.018	1.5209	0.823
.*| . |	. | . |	8	-0.069	-0.062	1.7692	0.880
. | . |	. | . |	9	-0.012	-0.017	1.7769	0.939
. |*. |	. |*. |	10	0.146	0.120	2.9595	0.889
.*| . |	.*| . |	11	-0.203	-0.205	5.3061	0.724
.*| . |	.*| . |	12	-0.127	-0.110	6.2612	0.714
.*| . |	**| . |	13	-0.134	-0.206	7.3617	0.691

For Ljung-Box Q-statistic, the null hypothesis is:

H_0: Autocorrelation at different lags, up to 13 lags, is zero.
Decision: Since, p-values are not significant up to 13 lags, the null hypothesis could not be rejected. Hence, it can be concluded that the residuals of the model follow white noise. This means the selected model is suitable to work ahead.

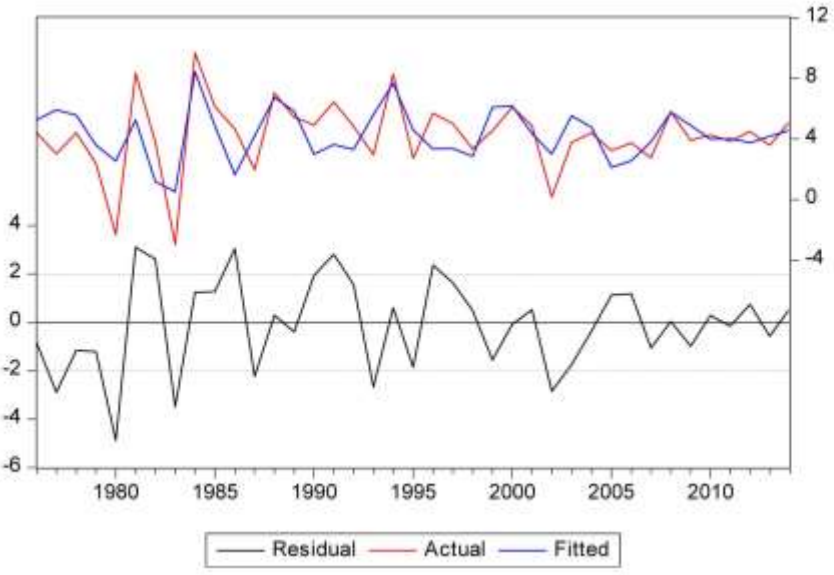
ARMA Structure Test



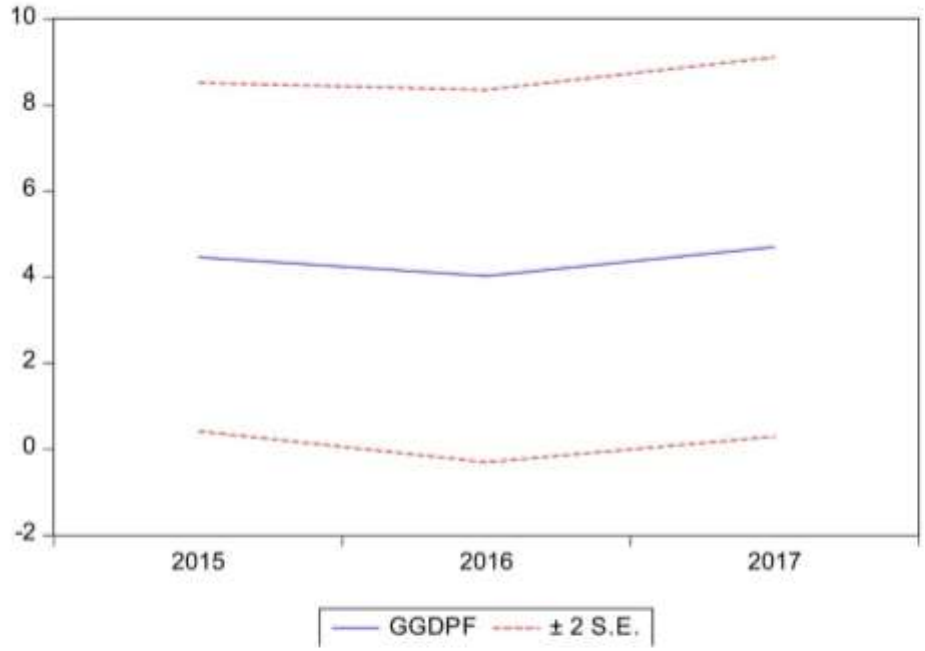
Decision: The selected model is ok as all the inverse roots of the selected model is within the unit circle.

4. The Forecast

Residual Graph: Actual vs. Fitted



The Forecasted Values



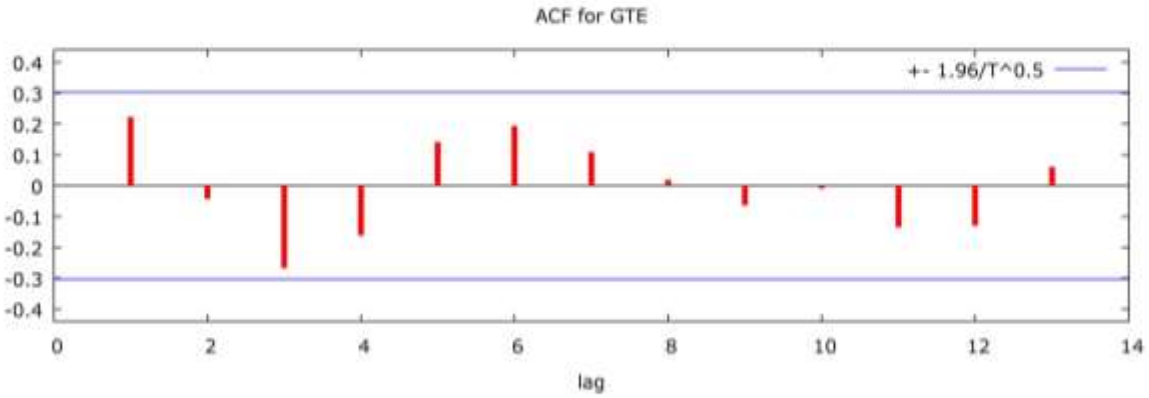
The forecasted values of GGDP from MA (3) are:

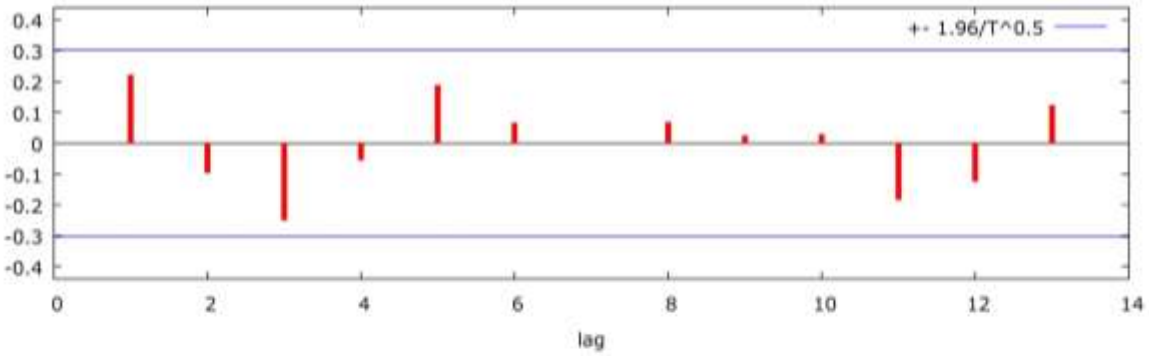
Year	Forecast
2015	4.4664
2016	4.0275
2017	4.7029

Appendix – D: ARMAX Model for GGDP Forecasting

1. Univariate Forecasting of GTE

Model Identification for GTE





Autocorrelation function for GTE

LAG	ACF		PACF	Q-stat.	[p-value]
1	0.2219		0.2219	2.2203	[0.136]
2	-0.0425		-0.0965	2.3038	[0.316]
3	-0.2671	*	-0.2499	5.6854	[0.128]
4	-0.1613		-0.0553	6.9509	[0.139]
5	0.1409		0.1887	7.9427	[0.159]
6	0.1936		0.0670	9.8672	[0.130]
7	0.1087		0.0000	10.4910	[0.162]
8	0.0184		0.0689	10.5095	[0.231]
9	-0.0633		0.0245	10.7342	[0.294]
10	-0.0089		0.0293	10.7387	[0.378]
11	-0.1347		-0.1837	11.8201	[0.377]
12	-0.1297		-0.1238	12.8560	[0.380]
13	0.0604		0.1231	13.0886	[0.441]

Though no significant spikes have been observed, the following are some of the alternatives from the ACF and PACF plots: AR(1), AR(3), MA (1), MA(3), ARMA(3,3), ARMA (3,4), or ARMA (4,3). However, lets confirm such from information criteria.

Akaike Information Criterion (AIC)
Schwarz-Bayesian Information Criterion (SBIC)
Hannan-Quinn Information Criterion (HQIC)

p\q	0	1	2	3	4
0	7.528007 7.570663 7.543312	7.548068 7.633379 7.578677	7.599164 7.727130 7.645077	7.629883 7.800505 7.691100	7.441578 7.654855 7.518100
1	7.556674 7.642862 7.587339	7.608434 7.737717 7.654432	7.597117 7.769494 7.658447	7.617140 7.832612 7.693804	7.540653 7.799220 7.632649
2	7.625030 7.755645 7.671078	7.659011 7.833164 7.720408	7.579436 7.797127 7.656182	7.543554 7.804784 7.635650	7.595655 7.900424 7.703100
3	7.667059 7.843006 7.728469	7.719324 7.939257 7.796086	7.652501 7.916421 7.744616	7.653060 7.960967 7.760528	7.660356 8.012249 7.783176
4	7.746567 7.968759 7.823268	7.785735 8.052367 7.877776	7.652752 7.963822 7.760134	**6.957466** **7.312974** **7.080187**	7.622787 8.022733 7.760848

Decision: All information criteria suggest ARMA (4,3).

The output of selected Model for GTE Series, ARMA (4,3)

Dependent Variable: GTE
Method: Least Squares
Date: 02/18/15 Time: 12:48
Sample (adjusted): 1980 2014
Included observations: 35 after adjustments
Convergence achieved after 162 iterations
MA Backcast: OFF (Roots of MA process too large)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.12927	1.451473	11.11234	0.0000
AR(1)	0.387320	0.218766	1.770480	0.0879
AR(2)	-0.122337	0.197796	-0.618500	0.5414
AR(3)	-0.920727	0.203984	-4.513724	0.0001
AR(4)	0.108241	0.232922	0.464707	0.6459
MA(1)	0.243829	0.245548	0.992996	0.3295
MA(2)	-0.592606	0.226565	-2.615617	0.0144
MA(3)	1.649418	0.275889	5.978554	0.0000

R-squared	0.649553	Mean dependent var	15.92142
Adjusted R-squared	0.558696	S.D. dependent var	10.69728

S.E. of regression	7.106277	Akaike info criterion	6.957466
Sum squared resid	1363.478	Schwarz criterion	7.312974
Log likelihood	-113.7557	Hannan-Quinn criter.	7.080187
F-statistic	7.149205	Durbin-Watson stat	1.679091
Prob(F-statistic)	0.000072		

Inverted AR Roots	.57+.87i	.57-.87i	.12	-.87
	Estimated AR process is nonstationary			
Inverted MA Roots	.60+.88i	.60-.88i	-1.44	
	Estimated MA process is noninvertible			

Decision: Overall, the model is significant as revealed from the F-statistic.

Model Diagnostic: ACF and PACF of the Residuals

Date: 02/18/15 Time: 12:50
Sample: 1980 2014
Included observations: 35
Q-statistic probabilities adjusted for 7 ARMA term(s)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. |*. |	. |*. |	1	0.125	0.125	0.5909	
. | . |	. | . |	2	-0.003	-0.019	0.5913	
. | . |	. | . |	3	0.011	0.014	0.5962	
.*| . |	.*| . |	4	-0.123	-0.128	1.2291	
. |*. |	. |*. |	5	0.164	0.203	2.3925	
. | . |	. | . |	6	-0.003	-0.063	2.3930	
.*| . |	.*| . |	7	-0.093	-0.077	2.7962	
. | . |	.*| . |	8	-0.064	-0.071	2.9932	0.084
. | . |	. | . |	9	-0.043	0.029	3.0874	0.214
. |*. |	. |*. |	10	0.145	0.119	4.1751	0.243
. | . |	.*| . |	11	-0.025	-0.086	4.2094	0.378
.*| . |	.*| . |	12	-0.192	-0.180	6.2904	0.279
. | . |	. |*. |	13	0.015	0.090	6.3028	0.390

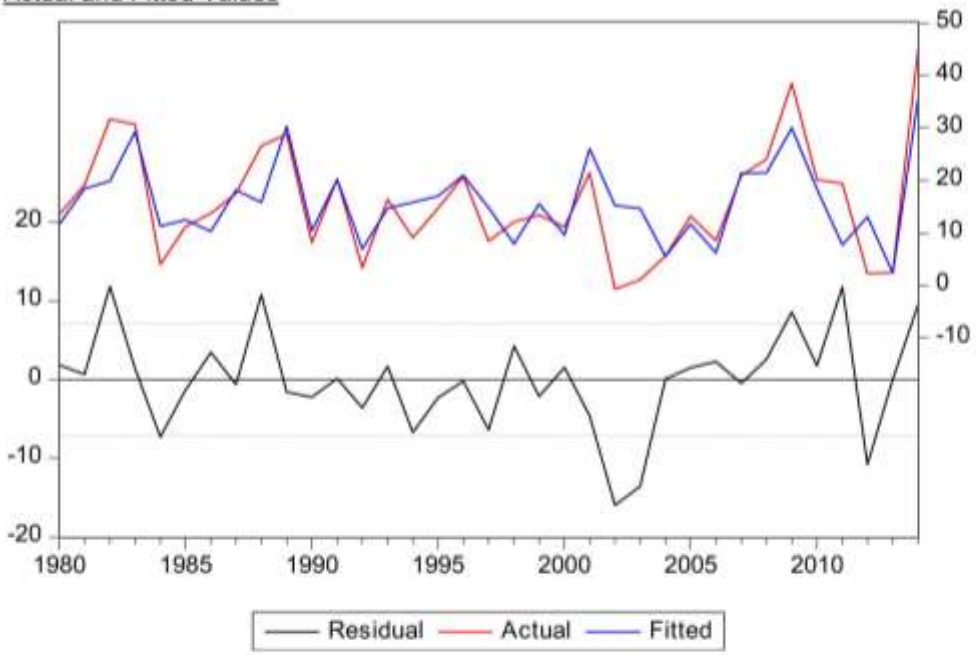
For Ljung-Box Q-statistic, the null hypothesis is:

H_0: Autocorrelation at different lags, up to 13 lags, is zero.

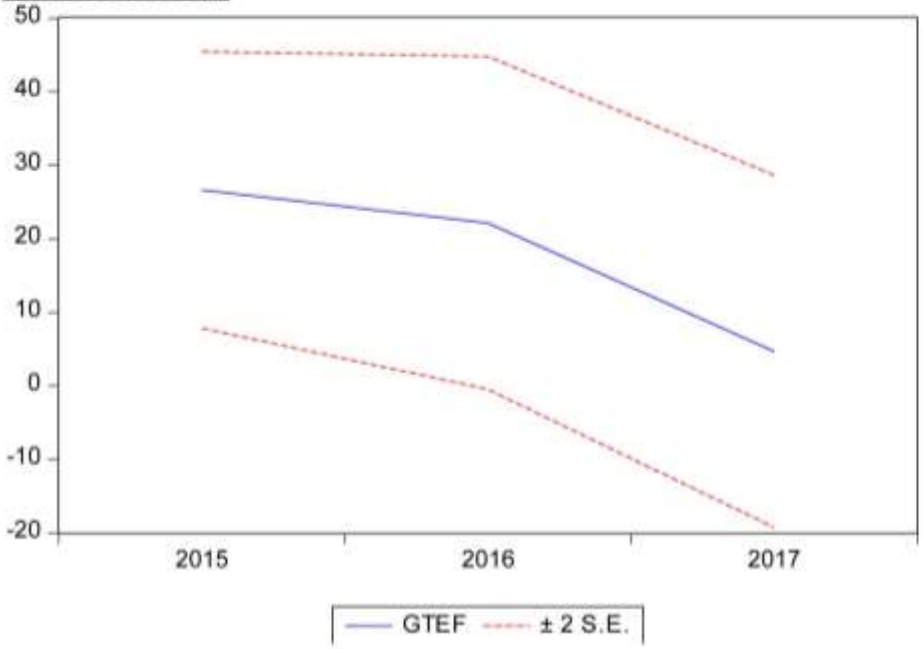
Decision: Since, p-values are not significant up to 13 lags, the null hypothesis could not be rejected. This confirms on suitability of the model. Hence, it can be said that the residuals of the selected model follows white noise. Overall, the model is suitable to work ahead.

The Forecasts of GTE

Actual and Fitted Values



The Forecast Graph



Year	Forecast
2015	26.6379
2016	22.1392
2017	4.6778

2. ARMAX Model Identification: Information Criterion

AIC
SBIC
HQIC

p\q	0	1	2	3	4
0	4.680937 4.766248 4.711546	4.633050 4.761017 4.678964	4.677789 4.848410 4.739006	4.334239 4.547516 4.410761	4.418722 4.674655 4.510549
1	4.692840 4.822123 4.738838	4.714064 4.886441 4.775394	4.729173 4.944645 4.805836	4.314755 4.573321 4.406751	4.377276 4.678937 4.484605
2	4.664715 4.838868 4.726112	4.688845 4.906536 4.765591	4.354891 4.616121 4.446986	4.225267 4.530036 4.332713	4.305286 4.653593 4.428081
3	4.682212 4.902145 4.758975	4.601087 4.865007 4.693202	4.198430 4.506337 4.305898	4.205783 4.557676 4.328604	**4.093189** **4.489069** **4.231362**
4	4.689153 4.955785 4.781195	4.588548 4.899618 4.695929	4.214182 4.569690 4.336904	4.279422 4.679369 4.417484	4.112902 4.557287 4.266304

Decision: All the three information criteria favor ARMAX (3,4)

3. The output of ARMAX (3,4) Model

Dependent Variable: GGDP
Method: Least Squares
Date: 02/18/15 Time: 13:11
Sample (adjusted): 1979 2014
Included observations: 36 after adjustments
Failure to improve SSR after 16 iterations
MA Backcast: 1975 1978

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.756218	0.326624	11.50015	0.0000
GTE	0.042104	0.008490	4.958944	0.0000
AR(1)	-0.482433	0.182348	-2.645668	0.0134
AR(2)	0.103248	0.244496	0.422291	0.6762
AR(3)	0.429117	0.158800	2.702245	0.0118
MA(1)	-0.194846	0.188762	-1.032228	0.3111
MA(2)	-0.404791	0.226409	-1.787870	0.0850
MA(3)	0.055126	0.208896	0.263893	0.7939
MA(4)	0.843750	0.128015	6.591020	0.0000

R-squared	0.653550	Mean dependent var	4.247001
Adjusted R-squared	0.550898	S.D. dependent var	2.513685

S.E. of regression	1.684548	Akaike info criterion	4.093189
Sum squared resid	76.61791	Schwarz criterion	4.489069
Log likelihood	-64.67740	Hannan-Quinn criter.	4.231362
F-statistic	6.366669	Durbin-Watson stat	2.056863
Prob(F-statistic)	0.000118		

Inverted AR Roots	.66	-.57-.57i	-.57+.57i	
Inverted MA Roots	.80-.60i	.80+.60i	-.70+.59i	-.70-.59i

Decision: F-statistic of the model suggests that the overall model is significant.

4. Model Diagnostic of ARMAX (3,4)

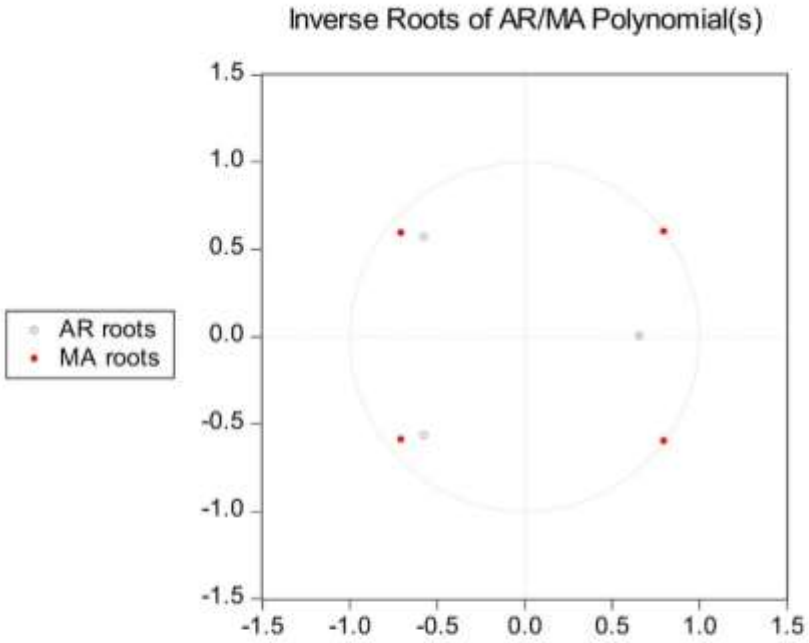
Residual Test: ACF and PACF

Date: 02/18/15 Time: 13:12
Sample: 1979 2014
Included observations: 36
Q-statistic probabilities adjusted for 7 ARMA term(s)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. | . |	. | . |	1	-0.038	-0.038	0.0555	
.*| . |	.*| . |	2	-0.196	-0.198	1.6023	
. | . |	. | . |	3	-0.026	-0.045	1.6314	
. |*. |	. |*. |	4	0.144	0.107	2.5224	
. |*. |	. |*. |	5	0.166	0.174	3.7363	
. | . |	. | . |	6	-0.000	0.070	3.7363	
. | . |	. |*. |	7	0.064	0.148	3.9272	
. | . |	. | . |	8	-0.002	0.019	3.9274	0.048
. | . |	. | . |	9	-0.016	-0.023	3.9401	0.139
. |*. |	. |*. |	10	0.126	0.096	4.7798	0.189
**| . |	**| . |	11	-0.242	-0.309	7.9794	0.092
. | . |	. | . |	12	0.012	-0.030	7.9882	0.157
.*| . |	**| . |	13	-0.067	-0.214	8.2527	0.220

Decision: Since, p-values are not significant at 1% level of significance, residuals from the model can be said to represent white noise. Overall, the model is suitable for forecasting.

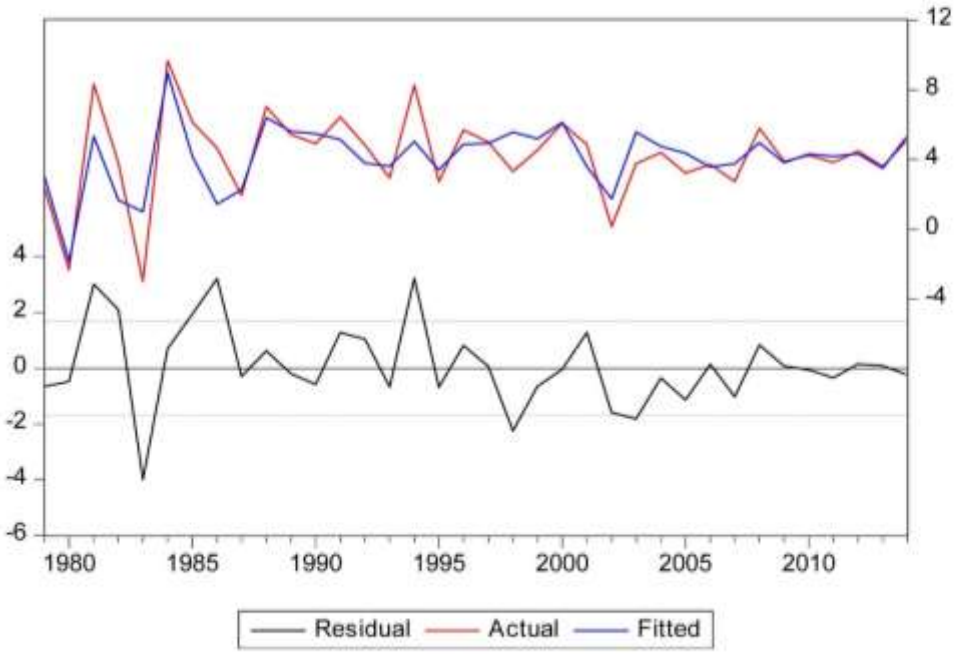
ARMA Structure Test



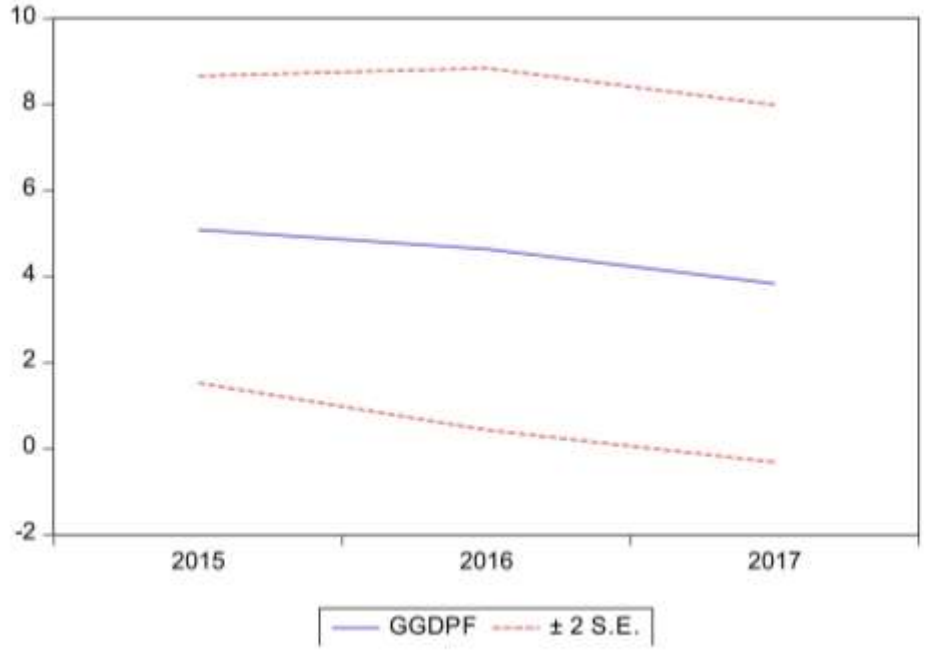
Decision: Since all the inverse roots are within the unit circle, the model is suitable.

5. The ARMAX (3,4) Forecast

Actual and Fitted Graph



The Forecast Graph



The Forecast

Year	Forecast
2015	5.0953
2016	4.6419
2017	3.8385

Appendix – E: VARX Model for GGDP Forecasting

1. Selection of Lags for VARX Model (Based on Information Criteria)

VAR system, maximum lag order 11

The asterisks below indicate the best (that is, minimized) values
of the respective information criteria, AIC = Akaike criterion,
BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion.

lags	loglik	p(LR)	AIC	BIC	HQC
1	-123.96962		9.426402	9.807031	9.542764
2	-112.37039	0.00012	8.883600	9.454544*	9.058143
3	-110.22785	0.36880	9.016275	9.777535	9.249000
4	-106.66995	0.12989	9.047854	9.999428	9.338760
5	-104.41727	0.34191	9.172662	10.314552	9.521749
6	-100.75851	0.12003	9.197036	10.529241	9.604305
7	-97.77196	0.20117	9.269426	10.791945	9.734875
8	-90.85016	0.00781	9.060726	10.773560	9.584356
9	-74.41208	0.00000	8.172291	10.075441	8.754103
10	-70.26510	0.08138	8.161793	10.255257	8.801786
11	-59.19775	0.00019	7.656982*	9.940761	8.355156*

Decision: Following parsimony, 2 lags have been selected.

2. The Output of Selected VARX Model

VAR system, lag order 2
OLS estimates, observations 1978-2014 (T = 37)
Log-likelihood = -178.96653
Determinant of covariance matrix = 54.495188
AIC = 10.3225
BIC = 10.8450
HQC = 10.5067
Portmanteau test: LB(9) = 28.4659, df = 28 [0.4400]

Equation 1: GGDP

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	5.79646	1.49177	3.8856	0.00050	***
GGDP_1	-0.375419	0.167092	-2.2468	0.03192	**
GGDP_2	-0.328225	0.162714	-2.0172	0.05241	*
INF_1	0.0684044	0.104448	0.6549	0.51735	
INF_2	0.127189	0.0954468	1.3326	0.19239	
GTE	-0.0147296	0.0396137	-0.3718	0.71255	

Mean dependent var	4.251262	S.D. dependent var	2.478663
Sum squared resid	169.0861	S.E. of regression	2.335463
R-squared	0.235512	Adjusted R-squared	0.112208
F(5, 31)	1.910007	P-value(F)	0.121134
Rho	-0.014908	Durbin-Watson	2.006154

F-tests of zero restrictions:

All lags of GGDP	F(2, 31) =	3.6399 [0.0380]
All lags of INF	F(2, 31) =	1.4791 [0.2435]
All vars, lag 2	F(2, 31) =	2.8262 [0.0746]

Equation 2: INF

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	3.16147	2.41512	1.3090	0.20014	
GGDP_1	0.110209	0.270515	0.4074	0.68651	
GGDP_2	0.571059	0.263427	2.1678	0.03797	**
INF_1	0.154925	0.169097	0.9162	0.36664	
INF_2	0.009061	0.154524	0.0586	0.95362	
GTE	0.0845121	0.064133	1.3178	0.19724	

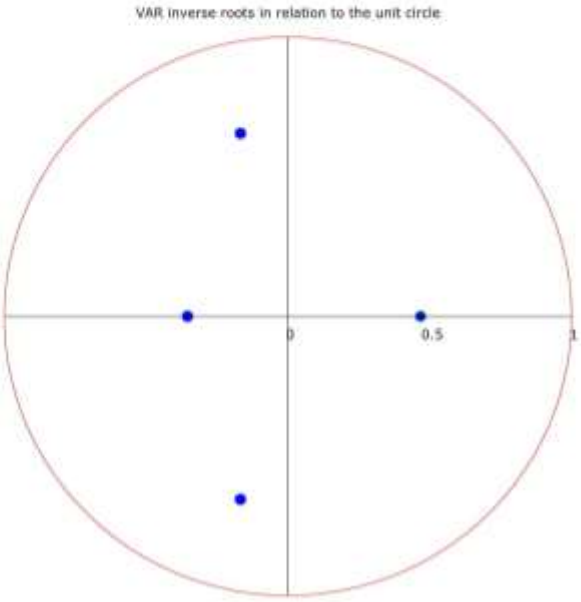
Mean dependent var	8.771113	S.D. dependent var	3.954444
Sum squared resid	443.1795	S.E. of regression	3.781020
R-squared	0.212761	Adjusted R-squared	0.085787
F(5, 31)	1.675629	P-value(F)	0.169898
rho	0.013899	Durbin-Watson	1.926859

F-tests of zero restrictions:

All lags of GGDP	F(2, 31) =	2.3609 [0.1111]
All lags of INF	F(2, 31) =	0.47698 [0.6251]
All vars, lag 2	F(2, 31) =	2.3594 [0.1112]

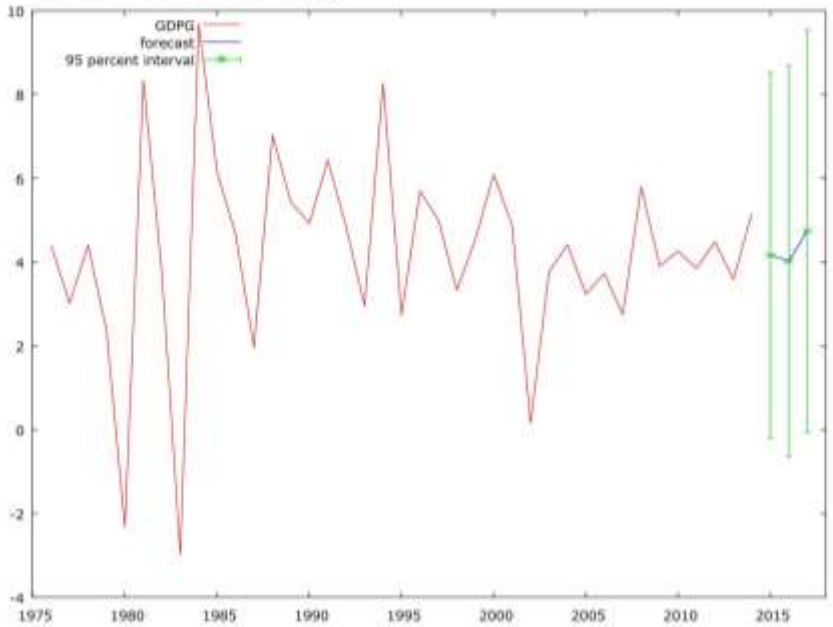
```
                    For the system as a whole
                  Null hypothesis: the longest lag is 1
               Alternative hypothesis: the longest lag is 2
Likelihood ratio test: Chi-square(4) = 11.4748 [0.0217]
```

3. Model Diagnostic: VARX Model Inverse Root Test



Decision: Since, all inverse roots of VARX model is within the unit circle, the selected VARX model is suitable for forecasting.

4. VARX Model Forecasting



For 95% confidence intervals, t(31, 0.025) = 2.040

Obs	GGDP	prediction	std. error	95% interval
2015	undefined	4.16668	2.13773	(-0.193250, 8.52661)
2016	undefined	4.02376	2.29014	(-0.647010, 8.69453)
2017	undefined	4.74510	2.35013	(-0.0480168, 9.53821)

The Final Forecast

Years	Models			
	ARMA	ARMAX	VARX	Final Forecast
2015	4.46638	5.0953	4.16668	4.57612
2016	4.02749	4.64188	4.02376	4.231043
2017	4.70295	3.8385	4.7451	4.42885

Paper No. 19

Export-Led-Growth or Growth-Led-Export Hypothesis: An Empiric.al Study of Nepal

Tarek Aziz *

Abstract

This study investigates the causal relationship between financial development and economic growth in Bangladesh over the period 1979 to 2014. After considering the time series characteristics of six measures of financial development, Johansen cointegration and the appropriate Error Correction Model are used to investigate the causal relationship between financial development and economic growth. The findings suggest that broad money causes economic growth with two-way causality. The major finding of this study does not strongly support the view that financial development boosts economic growth.

Key Words: Financial Development, Economic Growth, Cointegration, Error-correction model

JEL Classification: O16, G18, G28

1. Introduction

The relationship between financial development and economic growth has attracted widespread attention in the past three decades and there have been a large number of studies on this area. Bagehot (1873) argued that financial development played an important role for channeling the industrialization process in England. Goldsmith (1969), Hicks (1969), McKinnon (1973) and Shaw (1973) explained the link between financial development and economic growth showing the significant contribution of financial development in economic growth. It is claimed that financial development helps to identify better investment opportunities, reduces productive cost, mobilizes savings, boosts technological innovation and enhances the risk taking capacity of investors (Levine 1997). On the other hand, Robinson (1952) proposed that financial development is followed by economic growth and financial development itself is not a leading factor to growth. Lucas (1988) found that economists are 'badly over stressed on financial development for growth'. The main objective of this paper is to investigate the causal relationship between financial development and economic growth using time series data from 1979 to 2014. Bangladesh provides a good case study as it commenced the financial liberalization process in 1979. The contribution of this paper differs from previous studies in several ways; a longer time series of data is used with several, rather than one single indicator of financial development measures and new econometric methodology for empirical testing is employed.

The organization of this paper is as follows: section two presents a brief review of literature on financial development and economic growth based on theoretical and empirical studies; the details

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of data and methodology used in this paper is presented in section three; the results of empirical testing from the time series data of Bangladesh and their economic interpretation are presented in section four; the conclusion of the study is presented in section five.

2. Literature Review

Bagehot (1873), Schumpeter (1934), Goldsmith (1969), Hicks (1969), McKinnon (1973) and Shaw (1973) explored the relationship between financial development and growth focusing on the services provided by financial intermediaries. McKinnon and Shaw (MacKinnon, 1973 and Shaw, 1973) examined the impact of government intervention on the development of financial systems concluding that government restrictions on the banking system, such as interest rate ceilings and direct credits negatively affect the development of the financial sector and harm economic growth.

Jansen (1990) found that financial development contributes to economic growth, if proper allocation of financial resources is made for the efficient mobilization of production factors. Patrick and Park (1994) examined the role of financial development for economic growth in three countries; Japan, Korea, and Taiwan. Becsi and Wang (1997) observed that financial intermediation plays an important role in the economy. Ahmed and Ansari (1998) examined the relationship between financial development measures and economic growth for three South Asian countries, India, Pakistan and Bangladesh, based on the result of correlation analysis, Granger causality and Cobb-Douglas production function type equation for pooling data. The major finding of this study is that the governments in these countries were able to promote economic growth by encouraging financial sector development. Khan (1999) analyzed the relationship of financial development and economic growth by developing a theory of financial development based on the cost of the provision of external finance. He concluded that financial development reduces the costs of external finance and accelerates the rate of economic growth; on the other hand he predicts financial development would raise the return on loans and reduce the spread gap between borrowing and lending rates.

Deidda and Fattouh (2002) presented a simple model to establish a non-linear relationship between financial development and economic growth. They suggested that no significant relationship between financial development and economic growth is found in low-income countries. Gregori and Guidotti (1995) examined the empirical relationship between long run growth and financial development for Latin America. They found a positive relationship between the variables across the countries using cross country data and a negative relationship across countries from panel data analysis. Jean and Varoudakis (1996) used a large sample of cross-country data to conclude that the developed financial sectors favor growth by mobilizing savings. Demetriades and Hussein (1996) conducted causality tests between financial development and real GDP using time series data. The paper concluded that finance is a leading sector for economic development and there are different causality patterns across countries. In some cases the study found evidence that economic development systematically causes financial development. It shows the bidirectional relationship between financial development and economic growth.

Sinha and Macri (1999) studied the relationship between financial development and economic growth in eight Asian countries and concluded that a significant positive relationship exists between the income and financial variables for some countries. Kar and Pentecost (2000) examined the causal relationship between financial development and economic growth in Turkey. They developed five alternative proxies for financial development and suggested that the direction of

causality between financial development and economic growth in Turkey was sensitive to the choice of proxy used for financial development.

Rioja and Valev (2002) studied the effects of financial development on the sources of growth in different groups of countries with the panel data of 74 countries using GMM (Generalized Method of Moments) dynamic panel techniques. They found strong positive influences of finance on productivity growth mainly in the developed economies, while such growth occurs in less developed economies through capital accumulation. Christopoulos and Tsionas (2004) investigated the long run relationship between financial depth and economic growth combining cross sectional and time series data for developing countries. They found a single equilibrium relationship among financial depth, growth and ancillary variables; and cointegrating relationship indicated unidirectional causality from financial depth to growth. Waqabaca (2004) examined the relationship between financial development and economic growth in the context of Fiji using time series data of 30 years and found a positive relationship between financial development and economic growth, with causation running predominantly from economic growth to financial development.

3. Data and Methodology

The widespread literature on financial development offered several proxies of the extent of financial activity and the measure that has been common in most studies in the ratio of the broad money stock (M2) to the nominal per capita GDP traditionally used as a financial deepening indicator. In this study six measures of financial development are retained: the ratio of narrow money to nominal per capita GDP (FDM1), the ratio of broad money to nominal per capita GDP (FDM2), the ratio of total deposit to nominal per capita GDP (FDM3), the ratio of private sector credit to nominal per capita GDP (FDM4), the ratio of total credit to nominal per capita GDP (FDM5), and the ratio of private sector credit to total domestic credit (FDM6). Real GDP per capita is used the indicator of economic growth. The annual data set is employed for the Bangladeshi economy for the period 1979 to 2014. The gross domestic products (GDP) current prices, GDP at 1996 constant prices, population, narrow money supply and broad money supply are available from various issues of Bangladesh Bank Annual Report. Total domestic credit, banking deposit liabilities and private sector credits (claims on the private sector) are taken from various issues of Bangladesh Bank Economic Trends.

Unit Root Test

To establish cointegration between economic and financial development variables we have to check, in a preliminary step, whether each series is integrated and has a unit root using Dickey Fuller tests (DF) and Augmented Dickey-Fuller tests (ADF). The different tests are achieved assuming the presence of a unit root (non-stationary variable) in the null hypothesis (HO) and a stationary variable in the alternative hypothesis (Ha). If the calculated statistic is higher than McKinnon's critical value then we do not reject HO and the considered variable is non stationary, if not, it is stationary. First, tests in levels and then in first differences were carried out. Each series started with the most flexible specification of the test equation that includes an intercept and a trend.

Cointegration Tests

Once the tests of integration (that is unit root tests) are achieved then it is possible to implement tests of co-integration to check the existence of a stable long run relationship between fInancial

development and growth. The tests of cointegration between financial development and growth are based on a vector autoregression (VAR) approach initiated by Johansen (1988).

Johansen and Juselius (1990) developed two likelihood ratio tests: the Maximum Eigen Value test, which evaluates the null hypothesis of r cointegrating vectors against the alternative of

(r+ 1) cointegrating vectors and the Trace test, which evaluates the null hypothesis of, at most, r cointegrating vectors versus the general null of p cointegrating vectors.. In the case of a bivariate VAR, the null hypotheses is that there is no cointegration between the variables and the alternative one is the existence of only one cointegrating vector.

If the variables are cointegrated we use an error correction model to test causality between financial development and growth since co-integration implies the existence of an error correction model (ECM).

4. Empirical Evidence for Bangladesh

The results of the order of integration of each variable are summarized in table I. Both unit root results suggest that all variables are not stationary in the levels and but are stationary in the first difference I (1) at the 5 percent level of significance. Table 2 presents the cointegration results for financial development variables and economic growth using the Johansen Procedure. Maximum Eigen value and trace statistics show that there is one cointegrating vector between five of the six proxies for financial development variables per capita income at the 5 per cent level. In the case of FDM3 and ED, the maximum Eigen value and trace statistics, suggest that there is no cointegrating vector. Since most of the series are cointegrated, next step is to estimate the ECM model. The ECM contains the cointegration relation built into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics. We then explore the dynamic Granger causality in the ECM specification by running pair wise Granger causality tests. After estimating the VECM and applying the relevant statistical test to identify the sources of causation, the results are presented in Table 3.

Table 1: Tests of the order of integration of variables

Variables	Tests with a constant		Tests with a constant and a trend	
Levels	DF	ADF	DF	ADF
FDM1	-1.12	-0.94	-2.63	-2.71
FDM2	-1.21	-1.84	-2.17	-2.82
FDM3	-0.54	-1.17	-2.40	-3.12
FDM4	-1.59	-1.56	-2.18	-2.88
FDM5	-2.13	-1.66	-2.19	-2.66
FDM6	-2.56	-1.66	-2.92	-2.66
ED	-2.56	-2.22	-2.07	-1.98
Critical Value	**-2.92**		**-3.50**	
Differences				
FDM1	-5.54	-4.17	-4.90	-4.07
FDM2	-5.07	-4.72	-5.01	-4.68
FDM3	-5.50	-6.03	-5.44	-5.97
FDM4	-7.08	-8.11	-7.00	-8.02
FDM5	-7.77	-5.58	-7.70	-5.55
FDM6	-8.11	-6.65	-8.04	-6.59
ED	-4.97	-3.55	-5.83	-3.87
Critical Value	**-2.92**		**-3.50**	

Table 2: Cointegration Tests using Johansen Procedure

Variables		**Max. Eigen**	**Trace Test**	***Result***
FDM1 and EG	r=0	15.32(14.88)	20.16(17.86)	*Cointegrated*
FDM2 and EG	r=0	29.95(19.22)	35.74(25.77)	*Cointegrated*
FDM3 and EG	r=0	13.58(14.88)	20.88(17.86)	*Not cointegrated*
FDM4 and EG	r=0	20.99(14.88)	27.70(17.86)	*Cointegrated*
FDM5 and EG	r=0	20.27(14.88)	25.86(17.86)	*Cointegrated*
FDM6 and EG	*r=0*	*15.67(14.88)*	*28.88(17.86)*	*Cointegrated*

Table 3: Granger Causality Test using ECM

EG on FDM1 FDM1 on EG	8.37(0.212) 17.65(0.0007)	*FDM1 does not cause EG* *EG cause FDM1*
EG on FDM2 FDM2 on ED	14.09(0.029) 24.36(0.0004)	*FDM2 cause EG* *EG cause FDM2*
EG on FDM4 FGM4 on EG	16.69(0.0088) 1.95(0.92)	*FDM4 cause EG* *EG does not cause FDM4*
EG on FDM5 FDM5 on EG	6.27(0.39) 15.39(0.021)	*FDM5 does not cause EG* *EG cause FDM5*
EG on FDM6 *FDM6 on EG*	*4.70(0.58)* *15.89(0.01)*	*FDM6 does not cause EG* *EG cause FDM6*

Table 3 presents the results of the Granger Causality test using ECM procedures. The results show that FDMI does not cause economic growth however economic growth cause FDMI indicating one way causality. However, FDM2 Granger causes to economic growth. This is the only variable with bidirectional causality in our study. It may be due to the fast growing of broad money after economic reform. FDM4 Granger causes economic growth with one

way causality. FDM5 and FDM6 do not cause economic growth, but these variables have one way causality running from economic growth to financial development variables. Most of the credit variables are growing faster in Bangladesh because of the extension of credit flow, financial activities and banking reforms after the period of liberalization in the late 1970s. This situation has not contributed to economic growth however economic growth has boosted these variables. In summary, the results of the study suggest that broad money and private sector credit contribute to economic growth while economic growth contributes to narrow money, total credit and private sector credit with unidirectional relationship. In the case of variables FDM3, the causality test was conducted using first difference VAR since there is no cointegration with FDM3 and EG. The results suggest that the null hypothesis EG does not Granger cause financial development was rejected at the 5 percent level of significance while financial development does not Granger cause economic growth was rejected.

5. Conclusions

This study investigates the relationship between financial development and economic growth using Bangladeshi data from 1979 to 2014. Six measurers of financial development were developed: the ratio of narrow money to nominal per capita GDP (FDM1), the ratio of broad money to nominal per capita GDP (FDM2), the ratio of total deposit to nominal per capita GDP (FDM3), the ratio of private sector credit to nominal per capita GDP (FDM4), the ratio of total credit to nominal per capita GDP (FDM5), and the ratio of private sector credit to total domestic credit (FDM6). Unit root tests were conducted using DF and ADF procedures for all the time series data, and Johansen

procedure was used to tests the cointegration between economic growth and financial development.

As most of the variables are cointegrated, the Granger Causality Test was performed using ECM procedure to investigate the causal relationship between financial development and economic growth. The findings suggest that broad money causes economic growth and there is two-way causality between broad money and economic growth. Private sector credit has contributed positively to economic growth and in this case causality runs from private sector credit to economic growth as one-way causality. One-way causality runs from economic growth to narrow money, total credit, and private sector credit to total domestic credit. The major findings of this study do not support the view that financial development boosts economic growth.

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Paper No. 20

Banks, Non-Bank Companies and Stock exchange: Do we know the relationship?

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Abstract

This paper investigates the role played by the banking sector in founding, sustaining and developing stock exchange markets. The paper, for the first time in literature, has constructed and applied data on market capitalisation separately for banks and non-bank companies to examine the nature of relationship between the banks and stock markets.

We apply cointegration and bootstrapping techniques and find banks playing an important role in the development of stock markets. Further, the empirical analysis made among ten developed and developing exchanges suggests listing of non-bank companies important for stock market development. This finding has been verified by analysing the data of an exchange not included in the test.

1. Introduction

This paper provides evidence that in many countries the financial institutions mainly the banks and stock markets are closely related and banks play an important role in the establishment, management and daily trading of stock markets. This relationship as shown in this paper appears to be inversely related to the level of development of stock exchanges.

The motivation for this paper is the gap in the literature regarding the nature of the relationship between the two financial institutes. Many empirical papers have provided evidence that both banks and stock markets are important for economic growth (see for instance: Chakraborty and Ray, 2006, Deidda and Fattouh, 2008, Levine, 2002, Levine and Zervos, 1998). Studies have also shown the complementary role between banks and stock markets (Demirgüç-Kunt and Levine, 1996, Garcia and Liu, 1999, Li, 2007), while Deidda and Fattouh (2008) provide evidence of a diminishing impact of banks upon economic growth as stock markets develop. The literature as such is not clear and not connected well on the relationship between the two financial institutes. Moreover, economic growth literature also includes variables capturing the effect of both banks and stock exchanges as independent variables. Given the substitute and complementary nature of

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the relationship mentioned in different literature, keeping them as independent variables can be empirically questionable which further enhances the scope of this paper.

The paper is organised as follows. Section two reviews the literature on banks and markets. The new variables and data constructed for this paper will be discussed in section three. Section four describes the methodology used in this paper, discusses the results and also includes the analysis of a further case study: Nepal Stock Exchange. Finally, section five will outline the main conclusions.

2. Review of Literature

Atje and Jovanovic (1993) carried out the first cross country growth analysis involving banks and stock markets and found a positive influence of stock markets but a negative one for banks. The debate on comparative advantages of bank based and market based economies became more intense in the literature afterwards. Some of them included comparison of financial systems in different countries, particularly developed countries, while others investigated the nature of the relationship between the banks and markets.

Allen (1993) recommends bank-based systems for traditional industries where there is consensus about policies, and market-based systems for dynamic industries where wide agreement is lacking. Allen and Gale (1995) expands over Allen (1993). The authors provide quantitative measure of the share of banks and markets for Germany and United States. For example, they show the ownership of publicly listed banks during the period 1990-1991 was 8.9% in Germany compared to only 0.3% in the USA (Allen and Gale 1995, p.188, table 3).The authors continue to explore the bank and market based economies and in Allen and Gale (1995) they show theoretical model in which they find that bank based system may perform better than market based. The authors suggest German financial system with its reliance on financial intermediary market can minimize the risk (using the reserve held by the bank) better than the US financial system that relies more on financial markets. Levine (1997) compares the close bond between banks and industrialists in bank-based economies such as Germany and Japan, and greater liquidity and risk sharing opportunities in market-based countries such as the United Kingdom and the United States. The author finds bank-based financial structure of Japan superior to United States but raises concern over the available quantitative measure that differentiates an economy into bank-based and market-based. The author doubts if Japan is a bank-based economy as Japan has one of the best developed stock market in the world. The author therefore suggests the need for further research with new quantitative measures of financial structure and functioning of financial system (p. 719). Allen and Gale (2000) provided a more comprehensive explanation of five developed economies (France, Germany, and Japan as bank-based and United Kingdom and United States as market-based) and their effect in resource allocation and economic development. The authors find both banks and markets important for good financial system. Nevertheless, they stress the need for more research in the area to understand the advantages and disadvantages of the different types of financial institutions (Allen and Gale, 2001).

Some empirical works have suggested complementary role played by banks and markets. Boyd and Smith (1996) suggest that stock markets and banks may act as complements rather than as substitute sources of capital. Similar to Boyd and Smith (1996), Demirgüç-Kunt and Levine (1996) find that across countries the level of stock market development is positively correlated with development of financial intermediaries. Demirgüç-Kunt and Levine (1996) use data on 44 developed and emerging markets from 1986 to 1993 and find that large stock markets are more liquid, less volatile, and more internationally integrated than smaller markets. The authors find

developed markets having developed intermediaries. Thus, they conclude that stock markets and financial intermediaries complement each other and therefore they grow together when they develop.

Boot and Thakor (1997) explains the interaction between banks and markets. They make models of financial system based on three types of informational asymmetries. The first one is about imperfect knowledge on the quality of investment projects available to borrowers. This is better handled by financial markets as markets are better at pricing the value of the firms. The second is post-lending moral hazard and the third is uncertainty that borrower would be prone to moral hazard. The second and third informational asymmetries are better handled by banks as banks continue to retain information about the borrowers. The authors therefore present optimal combination of bank and markets as better financial system architecture. The authors also find that when the borrowers gain reputation (which is at the expense of bank), the capital market expands.

Garcia and Liu (1999) use seven countries in Latin America, six countries in East Asia, and two developed industrial countries (United States and Japan) in their empirical analysis regarding the macroeconomic determinants of stock market surge between the period 1980-1995. They argue that more developed banking sector in East Asian economies led to growth in the size of market in the region. The authors use stock market capitalization as a measure of stock market development. They find stock market as a complement rather than substitute for the banking sector. Similarly, Li (2007) finds development of financial intermediaries having positive association with the size of equity markets. The author uses 33 developed and developing countries. The author finds the stock market of less developed countries growing much faster in size than the developed countries in the sample whereas more developed countries enjoyed faster growth in trading activity than the developing countries.

Levine (2002) could not find support for either a bank-based or a market-based financial system, instead favoured for overall financial development importantly influenced by legal system. Chakraborty and Ray (2006) findings are similar to Levine (2002) as they were also unable to find one type of system superior to other although they suggested bank-based system more beneficial to industrial countries. Deidda and Fattouh (2008) find both banks and stock markets important for growth. However, in their study, the growth impact of bank development (measured by domestic credit to private sector to GDP) is lower when the level of stock market development (measured by turnover ratio) is higher. Minier (2009) finds that opening a stock exchange is important for growth. The author finds that countries experience higher economic growth during the first 5 years of existence of a stock exchange. However, the longer-term results according to Minier (2009) are more ambiguous.

3. New variables and data

In the literature on finance and growth, variables approximating the role of banks and of stock markets are included in the models to be estimated and are considered as independent variables. In this paper, we closely examine whether this assumption is correct.

The argument is that banks may play, in certain instances, an important role in the founding, managing and development of stock exchanges. In every country of the world, (commercial) banks have been established much earlier than stock markets. Therefore, the possibility that banks can play an important role in the actual setting up and/or running of stock exchange should not

discounted. For example, banks can own brokerage houses, shares of banks themselves are floated in stock markets (as parts of initial placement offers IPOs, further issuance or privatisation programmes), banks may act as brokers or financial investment advisors. In addition, banks might be instrumental in setting up stock markets in a number of other ways (providing initial capital, management and operators). Banks could establish and/or own stock markets. As shown in Table1, which is based on elaboration of the authors from data provided by Minier (2009), this is frequently the case.

Table 1. Role of banks in stock markets

Country	Date of Establishment	Founder
Croatia	1991	25 banks and insurance companies.
Estonia	1996	Founded by collection of commercial banks, brokerage firms and state actors.
Fiji	1994	Stock exchange established as a wholly owned subsidiary of Fiji Development Bank.
Iceland	1996	Joint venture of several banks and brokerage firms, at the initiative of Central Bank.
Jamaica	1968	Privately founded by four founding members in 1968 with involvement by Bank of Jamaica.
Korea	1956	Trading began March 1956 with 12 issues; established jointly by banks, insurance and securities companies under government sponsorship.
Nicaragua	1994	Government, banks and private companies met starting in 1990 to discuss forming stock market.
Taiwan	1961	Established late 1961 with capital from government operated and privately owned banks and enterprises.

To move one step further and provide some empirical evidence of this possible relationship, we collect, separately for banks and for companies other than banks, data on one of the variables most commonly utilised to approximate the development of stock exchanges: market capitalisation (usually as a proportion of GDP in the literature). Data on market capitalisation of banks (henceforth "BANKCAP") and market capitalisation of all other companies except banks (henceforth "NONBANKCAP") have been collected for the exchanges in countries listed in table 2. Table 2 also includes the date of establishment and the average capitalisation for the countries.

Table 2. Average annual market capitalization for the period 1991-2008 and age of exchange between 1991-2008 for sample countries.

Country	Market Capitalisation (million UD Dollars)	Age of Exchange
Hong Kong	505,366	117
Korea	332,734	52
Malaysia	171,536	78
Singapore	170,331	78
Thailand	90,488	45
Indonesia	61,690	96
Pakistan	18,614	61
Kenya	3,784	20
Sri Lanka	2,990	23
Bangladesh	**2,221**	**54**

Note:

Year of establishment is obtained from website of stock exchanges of the countries.

Details available in Appendix table A.1.

Age of exchange is calculated by subtracting from 2008 to find the age in 2008.

Market capitalisation above is from Standard & Poor's, Emerging Stock Markets Factbook and supplemental S&P data downloaded from ESDS International.

Given the complexity (mainly time consuming) of collecting data for market capitalisation for banks and non-bank companies, we restricted our sample to ten countries. The motivation for selecting the countries listed in Table 2 is to include exchanges at different levels of development in the sample which is discussed below:

1. Exchanges in Hong Kong and Singapore are some of the most developed ones in the world and, in comparison to others in the sample they were established a long time ago.
2. Exchanges in countries such as Korea, Malaysia and Thailand are not very old but are regarded as systematically more developed exchanges than many (Australia, Canada and many in Europe) in the world (Demirgüç-Kunt and Levine, 1996).
3. Exchanges in Bangladesh, Pakistan, Sri Lanka are not very new (for example Dhaka Stock Exchange was established two years before Korea stock exchange and the stock exchange in Pakistan was established before Korea) but they are not as developed as some others in the sample.
4. Finally, the exchange in Kenya is relatively new and has fewer (Only 47 as of March 2010) numbers of listed companies and a low market capitalisation.

The variables BANKCAP and NONBANKCAP are new in the literature and annual time series for them have been constructed by the authors over the period 1991 to 2008. We start from 1991 as data before this period are not available for many countries in the sample.

The correlation coefficient between average capitalisation and age for the countries in table 2 is 0.64, which is quite high i.e. older stock exchanges tend to be more developed. Therefore, we identify a new variable "AGEXCHANGE" as a proxy representing the development of exchange. This variable is admittedly less sophisticated than a variable capturing market capitalisation or a variable capturing the number of firms quoted in a market, although these variables are not immune from criticisms.

Data on market capitalisation are available from various sources such as the World Bank, World Federation of Exchange and International Monetary Fund. In the sources, the data are, however, only available for all listed companies (including banks), whereas our interest is to obtain BANKCAP and NONBANKCAP separately. To compute the two variables, data for the overall index (composite or all index) have been downloaded using Datastream and then manually separated into BANKCAP and NONBANKCAP. Table 3 shows the number of banks and non bank companies listed in the exchanges of the countries in the year 2008 (June).

It should be pointed out that the data above, on number of listed companies in the exchange of different countries, are taken from only one particular index of the exchange in each country. We have chosen the index, which included most of the listed companies (composite index, all share index as defined by Datastream).

A scrutiny of the number of banks listed in the exchange (Table 3) reveals that in countries with less developed exchanges, the proportion of banks is higher.

Table 3. No of listed companies and the % of banks in total

Country	No of Banks listed on the exchange	No of other companies listed on the exchange	% of Banks
Malaysia	6	992	0.60
Hong Kong	13	1021	1.27
Thailand	9	464	1.94
Korea	15	745	2.01
Singapore	6	215	2.79
Pakistan	18	234	7.69
Sri Lanka	18	233	7.73
Indonesia	29	346	8.38
Bangladesh	42	235	17.87
Kenya	5	14	35.71

The highest percentage of banks in the total number of listed companies is from Kenya followed by Bangladesh. The exchanges in these countries are relatively newer and less developed (according to total market capitalisation) than other exchanges in the sample. In countries with

stock exchanges classified as the most developed and fastest growing such as Malaysia, Singapore, Hong Kong and Korea (Demirgüç-Kunt and Levine, 1996), banks play a small role (less than 3%). In Sri Lanka, Pakistan and Indonesia the percentage of market capitalisation explained by banks ranges above 7 percent.

Next, the correlations between the variables BANKCAP and NONBANKCAP for the exchanges in the sample countries are shown in table 4.

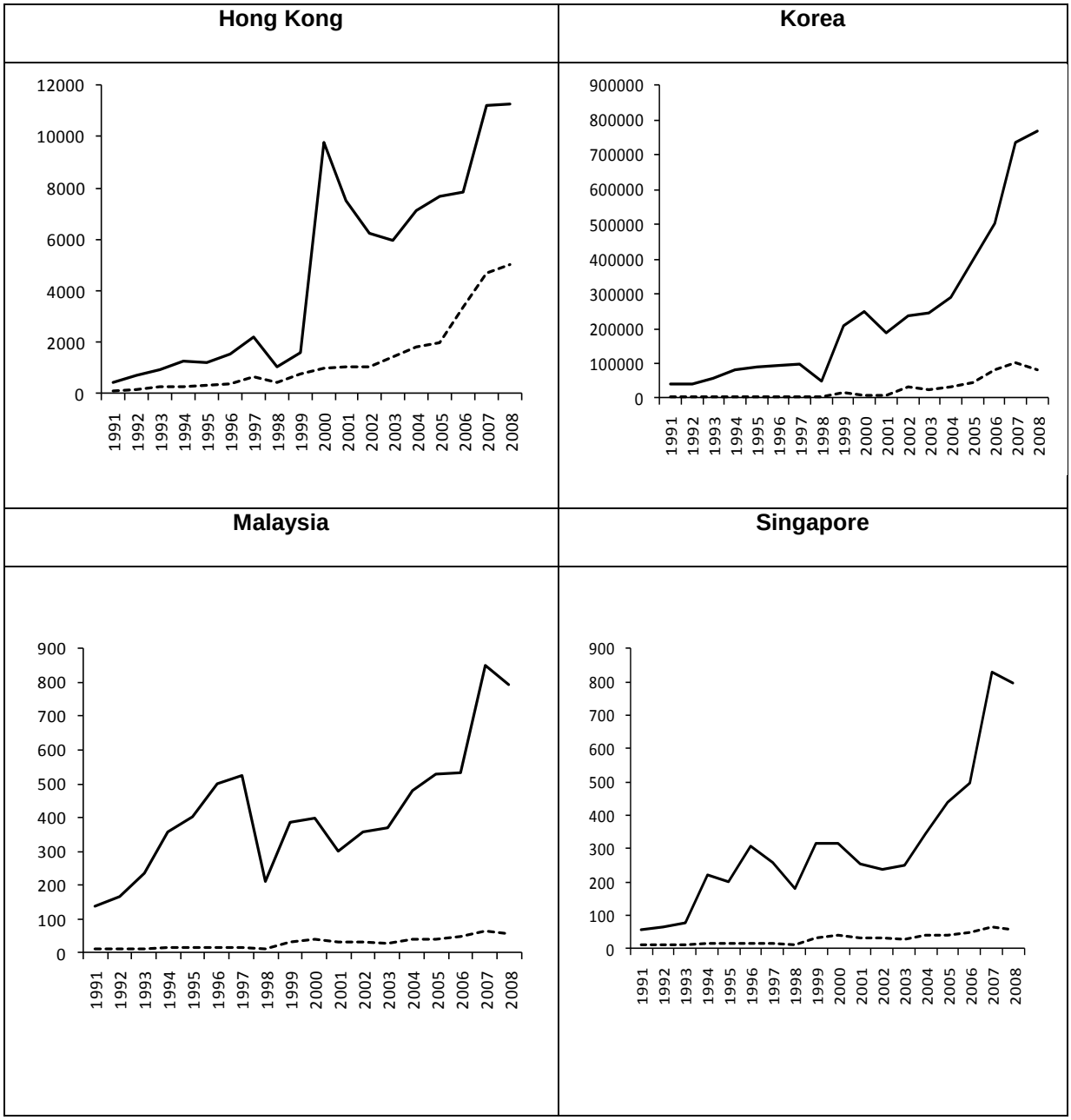
Table 4. Correlation coefficient between the variables BANKCAP and NONBANKCAP (annual data 1991-2008 17 observations)

Country	Correlation
Bangladesh	0.94
Hong Kong	0.84
Indonesia	0.95
Kenya	0.97
Korea	0.97
Malaysia	0.81
Pakistan	0.89
Singapore	0.91
Sri Lanka	0.96
Thailand	0.80

As noted in table 4, the correlations are positive and very high for each country in the sample. However, in the case of established exchanges BANKCAP represent a very small portion of the total market capitalisation. For effective analysis, we now present the line chart for both the variables.

Figure 1 presents line chart for the variables BANKCAP and NONBANKCAP for the markets of Hong Kong, Korea, Malaysia, and Singapore. Banks do not seem to have a prominent role as one would expect in large and diversified exchanges, although BANKCAP is more important in Hong Kong.

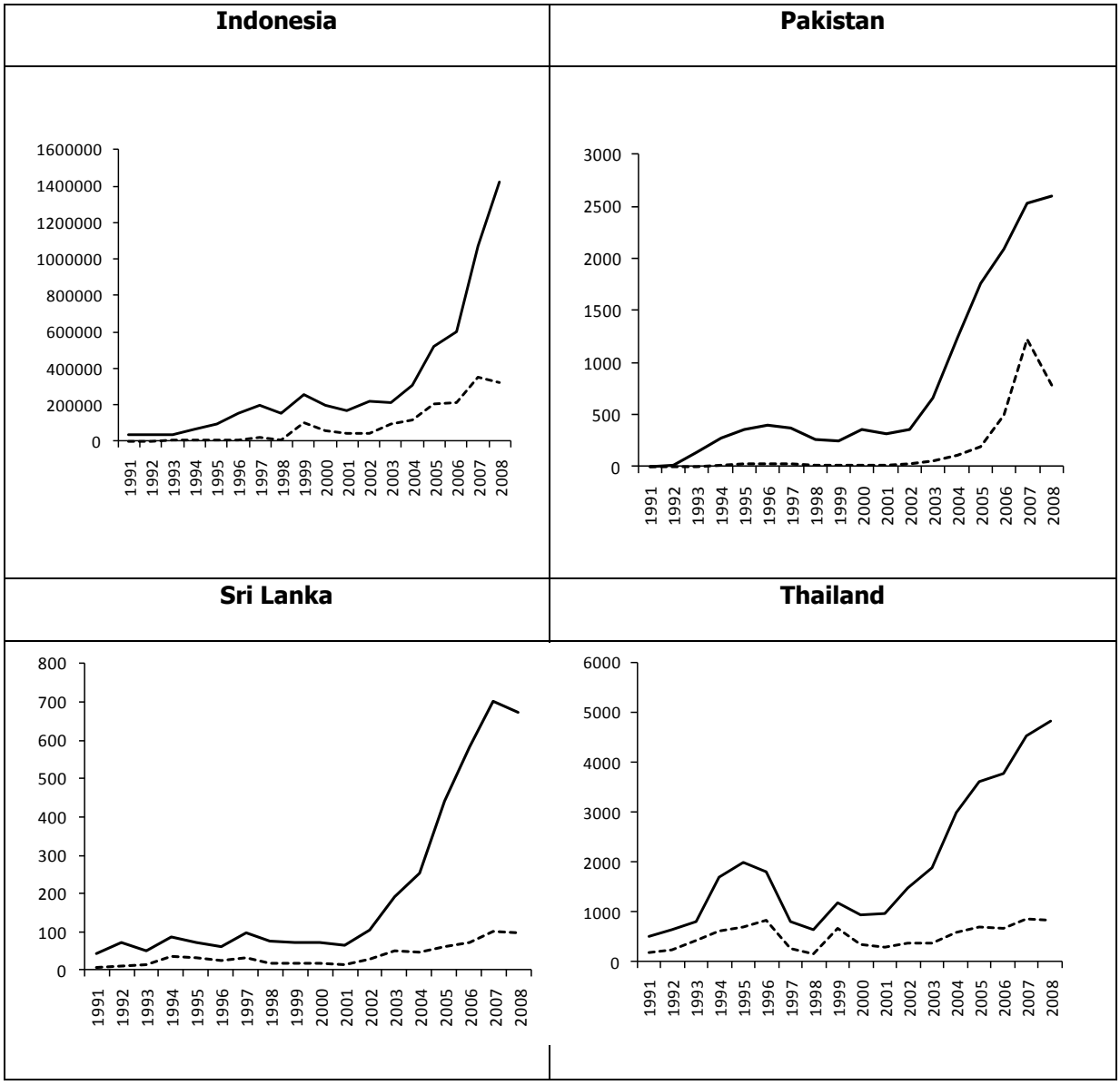
Figure 1. Line chart for the variables BANKCAP (dashed line) and NONBANKCAP (solid line) for Hong Kong, Korea, Malaysia and Singapore. (Values in trillion local currency)



Next, in Figure 2 the line charts for Indonesia, Pakistan, Sri Lanka and Thailand are presented.

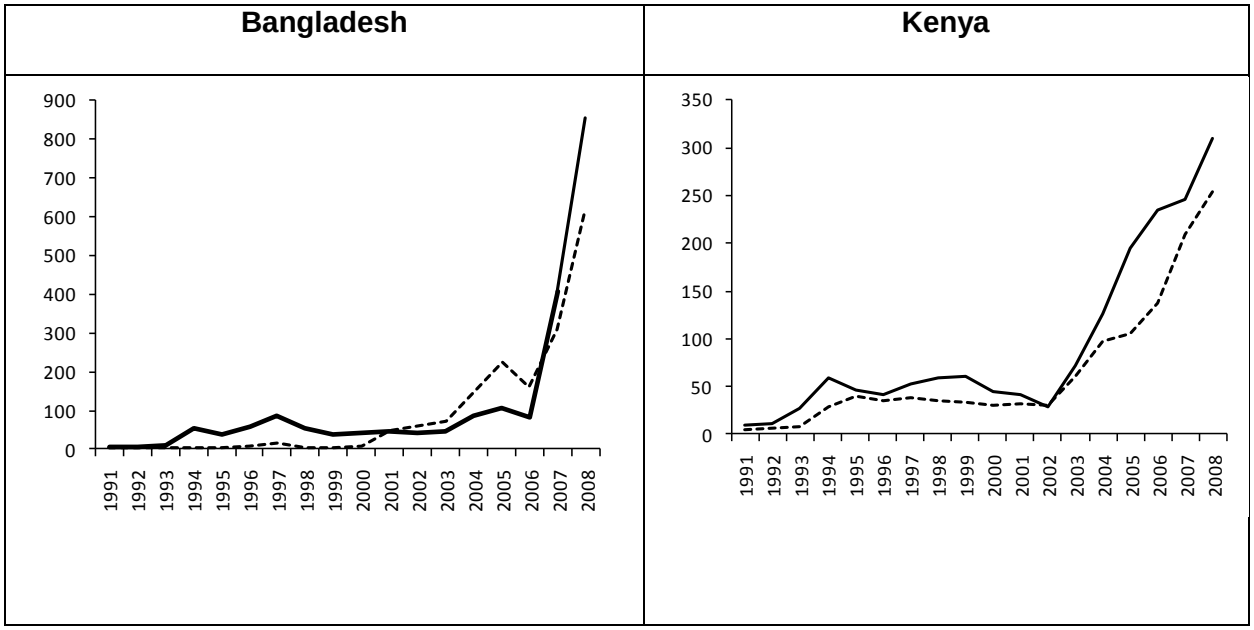
Banks appear to be playing a larger role, although in both Thailand and Sri Lanka the gap between BANKCAP and NONBANKCAP widens after around 2001.

Figure 2. Line chart for the variable BANKCAP (dashed line) and NONBANKCAP (solid line) for Indonesia, Pakistan, Sri Lanka and Thailand (Values in trillion local currency)



Finally, an eye ball of the line graphs of Bangladesh and Kenya show that the two variables have moved quite closely. In the case of low developed or new exchange such as Kenya we believe that banks play a very prominent role in shaping the size of the exchange as banks seem to represent a significant portion of total market capitalisation. In fact, in Bangladesh, during the period 2001-2007, BANKCAP has been higher than NONBANKCAP, while in Kenya, BANKCAP has almost been equal to NONBANKCAP throughout the entire period 1991- 2008. It may be noted that compared to other countries in the sample, these countries have less developed exchanges.

Figure 3. Line chart for the variable BANKCAP (dashed line) and NONBANKCAP (solid line) for Bangladesh and Kenya. (Values in trillion local currency)



4. Methodology and Results

By looking both at the number of banks against the number of other listed companies, and at the market capitalisation of banks against market capitalisation of other companies it is reasonable to suggest a testable hypothesis that in less developed and newer (i.e. more recently established) markets the stake of bank is relatively higher than in more developed and longer established markets.

Paper applies Johansen (1988) and the Engle-Granger (1987) two step method of cointegration. Johansen (1988) is applied as main test for the variable BANKCAP and NONBANKCAP. As an additional test, Engle-Granger (1987) carried out where the variable AGEEXCHANGE is used.

Two variables will be cointegrated to test if they have a long term, or equilibrium, relationship between them. So the test will help establish if there is cointegration between banks and exchanges, confirming evidence of any long-run relationship.

The idea of cointegration basically states that even though individual series may have a unit root, there may exist such a linear combination of variables which is stationary (Campbell and Perron, 1991). Technical note of Campbell and Perron (1991) is provided in Box 1.

Box 1. Technically explanation on co-integration, Campbell and Perron (1991, p. 164)

We start with an (n x 1) vector of variables Y_t. To keep the framework simple, we suppose that each element of this vector has a representation given by

$$Y_{it} = TD_{it} + Z_{it} \quad A_i(L)Z_{it} = B_i(L)e_{it} \qquad (i = 1, \ldots, n)$$

where

TD_{it} is the deterministic component of variable i

Z_i is its noise function modelled as an ARMA process, and

e_{it} the innovation is $N(O, \sigma_i^2)$.

First, Johansen cointegration test will be applied to find Trace/ Maximal Eigenvalue values. The null hypotheses is H0: r = 0 so there is no cointegration; and alternative H1: r > 0 so there is cointegration

To support Johansen test, the two step cointegration using Engle and Granger (1987) procedure will also be performed. To achieve this, the residuals from the regression equation are calculated. On the residuals, unit root tests (ADF) is applied to find the t statistics. The cointegrating regression equation estimated on the residuals is

"Δ" 〖" ε" 〗_"t-1" "=γ " "ε" _"t-1" "+ " ∑_"i=1" ^"p" ▒〖"α" _"i" "Δ" "ε" _"t-1" "+ " "u" _"t" 〗

Where, t-statistics is γ

The null hypothesis is γ = 0 i.e. there is no cointegration against the alternative hypothesis that γ< 0.

It is expected that if the t-statistics, is higher this will indicate closer association between the variables and vice versa. If the hypothesis is true then t-statistics for less developed stock exchanges will be higher. On the other hand, a developed stock exchange should have lower t-statistics value i.e. associated to a lesser extent.

The correlation coefficient is calculated between t-statistics and variables representing stock exchange development (AGEXCHANGE). If the correlation is negative then it would imply that in countries with highly developed stock exchanges, the banks and stock market will have less cointegration as compared to countries with less developed exchanges.

As a further robustness check, bootstrapping of the variables (AGEXCCHANGE and ADF t-statistics) can be done to find the level confidence interval between the two.

Finally, if the difference is stationary (from cointegration test), this should imply that banks are dominant for the stock market (and the country does not have well developed exchange). Cointegration does not seek the causality. However, in the exchange banks are only one out of many industries in a country. So it should not be the only element responsible for the growth of a stock market. In other words, if the difference between total market capitalization and bank stock

capitalization remains stationary, this practically means that banks' stock are the main element in the stock market contributing to its growth.

The Johansen cointegration results are reported in Appendix table A2. The test shows that there is cointegration among BANKCAP and NONBANKCAP for countries namely Bangladesh, and Kenya (Trace test at 8%). The cointegration for Thailand can be established at 9% from Trace test and 8 % from Maximum Eigenvalue test. The countries that have no cointegration are Hong Kong, Indonesia, Korea, Malaysia, Pakistan, Singapore, and Sri Lanka. Both the Trace and Maximum Eigenvalue tests support the results. The results are similar to those predicted through the graph of the lines. This means stock exchanges that have larger share of banks are cointegrated.

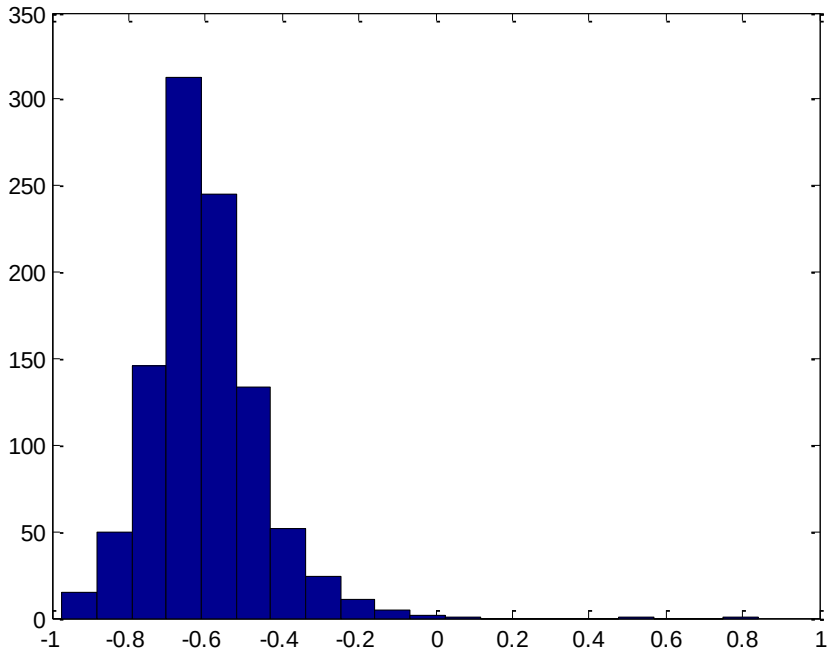
The paper now runs the Engle and Granger (1987) two step method of calculating cointegration. The OLS equation is run and the series for residual is derived in which the ADF test is performed. It is found that that the variables are not cointegrated for many countries. However, it is well established that the Engle and Granger (1987) method can be unreliable in case of small sample. Hence, the t-statistics computed from ADF tests of the residuals is taken. A higher t- statistics will mean the variables are more correlated and vice versa. The ADF t-statistics values of the unit root test on the residuals using Engle and Granger (1987) are made available in table 5.

Table 5. ADF t-statistics

Country	ADF t-statistics
Bangladesh	-1.403
Hong Kong	-1.491
Indonesia	-1.962
Kenya	-2.574
Korea	-2.719
Malaysia	-1.740
Pakistan	-3.085
Singapore	-1.279
Sri Lanka	-2.659
Thailand	-3.554

In addition, the re-sampling of the AGEXCHANGE and ADF t-statistics vectors a 1000 times is done to consider the variation in the resulting correlation coefficients. Correlation coefficient is computed on each sample and obtained the histogram that is shown in Figure next.

Figure 4. Histogram of correlation between the variables



The histogram shows that nearly all the estimates lie on the interval [-1 to -0.2]. Next bootstrapping is done for the pairs consisting of t-stats of ADF test and GEXCHANGE (to construct a confidence interval). After bootstrapping the correlation coefficient 5,000 times (this also helps in minimising error bias in small time series data) at 95% confidence interval, lower/upper limit of -0.2103 and -0.8577 respectively are obtained.

The above implies an evidence for an inverted relation between t-stats of ADF test and AGEEXCHANGE. In other words when age of exchange is high the t-statistics is low and therefore no cointegration and vice versa.

This (evidence of negative correlation between t-statistics and AGEEXCHANGE) implies that in countries with highly developed stock exchanges, the banks and stock market will have less co-integration as compared to countries with less efficient exchanges. The implication is that in less developed stock exchanges the variables BANKCAP and NONBANKCAP are more cointegrated suggesting stationarity of the relationship. In practical terms, this means that banks' stocks are the main element in the stock market contributing to its growth. Since bank is causing this (although there are many other industries in a country), in the stock exchange bank is the dominant player and the exchange may be less developed.

Confirming the result

The variables used are the first of its kind in the literature. In order to further support the findings (least developed exchanges have Banks as dominant player in the market) the paper has collected the market capitalisation of Nepal Stock Exchange (NEPSE). Nepal is not the sample country of this empirical investigation. Hence the testing of the results obtained should be unbiased when tested for NEPSE.

The numbers of listed companies in the exchange (as of July 2009) after separation to financial and non-financial sectors are presented below.

The number of listed financial and non-financial companies in the exchange (as of July 2009) are presented below in table 6.

Table 6. Number of listed companies in NEPSE

Types	Total Number of Listed Companies	Category	Number listed
Financial Intermediaries	133	Commercial Banks	23
		Finance Companies	62
		Development Banks	32
		Insurance Companies	16
Non Financial	31	Hotels	4
		Manufacturing & Processing	17
		Others	2
		HydroPower	4
		Tradings	4

Data source: NEPSE

The line graph of the data for BANKCAP and NONBANKCAP is provided in figure 5 next.

Throughout the six years the contribution of banks in total market capitalisation has remained stable at 82% on average.

The paper has also collected data on average annual Value traded and number of shares traded for one year on monthly basis for all companies listed in the exchange. It is found that on average financial institution represented 85.84% of the total value traded. Similarly, almost 91% of the total numbers of shares were traded on account of financial institutions. Finally, the Johansen co-integration test is carried out for NEPSE. The results show co-integration between the market capitalisation of financial and non-financial stocks (Appendix table A3).

Figure 5. BANKCAP (Dashed line) and NONBANKCAP (Solid line) – NEPSE. Amount in Million local currency.

Conclusion

In sum, it is found that more developed exchanges have poor cointegration with banks' development. The hypothesis that under developed exchanges will have higher level of cointegration has been confirmed by high 95% confidence interval of correlation coefficient. This implies that the less developed exchanges are relying mainly upon banks and hence do not have a developed stock exchange. The results of the empirical investigation have been checked and confirmed using Nepal as a sample. The paper finds cointegration in the series and also a large dominance of banking sector in the exchange of Nepal. The paper sends the message that listing of more non bank companies inside the exchange can be important for the development of exchange.

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Appendix

Table A1. Name of the exchange, establishment date, and Datastream code used to download the data

Bangladesh Bangladesh has two stock exchanges namely Dhaka Stock Exchange (DSE) and Chattagong Stock Exchange (CSE). The former was established in 1954 as "East Pakistan Stock Exchange Ltd". The name was changed to Dhaka Stock Exchange in 1964. (http://www.dsebd.org/ilf.php**).** CSE was established in 1995 and has relatively fewer numbers of companies as compared to DSE. In order to download the data on capitalisation, Datastream provided market capitalisation for "all quoted shares" has been used to download the data. The mnemonic in Datastream is FBANG. Date of establishment of exchange: 1954.	**Hong Kong** Hong Kong is the most investor friendly place in the world. As the first exchange, the Association of Stockbrokers in Hong Kong was established in 1891. At present the stock exchange is known as Hong Kong Exchanges and Clearing Limited (HKEx). It is a merger of The Stock Exchange of Hong Kong Limited (SEHK), Hong Kong Futures Exchange Limited (HKFE) and Hong Kong Securities Clearing Company Limited (HKSCC). (http://www.hkex.com.hk/eng/exchange/corpinfo/history/history.htm) In order to download the data on capitalisation, Datastream provided market capitalisation for "all domestic and foreign shares" has been used to download the data. The mnemonic in Datastream is FHKQ. Date of establishment of the exchange: 1891
Indonesia The first Stock Exchange in Indonesia was built in Batavia (currently known as Jakarta) by the Dutch East Indies in 1912. Later new stock exchanges were established in Semarang and Surabaya. Surabaya Stock Exchange was merged into Jakarta Stock Exchange (JSX). As a result, JSX changed its name into the Indonesia Stock Exchange. (http://www.idx.co.id/) The data for "Jakarta Composite Index" is downloaded using Datastream where the mnemonic is LJAKCOMP. Date of establishment of the exchange: 1912	**Kenya** In Kenya until 1963 the trading of shares was limited to European communities. In 1988, the first privatisation through Nairobi Stock Exchange took place when it sold the 20% of the share of the Kenya Commercial bank. So we take 1988 as the date of establishment of NSE. (http://www.nse.co.ke/newsite/inner.asp?cat=ahistory) The stock market capitalisation for "Nairobi Stock Exchange Index" is obtained using Datastream where the mnemonic is LNSEINDX. Date of establishment of the exchange: 1988
Korea The Daehan Stock Exchange, the predecessor of the Korea Stock Exchange (KSE), was established in 1956. In 1962, the KSE reorganized into a joint stock corporation. The Korea Exchange was established in 2005 as a merger of the Korea Stock Exchange, the KOSDAQ and the Korea Futures Exchange. The Korea Exchange is one of Asia's largest exchanges with around 1,800 listed companies. (http://eng.krx.co.kr/m9/m9_1/m9_1_3/UHPENG09001_03.html) The data for "KOSPI Composite Index constituents" is obtained using Datastream where the mnemonic is LKORCOMP.	**Malaysia** The first formal securities business organisation in Malaysia was the Singapore Stockbrokers' Association that was established in 1930. The Malayan Stock Exchange was established in 1960 and the public trading of shares commenced. Currency interchangeability between Malaysia and Singapore ceased in 1973, and the Stock Exchange of Malaysia became Kuala Lumpur Stock Exchange Berhad. On April 14, 2004, the name was changed to Bursa Malaysia Berhad. (http://www.klse.com.my/website/bm/about_us/the_organisation/history.html) The data for "Malaysia all quoted securities" is obtained using Datastream where the mnemonic is FMALQ.

Table A2 Results of Johansen (1988) cointegration test

Country	Test Type and detail	P-values
Bangladesh	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None	0.00
	At most 1	0.34
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None	0.00
	At most 1	0.34
Kenya	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None *	0.08
	At most 1	0.77
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None *	0.04
	At most 1	0.77
Hongkong	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None	0.35
	At most 1	0.65
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None	0.31
	At most 1	0.65
Indonesia	No. of CE(s)	
	None	0.17
	At most 1	0.56
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None	0.15
	At most 1	0.56
Korea	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None	0.16
	At most 1	0.69
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None	0.11
	At most 1	0.69
Malaysia	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None	0.11
	At most 1	0.98
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None	0.03
	At most 1	0.98
Pakistan	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None *	0.28
	At most 1	0.54
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None *	0.28
	At most 1	0.54
Singapore	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None	0.82
	At most 1	0.98
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None	0.61
	At most 1	0.98
SriLanka	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None *	0.42
	At most 1	0.33
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None *	0.64
	At most 1	0.33
Thailand	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None *	0.09
	At most 1	0.49
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None *	0.08
	At most 1	0.49

Table A3. Results of Johansen Cointegration Test: Nepal

Country	Test Type and detail	P-values
Nepal	Unrestricted Cointegration Rank Test (Trace)	
	No. of CE(s)	
	None	0.0671
	At most 1	0.6196
	Unrestricted Cointegration Rank Test (Maximum Eigenvalue)	
	No. of CE(s)	
	None *	0.0409
	At most 1	0.6196

Paper No. 21

Macroeconomic Risk and Equity Mutual Fund Returns

Inderjit Kaur*

K.P. kaushik**

Abstract

The paper estimates the effect of macroeconomic risk on equity mutual fund returns. For an individual stock an unexpected changes in macroeconomic conditions impact firm cash flows, and hence its valuation. Equity mutual funds as a portfolio of stocks attempt to hedge macroeconomic risk. We investigate the effect of macroeconomic changes on mutual fund returns so as to ascertain to extent to which mutual funds provide hedge to macroeconomic conditions. We empirically estimate the effect of innovations in inflation, interest rate, industrial production, term structure of interest rate, default risk premium, exchange rate and oil prices on performance of funds. The innovations in macroeconomic risk have been measured with forecast of conditional volatility with GARCH and also with moving average method. We utilized data on Indian equity mutual funds with growth objective for the period 2003-2013. We applied time-series regression for each mutual fund. The time series results provide that financial risk is the most important risk for mutual funds. Other than that mutual fund performance is affected by innovations in oil prices, default risk premium and exchange rate. Based on cross-sectional regression coefficients, we constructed four portfolios of mutual funds. The funds with higher coefficient on inflation and short term real interest rate provided average 22% and 20% higher return.

Key words: Macroeconomic risk, financial risk, mutual funds

JEL classification: G11, G12, G20

1. Introduction

The ascertaining of return generating process of financial assets has been important from pricing of financial assets such as stocks and for evaluation of mutual funds. Under Capital Asset Pricing (CAPM) theory, the only risk important for financial assets that could explain their returns has been market risk factor. But largely CAPM failed to explain the returns of financial assets. The Arbitrage Pricing Theory (APT) by Ross (1976) and Inter-temporal CAPM (I-CAPM) by Merton (1973) provided alternative explanation for financial asset returns. Chen, Roll and Ross (1986), Kryzanowski, Lalancette and To (1997), Connor and Korajczyk (2010) applied macroeconomic factors to explain financial asset returns while Fama and French (1993), and Carhart (1997) applied market based factors to asset returns. Though it has been well documented in the literature that macroeconomic variables better explain the return generating process of stocks and mutual funds, but effect of macroeconomic innovations on returns of mutual funds in India have not been studied.

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The purpose of this study is to investigate the effect of macroeconomic innovations on the returns on mutual funds. The active strategy of equity mutual funds allows them to shift their risk to market while expecting a change in the macroeconomic state variables. Thus it is important to study if mutual funds provided hedge to macroeconomic shock or innovation as it is desirable from investor point of view. We have investigated whether it has been important to consider only financial risk in case of mutual funds or other macroeconomic state variable risk also have been important for mutual funds. We have studied the effect of innovations in macroeconomic variables under Arbitrage Pricing Theory (APT) framework. The innovations in macroeconomic variables have been measured as difference in one year moving average forecast and actual. We have further provided macroeconomic risk as three year forecast of conditional volatility. The results provide that returns have been better explained with moving average innovations. Further, returns have been explained with financial risk measured with stock market risk.

The rest of the study has been organized as follows. Section-2 briefly discusses the literature, and section-3 provides discussion on data and methodological issues. Section-4 provides findings of the study and finally section-5 concludes the study.

2. Review of Literature

The literature has analysed the effect of macroeconomic state variables on stock prices or equity portfolio under the theoretical framework of inter-temporal CAPM of Merton (1973) or Arbitrage Pricing Theory of Ross (1976).

Chen, Roll and Ross (1986) studied the effect of macroeconomic variables on stock prices. They have taken a prior set of macroeconomic variables as source of systematic risk. They found industrial production, change in risk premium, term structure of interest rate affect stock prices. They found no effect of oil prices, and real per capital consumption on stock prices.

Asprem (1989) investigated the relationship between stock prices, portfolio and macroeconomic variables in European countries such as Denmark, Finland, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, and UK. He found that stock prices were negatively related to employment, exchange rate, level of imports, inflation and interest rate.

Elton, Gruber and Blake (1995) studied effect of macroeconomic variable on bond returns. They measured uncertainty in economic variables as difference in actual and publically available forecasts of variables. The bond returns were largely explained with GNP, and inflation.

Lockwood (1996) found that equity mutual fund betas were significantly negatively related to inflation growth and default risk premium whereas fixed income fund betas were significantly negatively related to risk free rate, industrial production index, and term structure. But passive portfolio betas were unrelated to macroeconomic variables. Similarly, Brown, Goetzmann and Grinblatt (1998) also found that mutual funds respond better to common factors of macroeconomic variables than stocks.

Kryzanowski, Lalancette and To (1997) used macroeconomic factors like exchange rate, industrial production, innovations of total exports and innovations in shape of term structure to explain mutual fund returns. Their model explained mutual fund returns very well.

Gay (2008) found no effect of exchange rate and oil prices on stock market index of BRIC countries (Brazil, Russia, Indian and China).

Connor and Korajczyk (2010) examined risk and return characteristics of US mutual funds using fifteen years monthly data. They developed methodology to extract statistical and economic relevant factors. The common factors extracted were shock to term structure, shock to junk-bond premium, shock to unemployment and shock to inflation.

Chu (2011) examined the effect of inflation rate, money supply, short term interest rate on close ended Hong Kong pension fund schemes. The results for bivariate cointegration provide fund returns have long-term equilibrium relation with inflation rate.

Kusairi, Sanusi, Muhamad and Damayanti (2013) examined the effect of monetary environment on performance of mutual funds in Malaysia. They found positive effect of expansionary monetary environment on domestic mutual funds but negative effect on global funds.

Bali, Brown and Caglayan (2014) have analysed the effect of uncertainty in macroeconomic variables such as default spread, stock market, dividend yield, t-bill rate, GDP per capita, term spread, inflation rate, and unemployment rate on hedge fund and mutual funds returns. They measured uncertainty in macroeconomic state variables with VAR-GARCH model. They found that though returns for hedge fund were being affected by macroeconomic uncertainty but mutual fund returns were not affected by uncertainty in macroeconomic variable. Further, mutual funds did not time the macroeconomic risk.

Dhankar and Singh (2005) tested CAPM and APT model in case of Indian equity market. They extracted factors with principal component method and found that APT better explained the stock market returns.

Ahmed (2008) applied BVAR model to study long run and short run relationship between macroeconomic variables and stock market. He found that stock market lead the macroeconomic variables such as industrial production, exports, foreign direct investment, money supply, and exchange rate but lag interest rates. Thus stock markets not only adjust itself to actual change in macroeconomic variables but also to their expected changes also.

The review of literature provided that macroeconomic variables affect the equity returns and hence could provide appropriate factors for mutual fund returns.

3. Data and Methodology

3.1 Methodology

The effect of macroeconomic state variables on returns of mutual funds has been studied under the framework of APT and ICAPM. We have measured the macroeconomic risk with moving average and conditional volatility approach.

3.1.1 Moving Average Method

We have studied the effect of macroeconomic variables on mutual fund returns in the APT framework. The APT model by Ross defined the return generating process of portfolio as composition of macroeconomic and microeconomic factors. In this, common factor is assumed to

have zero expected value which measures the new information in the economy. The model defined the return generating process of portfolio or asset as,

$$r_i=\alpha+\sum\beta_i F_n+e_i \quad (1)$$

where ei are returns due to unsystematic microeconomic factors and Fn are the deviation of n common factors from their expected value.

In the literature, APT model has been specified either with pre-defined factors or with factors obtained from factor analysis. Factors obtained from factor analysis have problem as they cannot be identified with true macroeconomic changes. Thus we have taken pre-defined macroeconomic variables. The difference in forecast provided by one year moving average and actual has been considered as innovation in macroeconomic variables.

3.1.2 Conditional Volatility Method

The innovation in macroeconomic variables has also been measured with forecast of conditional volatility. We apply ARCH, GARCH, T-GARCH and GARCH-M models to model the macroeconomic series. In all cases, GARCH model with (1,1) and (2,1) explained the series. Though we have attempted to explain the series with all models, we provide here the results for GARCH (1,1) model. The GARCH (1,1) model is specified as,

$$r_t=\alpha+\sum_{(i=1)}^{m} [\beta_i f_{it}+\varepsilon_t,\varepsilon_t |\varphi_{(t-1)}\sim N(0,\sigma^2)] \quad (2)$$

$$\sigma_t^2=\omega+b\varepsilon_{(t-1)}^2+g\sigma_{(t-1)}^2 \quad (3)$$

where $\omega>0$, $b\geq0, g\geq0$. The equations (2) and (3) are return and variance equation respectively. ε_t is the conditional heteroskedastic on the information set $\varphi_{(t-1)}$ at time t-1. ω is the weighted function of long-term average value, $\varepsilon_{(t-1)}^2$ is the information about volatility during previous period and $\sigma_{(t-1)}^2$ is the fitted variance during previous period. The value of $b+g<1$, otherwise, the unconditional variance is not defined and there is non-stationarity in variance. The GARCH (1,1) model in equation (2) assumes normal distribution for error terms.

We forecast conditional volatility estimate for a macroeconomic variable from the three year rolling GARCH regression. We estimate the series with GARCH (1,1) model for three year period and provide one month estimate of conditional volatility. The data for macroeconomic variables have been taken from 2000-2013. The forecasted conditional variance of series has been considered as measured of macroeconomic risk. Under the intertemporal CAPM framework, we estimate the effect of macroeconomic risk on mutual fund returns,

$$r_i=\alpha+\sum\beta_i \sigma_n+e_i \quad (4)$$

where, σn is the risk measure for macroeconomic series provided by GARCH (1,1).

3.2 Data

Though, it is difficult to incorporate all the macroeconomic variables that could affect mutual fund returns, but based on the significant variables in the earlier literature, we have selected eight variables that are, inflation measured with wholesale price index (WPI), short term real interest rate (as difference in 3-month t-bill rate and inflation), NSE NIFTY S&P-50 index proxy for stock market index, industrial production index to proxy level of domestic production, term structure of interest rates, risk premium, exchange rate and international oil prices. The frequency of all variables is monthly. We have taken the data for the period 2003-2013 as it has both bull and bear period of stock market. The details of all macroeconomic variables with their data source have been provided in Table 1. The macroeconomic variables represent the monetary and fiscal environment of the economy.

Table 1: List of variables and their data source

Variable	Definition	Data Source
inf	inflation (log difference of WPI series)	http://mospi.nic.in, Economic Survey of India
int	real interest rate (difference between 3-month t-bill rate and inflation)	http://www.nseindia.com
index	return from NIFTY S&P -50 index	http://rbi.org.in
ip	industrial production (log difference of IIP series)	http://rbi.org.in
term	term structure of interest rates (difference between long-term govt. bond and 3-month t-bill)	nseindia.com
riskpre	risk premium (difference between commercial paper and t-bill)	nseindia.com
rxrate	appreciation/depreciation of INR/USD	http://rbi.org.in
oil	change in US crude oil prices (in $/barrel)	http://www.eia.gov

To study the effect of macroeconomic variables on mutual funds, we have taken equity mutual funds with growth objective. The mutual fund schemes for which data has been available during the period 2003-13 have selected in the final sample. The descriptive statistics of all macroeconomic variables are provided in Table-2.

Table 2: Descriptive statistics of macroeconomic variables

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability	Obs.
exrate	0.2339	-0.1112	6.7861	-4.2652	2.0676	0.8399	4.3281	24.4549	0.0000	128
index	1.3294	2.2396	18.1461	-27.0337	6.3439	-0.8350	5.6642	53.9643	0.0000	131
inf	0.5078	0.4755	2.5459	-1.9094	0.6666	-0.1033	4.4507	11.7199	0.0029	131
ip	0.4684	0.2977	13.9244	-15.3893	5.8079	-0.4202	3.7731	7.1170	0.0285	131
oil	1.2557	1.7199	22.6401	-28.2499	8.4314	-0.6848	4.4821	22.2281	0.0000	131
int	0.0157	0.0060	2.4196	-1.8496	0.6572	0.1479	4.2531	9.0480	0.0108	131
riskpre	0.3279	0.3272	0.7714	0.0064	0.1726	0.2758	2.3448	4.0043	0.1350	131
term	0.1118	0.0874	0.3506	-0.0711	0.0796	1.2286	4.2162	41.0306	0.0000	131
eq wt mf	0.5702	0.7935	16.9656	-18.5129	4.4916	-0.1640	5.8808	53.5309	0.0000	131

4. Discussion of Results

In this section, we have provided the results for effect of innovation in macroeconomic variables on mutual fund returns. We have estimated regression equation (1) and (4) to study this. Before regression, we have applied unit root test to test stationarity of data and structural break to test stability of series.

4.1 Unit Root Test

The non-stationary data can lead to spurious regression. Thus we test the stationarity of time series data with Philips-Perron test for unit root. The results for test are reported in Table-3. The results provide that innovations in all macroeconomic variables are stationary at level.

Table 3: Phillips-Perron test for Unit-root test

	No Constant and No Trend		With Constant and No Trend		With Trend and Constant	
On Level						
ex_ux	-7.284	*	-7.273	*	-7.276	*
index_ux	-7.852	*	-7.822	*	-7.792	*
inf_ux	-7.93	*	-7.907	*	-7.879	*
ip_ux	-23.397	*	-23.397	*	-23.311	*
oil_ux	-8.517	*	-8.489	*	-8.458	*
int_ux	-7.92	*	-7.893	*	-7.868	*
riskpre_ux	-5.101	*	-5.094	*	-5.071	*
term_ux	-3.056	*	-3.026	**	-3.033	

4.2 Structural Stability of Univariate Series

The structural break in the series provides change in volatility over the period of time. The forecast by both methods are provided in Figure 1-8. The figures provide that volatility changed over period of time. There are high and low volatility periods. Further, since the data period from 2003-2013 has complete business cycles of Indian economy, we test for structural break in the macroeconomic variables. In the literature, mostly one structural break had been tested. We apply Bai-Perron (1998, 2003) test for multiple structural breaks. The results for test for structural break are provided in Table-4.

The results for Bai-Perron (2003) structural break test provides that with moving average innovations, default risk premium, term structural of interest rates had structural breaks. With GARCH innovations, exchange rate, stock market index, default risk premium, and term structural of interest rate had structural breaks. To measure the change in risk during structural break, we introduce interaction variable of macroeconomic variable and dummy variable that takes value '1' during that period.

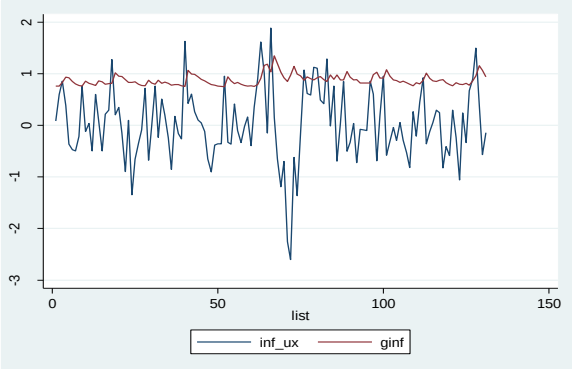

Figure 1: Inflation

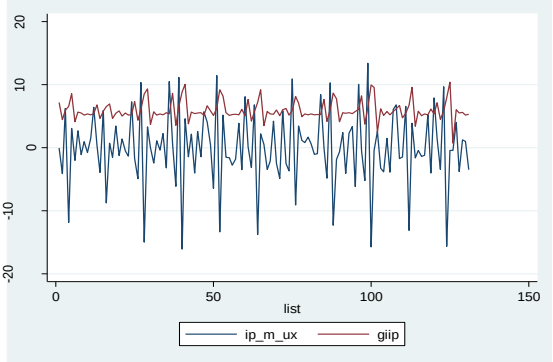

Figure 2: Industrial Production Index

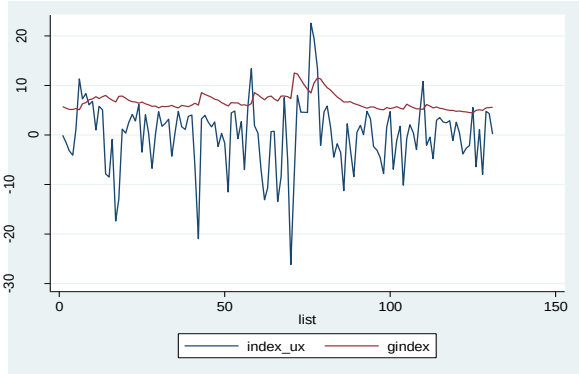

Figure 3: Stock Market Index

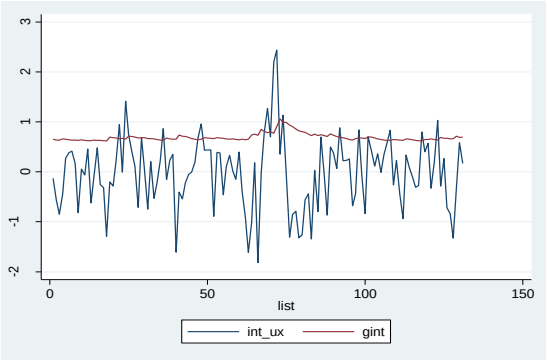

Figure 4: Short Term Real Interest Rate

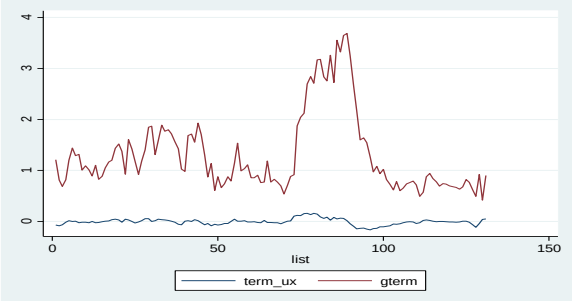

Figure 5: Term Structure of Interest Rate

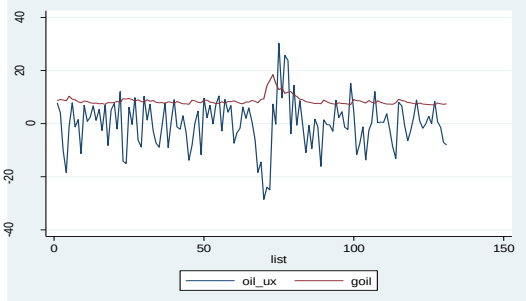

Figure 6: Oil Prices

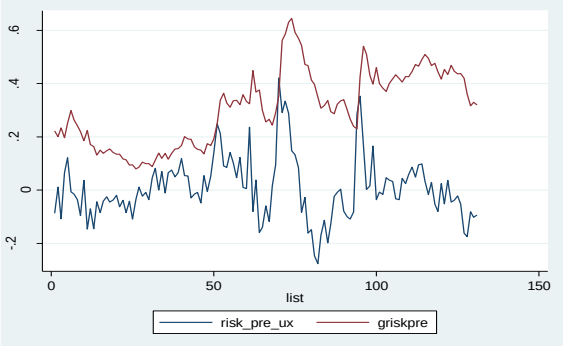

Figure 7: Default Risk Premium

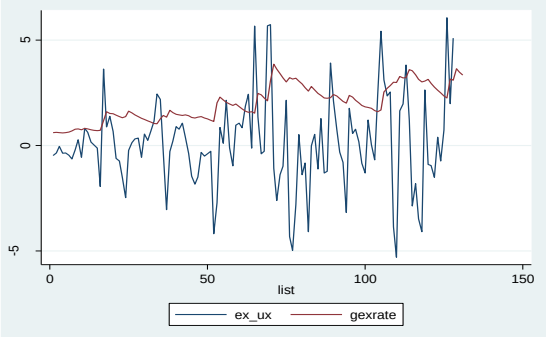

Figure 8: Exchange Rate (USD/INR)

Table 4: Results for Bai-Perron (2003) Structural Break Test

Variable	Udmax	Critical value	no. of breaks	Break dates		
Innovations with Moving Average Method						
ex_ux	1.94	8.58	0			
index_ux	2.05	8.88	0			
inf_ux	1.77	8.58	0			
ip_ux	0.39	8.58	0			
oil_ux	2.61	8.58	0			
int_ux	1.53	8.58	0			
risk_ux	14.67	8.88	2	2005m07	2009m05	
term_ux	64.18	8.88	3	2008m11	2010m6	2012m1
Innovations with GARCH method						
gexrate	22.71	8.88	2	2007m05	2011m11	
gindex	12.22	8.88	2	2008m07	2010m02	
ginf	6.21	8.88	0			
giip	1.51	8.88	0			
goil	3.46	8.88	0			
gint	7.96	8.88	0			
griskpre	20.18	8.88	2	2007m03	2008m11	
gterm	34.21	8.88	2	2009m02	2010m09	

4.3 Regression Estimates

We estimated regression equation (1) and (4) to estimate the effect of macroeconomic innovations on performance of mutual funds. We employed innovations measured with both moving average method and GARCH method. Since variables in interest had structural breaks which we measured with Bai-Perron (2003) test, we applied interaction variables to measure the effect of structural break. The results of regression are provided in Table-5 to Table-8. The comparison of adjusted R2 and information criteria (Akaike information criteria and Bayesian information criteria) provide that results with innovations measured with moving average method are preferred over innovations measured with GARCH method. Further, the results with innovation measured with GARCH method provided that variables have not been statistically significant.

Table 5: Regression coefficient for innovation measured with moving average method

	Min	Q1	Median	Q3	Max	Average
ex_ux	-0.66	-0.36	-0.30	-0.25	-0.15	-0.31
oil_ux	-0.10	-0.06	-0.05	-0.04	-0.02	-0.05
riskpre_ux	-15.32	1.22	5.61	8.82	15.82	4.92
term_ux	6.51	11.48	15.89	18.70	27.64	15.82
int_ux	-7.28	1.12	2.79	4.15	12.08	2.85
index_ux	0.36	0.40	0.42	0.44	0.53	0.42
ip_m_ux	-0.01	0.01	0.03	0.04	0.08	0.03
inf_ux	-7.14	1.23	3.01	4.57	12.21	3.05
term1	-26.59	-16.67	-13.78	-10.06	-0.93	-13.59

	Min	Q1	Median	Q3	Max	Average
term2	-13.36	-7.43	-3.12	0.17	15.96	-3.27
term3	-41.91	-6.66	-0.82	6.04	38.42	-0.25
risk1	-35.25	-20.82	-16.16	-10.96	1.28	-15.88
risk2	-16.92	-8.61	-5.89	-2.06	13.35	-5.44
constant	0.65	1.00	1.14	1.25	2.12	1.14

Table 6: Statistical significance of coefficients for innovations with moving average method

	min t-stat	t<-2.326	-2.326<t<-1.96	-1.96<t<-1.645	-1.645<t<0	0<t<1.645	1.645<t<1.96	1.96<t<2.326	t>2.326	max t-stat
ex_ux	-2.62	4	13	13	25	0	0	0	0	-0.39
oil_ux	-2.30	0	4	10	41	0	0	0	0	-0.32
riskpre_ux	-0.68	0	0	0	11	43	1	0	0	1.66
term_ux	0.49	0	0	0	0	47	5	3	0	2.28
int_ux	-0.78	0	0	0	10	44	1	0	0	1.82
index_ux	5.14	0	0	0	0	0	0	0	55	7.89
ip_m_ux	-0.21	0	0	0	4	51	0	0	0	1.33
inf_ux	-0.75	0	0	0	10	44	1	0	0	1.85
term1	-1.52	0	0	0	53	0	0	0	0	-0.06
term2	-0.80	0	0	0	39	14	0	0	0	0.71
term3	-1.66	0	0	1	28	24	0	0	0	0.70
risk1	-2.51	3	7	13	30	2	0	0	0	0.06
risk2	-1.33	0	0	0	46	7	0	0	0	0.61
Constant	1.43	0	0	0	0	2	5	5	43	4.01

Table 7: Regression coefficients for innovations measured with GARCH method

	Min	Q1	Median	Q3	Max	Average
gexrate	-2.90	-1.69	-1.25	-0.71	2.90	-1.06
goil	-0.60	0.15	0.33	0.46	2.10	0.31
griskpre	-67.77	-4.21	0.79	2.79	9.74	-2.99
gterm	0.64	2.03	2.32	2.58	3.67	2.30
gint	-41.44	0.41	3.49	7.01	16.31	2.47
gindex	0.07	0.26	0.41	0.48	1.34	0.43
giip	-0.39	-0.19	-0.13	-0.08	0.22	-0.12
ginf	-6.60	-4.59	-3.50	-2.47	4.30	-3.32
gindex1	-1.06	-0.52	-0.39	-0.30	-0.15	-0.44
gindex2	-1.50	-0.75	-0.56	-0.42	-0.24	-0.61
grisk1	-8.19	-3.06	-1.79	0.39	42.71	0.96
grisk2	-7.25	0.80	3.25	6.63	65.60	6.74
gterm1	-1.37	-0.63	-0.28	0.07	1.49	-0.18
gterm2	-0.32	0.76	1.08	1.53	3.34	1.21
gex1	-2.71	-0.32	0.03	0.34	1.15	-0.08
gex2	-2.11	0.70	1.05	1.54	2.53	1.03
constant	-7.01	-4.75	-3.62	-2.10	5.34	-3.31

Table 8: Statistical significance of coefficients for innovations with GARCH method

	min t-stat	t<-2.326	-2.326<t<-1.96	-1.96<t<-1.645	-1.645<t<0	0<t<1.645	1.645<t<1.96	1.96<t<2.326	t>2.326	max t-stat
gexrate	-1.27	0	0	0	48	7	0	0	0	1.09
goil	-0.79	0	0	0	8	46	0	1	0	2.10
griskpre	-2.69	2	0	0	22	31	0	0	0	0.65
gterm	0.34	0	0	0	0	50	4	1	0	1.99
gint	-1.24	0	0	0	13	42	0	0	0	1.01
gindex	0.13	0	0	0	0	54	0	1	0	2.07
giip	-1.05	0	0	0	47	8	0	0	0	0.70
ginf	-1.05	0	0	0	53	2	0	0	0	0.40
gindex1	-2.42	1	0	5	47	0	0	0	0	-0.40
gindex2	-1.93	0	0	3	50	0	0	0	0	-0.45
grisk1	-0.71	0	0	0	39	14	0	2	0	2.23
grisk2	-0.53	0	0	0	8	43	0	0	2	2.65
gterm1	-0.74	0	0	0	36	17	0	0	0	0.68
gterm2	-0.10	0	0	0	1	52	0	0	0	0.92
gex1	-1.23	0	0	0	27	28	0	0	0	0.56
gex2	-0.91	0	0	0	5	48	0	0	0	1.25
Constant	-0.88	0	0	0	51	4	0	0	0	0.32

Table 9: Comparison of adjusted R-square and information criteria

		Adjusted R^2	AIC	BIC
		max	min	Min
Moving Average Method	Average	0.48	667.96	707.07
	Preferred no. of funds	55	55	55
GARCH method	Average	0.02	764.16	811.93
	Preferred no. of funds	0	0	0

The regression estimates for innovations measured with moving average method provide that financial risk measured with innovation in stock market index has been statistically significant in all cases. The effect of financial risk is positive on performance of mutual fund. Other than stock market index, innovation in exchange rate and oil prices has been statistically significant. The effect of exchange rate and oil prices has been negative on performance of mutual funds. The interaction variable for default risk premium has been statistically significant and has negative effect on returns on mutual funds. The results provide that one percent increase in unexpected stock market return led to 0.42 percent increase in mutual fund return. Further, one unit increase in unexpected expected rate and oil prices led to 0.31 percent and 0.05 percent decrease in mutual fund returns respectively. The unexpected change in default risk premium during 2005 led to 15.88% decline in mutual fund returns.

Thus we find that innovations in stock market, exchange rate and oil prices affected mutual fund returns. The other issues have been whether mutual funds that predict macroeconomic direction in right direction and change their risk exposure accordingly can provide better returns. We further investigated on this. For this, we obtained regression coefficients which represent the extent of risk exposure from the three-year rolling regression for each month. The first coefficients are obtained for the month 2006m01. Based on cross-sectional beta, we obtained four portfolio based on funds with highest to lowest beta for the period 2006m01-2013m11. We found next month average return for the portfolio based on macroeconomic risk beta. We compared the performance of portfolio with highest risk beta and lowest risk beta with paired t-test. The results are provided in Table-10.

Table 10: Paired t-test for Comparison of Portfolio Return

	Return to lowest coeff. Portfolio	Return to highest coeff. Portfolio	difference	t-stat	p
ex_ux	-0.01	0.11	-0.12	-1.04	0.15
index_ux	0.07	0.01	0.06	0.63	0.27
inf_ux	-0.06	0.16	-0.21	-2.34	0.01
ip_m_ux	0.01	0.13	-0.12	-1.22	0.11
oil_ux	0.12	0.05	0.07	1.08	0.14
int_ux	-0.05	0.15	-0.20	-2.23	0.01
risk_pre_ux	0.02	0.09	-0.07	-0.61	0.27
term_ux	0.04	0.05	-0.01	-0.13	0.44

The results provide that portfolio constructed on the basis on risk exposure to unexpected innovations in inflation rate and real short term interest rate provided significant difference in future returns. The funds with higher risk beta for unexpected inflation and interest rate had higher returns compared to funds with lower risk beta. The difference in returns of portfolio has been 0.22 with innovation in inflation and 0.20 with innovation in real interest rate.

Conclusion

The paper investigates the effect of innovations in macroeconomic variables on mutual fund returns. We have employed eight macroeconomic variables that are, exchange rate, default risk premium, term structure of interest rates, stock market index, inflation rate, real interest rate, oil price index, and industrial production index. We investigated the effect of these macroeconomic variables on a sample of 55 equity mutual funds in India. The time period of the study has been 2003-2013. We have measured the macroeconomic innovations with one year time series average and rolling GARCH (1,1) regression forecast for volatility. The first finding of the paper is that there have been structural breaks in macroeconomic innovations. The time period of structural breaks coincide with recessionary phase of Indian economy. Further, regression with rolling time series average has been preferred over GARCH estimates. The regression results provide that financial risk has been most important for mutual funds. Other than financial risk, shocks in oil prices and exchange rate affect the returns of mutual funds. The study provided that Indian equity mutual funds hedged against other macroeconomic risk during the period. Further, funds with higher three year beta for unexpected inflation and unexpected real interest rate provided significant higher

returns compared to funds that had lower risk exposure. This provided that higher risk was compensated with higher returns.

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Paper No. 22

Possibilities of Foreign Employment Saving Bond for Sustainable Economic Development in Nepal

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Abstract

There is no doubt that remittances income of the developing countries are three times the size of official development assistance and can have profound implications for development and human welfare. It is also a fact that at present 78.9 percent of the remittances is spent on daily consumption. This has given rise to the consumerism. Though, achievement of these Foreign Employment Saving Bond are not encouraging, it could be considered as a bold effort in harnessing remittances and gearing towards productive investments. This paper examines the possibilities of utilizing remittance income for financing the development activities.

Prediction of remittance income and Gross fixed Capital Formation for the year 2014-2020 has been made using quadratic model and availability of remittance income for financing deficits i.e, contribution on GFCF is calculated, based on the that assumption that at least 3 percent remittance will be available.

The result of the analysis is that on an average remittance income can be contribute to GFCF up to 3.25 percent in 2014 and increase up to 3.61 percent in 2020. This shows very high possibilities of financing deficit through Foreign Employment Saving Bond. In this endeavor, government has to overcome the following challenges as a lessons learnt from the previous issuing of the bond. The first would be attracting migrant to participate; the second would be to equip with the regulatory framework and the last would be to define the ways for managing the projects implemented through remittance investment.

JEL Classification: A10, C53, F24

Key words: Foreign Employment Saving Bond, Remittance, Economic development, Migration

1. Development Needs of the Country and Remittances

Financing development is crucial for the sustainable economic development of any country. Optimum utilization of natural resources, technical development, formation of capital and capital market development are the important aspects for economic development of the country. Among these, capital formation is the most important element. The government announces the budget along with the list of developmental project that needs to be financed during the prescribed period. The required expenditure for the projects is met by the government through revenue or from borrowings. It is the regular phenomena of the developing country that every time the government expenditure supersedes its revenue, the situation of deficit of resources may exist. Remittances are increasingly becoming the major contributor in financing the deficit.

The fiscal Deficit in relation to percentage of GDP

(In Rs. 10 millions)

Description	2009/10	2010/11	2011/12	2012/13	2013/14
GDP	119,277.4	136,695.4	152,734.4	169,264.2	192,851.7
Expenditure	25,968.9	29,536.1	33,916.8	35,863.8	51,724.0
Income	21,849.2	24,574.1	28,798.4	33,392.7	42,953.6
Budget Deficits (-)	- 4,119.7	- 4,962.1	- 5,118.4	- 2,471.1	- 8,770.4
Ratio to GDP in Percentage					
Expenditure	21.8	21.6	22.2	21.2	26.8
Income	18.3	18.0	18.9	19.7	22.3
Budget Deficits	3.5	3.6	3.4	1.5	4.5

Source: Central Bureau of Statistics and Financial Comptrollers' General Office

Budget deficit of the Government of Nepal is estimated at Rs. 87.70 billion in FY 2013/14. Such deficit was estimated to be Rs. 63.83 in FY 2012/13 but it was Rs. 4.71 billion only. The budget deficit of the Government of Nepal had increased by 3.2 percent in FY 2011/12 reaching Rs. 51.18 billion, while such deficit has declined by 51.7 percent in FY 2012/13. Budget Deficit in the current fiscal year is likely to rise by 254.9 percent than that of previous fiscal year if the entire budget is fully spent. However, the budget deficit has declined due to the fact that the Government revenue in fiscal years 2011/12 and 2012/13 grew by 17.2 percent and 15.9 percent respectively while government expenditure increased only by 14.8 percent and 5.7 percent in those years respectively. During the fiscal year 2011/12, budget deficit had increased by 20.4 percent against the 17.3 percent decline in its preceding year due to higher growth rate of expenditure than that of revenue (MoF, 2013/14).

The major problems of this sector faced by the nation are: increase in the current expenditure, lack of control of non-budgetary expenditures, very low capital expenditures, lack of effective monitoring and evaluation of government expenditures and lack of effective public expenditure system, and monitoring and reporting tasks.

Nepal has set aim for graduating it to a developing country within 2022. For the purpose, infrastructure development is believed to lay down the foundation. The Country needs at least 30 percent of GDP in capital formation that is infrastructure development projects (Nepal Infrastructure Summit 2014). It is also fact that there is no country in the world which has built and developed infrastructures only through government budget. The role of private sector is vital in this regard.

In 2014 over half a million people went abroad for employment opportunities. This translates to some 1600 foreign job seekers leaving the country every day on an average (DoFE, 2014). A total of Rs 543.29 billion was brought into Nepal as remittance in the fiscal year 2070/71. It was Rs 26

more than the annual budget of Rs 517.24 billion for the fiscal year. The scenario of utilization of remittances earning shows that 78.9 percent of the remittances is spent on daily consumption. Only a minimal 2.4 percent is used on capital formation (CBS, 2014).

Remittances could contribute significantly in building the national economy. It is important to understand that remittances are not a panacea to our structural economic problems. Remittances do not automatically contribute to national development. Private investments whether domestic or foreign, need the right environment and these include investor friendly policies to channel remittances into productive projects.

This study attempts to examine the inflow of remittances which could be used to improve infrastructure, housing and public utilities. For the purpose, the study also analyzes the possibilities of introducing the Foreign Employment Saving Bond as an instrument for financing the fiscal deficits and sustainable economic development.

2. Relationship between the remittances and economic growth

At the macroeconomic level, the flows of remittances have increased the foreign exchange earnings of labor exporting countries. It has also raised the consumption capacity of rural households which might have substantial multiplier effect because they are likely to be spent on domestically produced goods (Ratha, 2003). Migrant remittances impact positively on the balance of payment in many developing countries as well as enhanced economic growth, via their direct implication for saving and investment in human and physical capital and, direct effect through consumption (World Bank, 2008).

On the contrary, an IMF working paper rejected the notion that the remittances can have a role in promoting economic growth or that they are similar to FDI. It concludes that there is no significant impact of remittances on long-term growth, and often it is negative relationship between remittances and growth, when impacts of remittances are properly measured using the specific growth equations (IMF, 2005).

Thus, empirically, the impact of remittances on economic growth in developing economies has remained inconclusive.

The relationship between the remittances and economic growth of the country could be understood by the influence of remittances on the macroeconomic indicators. This study at first tried to explore the relationship of the remittances with the indicators mainly, the GNP, and Gross Fixed Capital Formation (GFCF) before analyzes the possibilities of introducing the Foreign Employment Saving Bond as an instrument for financing the fiscal deficits and sustainable economic development.

For the purpose, two specific hypotheses are formulated to test directional relationships between Remittances (Rem.) and the two independent economic dimensions- GNP and GFCF:

H1. Rem. has a positive influence on GNP.

H2. Rem. has a positive influence on GFCF.

In the theory of the economics, it could be stated that remittance has influenced on other two variables the GNP and GFCF with positive impact. Following equations were constructed to run ordinary least square method to examine the relationships of 'Rem.' with the other two variables, with the time series data of 24 years (1990 - 2013). See Annex 1.

$$GFCF = \beta 1 + \beta 2\ Rem. + Ui \quad \text{..... (i)}$$

$$GNP = \beta 1 + \beta 2\ Rem. + + \beta 3\ GFCF + Ui \quad \text{..... (ii)}$$

Test of hypothesis one (relation between the remittances and GNP) shows that with the increase of 1.0 percent of remittances the GNP has been increasing at the rate of 1.42 per year. This growth rate is statistically significant for the estimated 't' value of above 2.45. The intercept value is 31042.25. This shows that remittance is not only the sole determinants of growth rate of GNP. The test of the residuals declares that there is no such autocorrelation in the model as the p-value is more than 5 percent level of significance. So, there is no violation of autocorrelation assumption this multiple regression model.

Similarly, the result of test of hypothesis two (relation between the remittances and GFCF) shows that with the increase of 1.0 percent of remittances the GFCF has its coefficient value of 0.38 and 't' value of 2.56. In this situation we can say that the relationship of remittance and GFCF is statistically significant. Further to that the tested R2 value of 0.98 means that 98% of the variation in GFCF is explained by remittances. However, other factors also influence GFCF. This is why the analysis gives the result of correlated GFCF and remittance.

Based on the empirical tests it could be concluded that there is no violation of assumptions. Thus, it is assumed that remittance is an important determinant for the GNP and GFCF. See Annex 2

3. Existing situation of Foreign Employment Saving Bond

In the budget for FY 09/10, the Government of Nepal (GoN) announced that it will be raising NRs. 7 billion by selling "Infrastructure Development Bonds" – which name was later changed to "Foreign Employment Saving Bond"- to Nepali workers working in 5 countries (namely, Saudi Arabia, Qatar, UAE, South Korea and Malaysia). The government was planning to use the fund raised from the issuance of such bonds for infrastructure development of the country.

Later, in the Three Year Plan Approach Paper (2010/11 - 2012/13) of the National Planning Commission has envisaged the sustainable economic development of the nation through creating and availing the opportunities for investing in productive sector and utilizing remittances for poverty reduction. For the purpose, government had planned to issue Foreign Employment Saving Bond to make foundation for the priority sectors and create investment friendly environment.

Responding to the plan, in June 2010, Nepal Rastra Bank on the behalf of the GoN, floated "Foreign Employment Saving Bond" worth Rs. 1 billion for the first time. Nepali workers working in South Korea, Qatar, Saudi Arabia, UAE, and Malaysia could buy the bond from one of seven licensed money transfer operators in denominations of Rs. 5,000 (the then about $65). But the fund raised was nowhere near target (Only Rs. 4 millions).

Perhaps this failure was due to lack of publicity and a short period of sale. Little marketing was done before the issuance of bonds (only for two weeks), there wasn't enough time to generate wide interest. A second reason was limited targeting. Migrants in India (the largest destination of

Nepali migrants) were not allowed to buy these bonds. Also excluded were Nepali migrants in the OECD countries that generally have higher incomes than migrants in the Gulf countries and Malaysia. A third reason was financial, not withstanding patriotism and home bias. The interest rate offered on the bond was not attractive to potential buyers. This local currency diasporas bond had an interest rate of 9.75% and a maturity of 5 years. Commercial banks in Nepal were offering up to 13% on 5-year fixed deposits. Finally, money transfer agencies that sold the bonds received a 0.25% commission on the sale but had to forgo money transfer fees. It is possible that they did not have the right incentives to promote the bonds over remittance transfers. (Ratha and Silwal, 2011)

Nepal Rastra Bank has floated six round of Foreign Employment Saving Bond. The status till date is as follows:

S. No.	Name	Issue Date	Maturity Date	Amount Offered	Amount Sold	Interest Rate	Term
1	FESB 2015	16/07/ 2010	16/07/2015	Rs. 1 bil.	Rs. 4.00 mil.	9.75%	5 Year
2	FESB 2016	26/06/ 2011	26/06/ 2016	Rs. 5 bil.	Rs. 3.38 mil	10.50%	5 Year
3	FESB 2017	12/07/ 2012	12/07/ 2017	Rs. 1 bil.	Rs.8.66 mil.	10%	5 Year
4	FESB 2018	14/07/ 2013	14/07/ 2018	Rs. 1 bil.	Rs. 42.85 mil.	10.50%	5 Year
5	FESB 2018 A	12/01/ 2014	12/01/ 2019	Rs. 250 mil.	Rs. 26.40 mil	9.00%	5 Year
6	FESB 2018 B	17/03/ 2014	17/03/ 2019	Rs. 250 mil.	Rs.50.01 mil.	9.00%	5 Year
				Total Sold	135.3 mil.		

Source: Nepal Rastra Bank, website

The above table shows that average achievement of the Foreign Employment Saving Bond sold against bond offered is 6.03 percent. Whereas the average interest rate of the bond is 9.79 percent.

4. Methodology

4.1 Data Sources

This paper is based on secondary sources of information. The timeline data regarding remittances, GNP, and, GFCF are collected from the authentic government publications.

The principal sources of data for the present study are the following:

- Time line data on remittances are collected from Quarterly Economic Bulletin, Vol. 48, Mid-July 2014, No. 4.

- Time line data on GNP and GFCF are collected from various publications of Central Bureau of Statistics and Financial Comptrollers' General Office.

4.2 Data collection Period

Timeline data of 24 years (1990 - 2013) was taken as a reference for predicting the contribution of remittance on GFCF and GNP for economic development.

4.3 Prediction Procedures

For exploring the possibilities of financing budget deficit through remittance income, the first step was making the assumption of availing approximately 3.0 percent of the remittance income for the economic development of the nation. This assumption has been made based on the followings:

- In the year 2010/011, Nepal Rastra Bank floated Foreign Employment Saving Bond worth Rs. 5.0 billions, which is 2.3 percent of the total Remittance income for the year 2009/10. Thus, taking it as a basis, this study assumed that approximately 3 percent of the forecasted remittance income will be available for the economic development of the country;

- It is also assumed that approximately 3 percent of the remittance income had contributed in the development efforts (GFCF) of the country during 2000/01-2012/13; and

- It is further assumed that the similar trend will prevail, while estimating the contribution of future availability of annual remittance income (approximately 3 percent) in the economic development (forecasted GFCF) from 2013/14 to 2019/20.

The second step in the prediction procedure was the analysis of significance of forecasting the employment of remittances income in the national economy. For the purpose indexes were constructed combining following individual leading indicators into single time series for avoiding random fluctuation in each individual series. Composite indices and diffusion indices were constructed for measuring the weighted average of individual indicators, and to measure the proportion of individual time series that increase from year to year respectively, to improve the accuracy of forecasting.

Both indices (Annex 3) suggest that future prediction remittance income (@ 3 percent) for utilizing in productive sector as a part of country's GFCF will be significant for economic growth of the nation.

The third step after the indices has been derived; attempt is being made to project the possible growth of the remittance, and GFCF for the year 2014 till 2020. Available of remittance income for financing budget deficit is regressed against year, as a time-predictor with two statistical models- simple regression model and quadratic model to identify the fitness of the model for prediction.

The ANOVA table in annex 4 reports a significant F statistic. More than 90 percent of the variation in available remittances is explained by the model. The time period -Year has a positive significant effect on available remittances. Both the models have good fit. But we use appropriate model such that one has more predictive power. When we compare the standard error of the estimate for the both model, the quadratic model has smaller std. error than the simple regression model. And the quadratic model has a slightly positive impact of the square of Year, term, on remittances availability when their standardized beta coefficients are compared.

Besides that diagnostic tests were conducted to specify the predictability of the preferred model - the quadratic model.

Multi-collinearity

This is a simple regression model of remittance income for economic development on Year2. So, there is no question of collinearity in the model.

Autocorrelation

Durbin-Watson d statistic of 2.308 lies above du, suggesting that there is no evidence of positive first-order serial correlation. So, there is no violation of autocorrelation assumption this simple regression model.

Heterioscedasticity

Spearman's rank correlation test is applied to indentify the presence of Heterioscedasticity in the model. This test is performed between the residuals and its one-period lag residual. It is hypothesized that there is no correlation between them. From the test, we have, r = -0.227, df = 9, p-value = 0.502. This p-value reveals that there is no significant correlation between them. So, it is concluded that there is no violation of Heterioscedasticity assumption in the model.

Normality

The Kolmogorov-Smirnov, a non-parametric test is applied to identify that the residuals did not depart from normality. From the analysis, it is observed that Kolmogorov-Smirnov Z=0.764 and p-value=0.604. The p-value shows that the residuals have a normality nature for remittance income for economic development and Year2.

Thus comparatively, quadratic model preferred for the prediction purpose.

5. Findings

Using quadratic model Remittances and Gross Fixed Capital Formation for the years 2014 to 2020 has been predicted. The prediction uses the annual data of Remittances and Gross Fixed Capital Formation obtained from Nepal Rastra Bank which starts from 2001 and ends to 2013. The reason behind the span of dataset chosen is the compilation of Balance of Payments statistics to version five from 2001 in Nepal which revises the compiling procedure and the coverage of remittance data so that historical series is fragmented. All the figures are in billion Nepali Rupees. The predicted values are tabulated below.

Prediction of remittance income and Gross Fixed Capital Formation for the year 2014 - 2020 and contribution of 3% remittance

S.N.	Year	Remittances in billion Rs.	Gross Fixed Capital Formation in billion Rs.	3% Remittances in billion Rs.	Possible contribution of Remittances on GFCF (%)
1	2001	9.798	78.03	0.294	0.377
2	2002	14.860	81.61	0.447	0.548
3	2003	41.630	86.96	1.248	1.435
4	2004	56.630	98.03	1.698	1.732
5	2005	61.785	117.54	1.854	1.577
6	2006	92.749	135.53	2.781	2.052

S.N.	Year	Remittances in billion Rs.	Gross Fixed Capital Formation in billion Rs.	3% Remittances in billion Rs.	Possible contribution of Remittances on GFCF (%)
7	2007	107.417	153.34	3.222	2.101
8	2008	139.422	178.45	4.182	2.344
9	2009	194.216	211.04	5.826	2.761
10	2010	213.999	264.89	6.420	2.424
11	2011	225.909	292.73	6.777	2.315
12	2012	333.367	317.18	10.002	3.153
13	2013	432.721	382.15	12.981	3.397
14	2014	472.390	435.75	14.171	3.252
15	2015	554.129	497.84	16.624	3.339
16	2016	644.737	566.62	19.342	3.414
17	2017	744.666	642.45	22.340	3.477
18	2018	854.365	725.70	25.630	3.532
19	2019	974.286	816.72	29.228	3.579
20	2020	1104.881	915.88	33.146	3.619

In the above table the prediction of remittance income and Gross fixed Capital Formation for the year 2014 is Rs 472.390 billion and Rs. 435.75 billion respectively at 95% confidence. In the similar fashion, the values of remittances and GFCF are predicted for upcoming years till 2020. Based on the assumption of 3 percent remittance availability financing deficits, its contribution on GFCF is calculated. On an average it is observed that it can be contribute to GFCF up to 3.25 percent in 2014 and increase up to 3.61 percent in 2020. And, it seemed to be increasing as the remittance income increases in the future or in the upcoming years.

6. Conclusion

There is no doubt that remittances income of the developing countries are three times the size of official development assistance and can have profound implications for development and human welfare. Remittances can contribute to lower poverty and to the building up of human and financial capital for the poor. A study found that in countries where remittances mark up five percent or more of GDP on average 10 percent rise in remittances leads to a reduction of 3.9 percent in the poverty headcount ratio (World Bank, 2010).

Efforts have been made to develop remittance income as a financing instrument for national development purposes. It has been realized that diaspora bonds can be a powerful financial instrument for mobilizing diaspora savings to finance specific public and private sector projects, as well as to help improve the debt profile of the country. It is high time that governments adopt strategies for investing surplus remittance for economic development.

There is ongoing argument that the growing trade and current account deficits and fiscal deficit are a result of mismanagement and wrong economic policies pursued and pose a serious threat to macroeconomic stability and future growth. On the other hand the government supporters believe that there is nothing to worry about because these deficits can be financed at present.

Deficits, by themselves, are not necessarily undesirable. What it simply is that the domestic savings of a country are not enough to meet its investment requirements. In this case, policy makers have two choices – either they limit investment to the exact level of domestic savings or borrow it. Such investments can be financed by foreign as well as domestic savings. Reliability on foreign finance has always been controversial because it leaves to devastating crises if foreign leading suddenly

dries up. It could be discussed that mobilization of foreign borrowings to augment their domestic savings and achieve a higher rate of economic growth.

Data shows that Nepal is one of the few countries that received remittances income more that 25 percent of its GDP. On the other hand it is also a fact that at present 78.9 percent of the remittances is spent on daily consumption. This has given rise to the consumerism.

But, country's conscious effort can harness these remittances to create programs, projects and schemes geared towards productive investments, which, could be channeled towards economic and social development. Perhaps, the consecutive issuance of Foreign Employment Saving Bond in Nepal could be considered bold effort in this endeavor.

Though, achievement of these Foreign Employment Saving Bond are not encouraging in terms of migrants participation, certain lessons could be derived to utilize it as a domestic investment for economic development of the nation. The first would be attracting migrant to participate; the second would be to equip with the regulatory framework and the last would be to define the ways for managing the projects implemented through remittance investment.

Mere issuing of the Bond may not ensure necessary participation of the migrant workers unless they are provided necessary information and other incentives for investment. The primary gap in evidence regarding remittances' development impact is lack of research supporting their positive impact on economic growth. In general, the inconclusive results of the impact of remittances in economic growth are largely due to difficulty of separating the cause from the effect.

Migrant investors may be specially, interested in specific projects like financing infrastructure, housing, health and education where they can visualize themselves as a part of the project, rather than vaguely investing in productive sector and utilizing remittances for poverty reduction. Thus, in order to attract migrant to participate in the Foreign Employment Saving Bond, investors would be interested to have information regarding the project where the remittance income is being invested.

Perhaps the most critical aspect for the success of Foreign Employment Saving Bond as an instrument for economic development of the nation is the regulatory framework. The regulatory framework will fundamentally affect the capacity of the public entity to attract migrant investors (private) and to create effective sustainable arrangements. From the migrant investor's perspective, an effective regulatory framework will create investment incentives and a predictable investment environment, and for the public sector, it enables the government in decision-making and to regulate private investor's performance.

For sustainability of Foreign Employment Saving Bond for economic development, it is essential to use appropriate principles and mechanisms to get there. This requires a system of monitoring, reporting and reviewing to ensure the actions and improvements required to achieve these aims continue to be implemented.

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Annex 1

Time line data for empirical Analysis

S.N.	Fiscal Year	Remittances in billion Rs.	GDP by Exp. (at current prices) in billion Rs.	Gross fixed capital formation in billion Rs.	GNP (at current prices) in billion Rs.
1	1988 - 1989	0.6	89.3	16.4	90.8
2	1989 - 1990	0.7	103.4	17.0	105.4
3	1990 - 1991	0.5	120.4	22.8	122.5
4	1991 - 1992	0.4	149.5	29.3	152.2
5	1992 - 1993	0.5	171.5	37.3	174.7

S.N.	Fiscal Year	Remittances in billion Rs.	GDP by Exp. (at current prices) in billion Rs.	Gross fixed capital formation in billion Rs.	GNP (at current prices) in billion Rs.
6	1993 - 1994	0.2	199.3	42.0	203.1
7	1994 - 1995	2.9	219.2	48.4	224.0
8	1995 - 1996	2.7	248.9	56.1	252.5
9	1996 - 1997	2.9	280.5	60.8	285.2
10	1997 - 1998	4.1	300.8	65.4	306.9
11	1998 - 1999	6.5	342.0	65.3	352.9
12	1999 - 2000	6.0	379.5	73.3	392.6
13	2000 -2001	9.8	441.4	78.0	443.3
14	2001 -2002	14.9	459.4	81.6	458.8
15	2002-2003	41.6	492.2	87.0	491.6
16	2003-2004	56.6	536.8	98.0	535.1
17	2004-2005	61.8	589.4	117.5	591.1
18	2005-2006	92.7	654.1	135.5	659.0
19	2006-2007	107.4	727.8	153.3	735.3
20	2007-2008	139.4	815.7	178.4	823.6
21	2008-2009	194.2	988.3	211.0	1000.0
22	2009-2010	214.0	1192.8	264.9	1201.9
23	2010-2011	225.9	1367.0	292.7	1382.5
24	2011-2012	333.4	1527.3	317.2	1550.8
25	2012-2013	432.7	1692.6	382.2	1709.0

Annex 2

Result of Analysis

Dependent Variable: GNP

Method: Least Squares

Date: 12/26/14 Time: 13:47

Sample (adjusted): 1990 2013

Included observations: 24 after adjustments

Convergence achieved after 48 iterations

Variable Coefficient Std. Error t-Statistic Prob.

REM	1.428871	0.582924	2.451211	0.0231
C	31042.25	1399620.	0.022179	0.9825
AR(1)	0.998642	0.061782	16.16399	0.0000

R-squared	0.990976	Mean dependent var	589.7500
Adjusted R-squared	0.990117	S.D. dependent var	464.4337
S.E. of regression	46.17136	Akaike info criterion	10.61906
Sum squared resid	44767.68	Schwarz criterion	10.76632
Log likelihood	-124.4288	Hannan-Quinn criter.	10.65813
F-statistic	1153.090	Durbin-Watson stat	0.827326
Prob(F-statistic)	0.000000		

Inverted AR Roots 1.00

Dependent Variable: GFC

Method: Least Squares

Date: 12/26/14 Time: 13:41

Sample (adjusted): 1990 2013

Included observations: 24 after adjustments

Convergence achieved after 80 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REM	0.382685	0.149394	2.561585	0.0182
C	13699.71	1860282.	0.007364	0.9942
AR(1)	0.999388	0.083495	11.96948	0.0000

R-squared	0.986402	Mean dependent var	121.4583
Adjusted R-squared	0.985106	S.D. dependent var	101.7970
S.E. of regression	12.42322	Akaike info criterion	7.993481

Sum squared resid	3241.065	Schwarz criterion	8.140737
Log likelihood	-92.92177	Hannan-Quinn criter.	8.032548
F-statistic	761.6463	Durbin-Watson stat	1.815249
Prob (F-statistic)	0.000000		
Inverted AR Roots	1.00		

Annex 3

Three leading Indicators of Remittances and Gross Fixed Capital Formation

(Rs. In billion)

Year	Leading Indicator I	Leading Indicator II	Leading Indicator III
	Remittance Income	Gross Fixed Capital Formation	Available of Remittance income for Economic Development (based on 3.0 percent utilization)
2000/01	9.798	78.03	0.294
2001/02	14.860	81.61	0.447
2002/03	41.630	86.96	1.248
2003/04	56.630	98.03	1.698
2004/05	61.785	117.54	1.854
2005/06	92.749	135.53	2.781
2006/07	107.417	153.34	3.222
2007/08	139.422	178.45	4.182
2008/09	194.216	211.04	5.826
2009/10	213.999	264.89	6.420
2010/11	225.909	292.73	6.777
2011/12	333.367	317.18	10.002

Source: Economic Bulletin, 2013, NRB

Construction of Composite and Diffusion Indices

Year	Composite Index	Diffusion Index
2000/01	100	-
2001/02	131	66.7
2002/03	310	66.7
2003/04	413	100
2004/05	453	100
2005/06	666	100
2006/07	778	100
2007/08	1012	100
2008/09	1408	100
2009/10	1562	100
2010/11	1712	100
2011/12	2500	100

Annex 4

Available of Remittance income for Economic Development of the Country		
	Simple Regression Model	Quadratic Model
Adjusted-R2	.914	.975
F	117.499	433.361
P for F	.000	.000
Standard error of the estimate	899.98	482.622
Beta (β1) (First degree of Year)	0.960	-
Unstandardized Coefficient, (First degree of Year)	815.798	
P for t	.000	.000
Unstandardized Coefficient, (Second degree of Year)		62.914
Durbin-Watson d	d=1.019. For n=12, k=1 and α=.05, dl=.971 and du=1.331	2.308. For n=12, k=1 and α=.05, dl=.971 and du=1.331
Runs test for residuals for randomness (No autocorrelation)		
Spearman's rank correlation test for Heterioscedasticity	Rho=.500, n=11, p-value (2-tailed)=.117	Rho=-.227, n=11, p-value (2-tailed)=.502
Kolmogorov-Smirnov Test	Z=0.615 and p-value=0.844	Z=0.764 and p-value=0.604

Paper No. 23

Re-investigation of Credit Risk and Performance Relationship: Panel Data Analysis of Islamic Banks in Pakistan

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Abstract

This study aims to evaluate Azam & Ghauri (2012) study {presented at ICSS-12 at Qatar University, Doha in December 2012} on the investigation of relationship of credit risk with performance of Pakistani Islamic banks. This is to evaluate with the inclusion of macro variables, to the bank specific variables, with an objective to recognize any development in this relationship. Forty three quarterly observations of full-fledged Islamic banks operating in Pakistan from June 2002 to December 2012 are analyzed. The value of non-performing financing and total financing is taken as the dependent variable for credit risk (CR), while the value of before tax profit to gross assets is employed as the dependent variable for performance (PER) measures. It is expected that the inclusion of Inflation (CPI), broad money (M2) and rate of return (RR) macro variables will improve the relationship.

Keywords: Islamic Banking, Pakistan, Credit Risk, Performance, Relationship, SUR, Panel data

1.1. Introduction

Financial system of a country plays crucial role in the mobilization of savings and their allocation to the most productive uses. Islamic finance has proven conceptually difficult especially for money management, even though Islamic banking is exposed to many risks similar to conventional banking. Tariqullah and Habib (2001) identified that credit risk has greatest importance among all the risks faced by the Islamic banks. The authors further elaborated that, credit risk is the cause of 80 percent bank failures that helps stipulate credit risk as the main risk that Islamic banks face in operations. Gup et al (2007) supported this study and identified that, credit risk is the most viable risk affecting banks' performance. And performance of financial institution depends on how it manages its credit portfolios to reduce credit risk.

For decades, researchers and academicians have analyzed the link between risk and performance of Islamic banks and focused mostly on the descriptive rather than quantitative and qualitative aspects of credit risk and performance relationship. As such, there found a gap in the literature on this important subject, specifically in the case of Islamic banks in Pakistan. Azam & Ghauri (2012) tried to fill out this gap in the literature with a comprehensive quantitative and qualitative analysis of credit risk and performance relationship of Islamic banks in Pakistan.

1.2. Statement of the Problem

For more than two decades, researchers like, Ross, 1994; Sabi, 1996; Khan, 1998; Hassan, 1999; Samad and Hassan, 1999; Tariqullah and Habib, 2001; Usmani, 2002; Elgari, 2003; Fatemi and Fooladi, 2006; Gup et al, 2007; Afsheen, 2010; Ahmed et al, 2011 and Alkhatib 2012, are used to analyzing credit risk and performance of Islamic banks in different ways of which studies on Pakistan are mostly based on descriptive statistics and covered limited areas. For instance, Usmani (2002) compared the financial performance of two Islamic and two conventional banks in Pakistan, which is based on the analysis of size of bank deposits. Afsheen and Nasr (2010) studied the risk management practices and risk involved in the return on investment of portfolio. Khan (1998) introduced the concept of performance auditing and showed how Islamic banks in Pakistan can use it to their advantage.

Contrary to this, studies on analysis of credit risk and performance relationship of banks in countries other than Pakistan comprised econometric analysis. For example, Samuel et al (2012), revealed the relationship between profitability and credit risk of some selected banks in Ghana.

Azam & Ghauri (2012) tried to investigate the link between credit risk and performance of specific factors of full-fledged Islamic banks operating in Pakistan. Problem arises when audience of the conference objected on non-inclusion of Macro Variables in the models. Taking into account the feedback received during the paper presentation to the intellectuals of ICCS-12 Islamic countries conference at Qatar University, Doha on 22nd December 2012, this study decides to incorporate their suggestions to see any developments in the relationship, and addresses the points raised by the chair, rapporteur (chairman of the conference) and the intellectuals attended the conference. Though it was clearly explained to the audience during the presentation that the paper has focused mainly on the bank specific variables, they suggested including macro variables to encompass another output of the study. Their feedback is therefore, given weightage to observe any progress in the relationship between performance and credit risk. Resultantly, the study tries to re-investigate the relationship of bank specific variables of credit risk and performance of Islamic banks in Pakistan with macro variables; Inflation (CPI), M2 and Rate of Return (RR) with objective to solve the problem identified in the above discussions, and devises following research questions.

1.3. Research Questions

1. What relationship exists between the performance and the credit risk of Islamic banks in Pakistan after inclusion of macro variables in the study?
2. Do bank specific and macro variables influence credit risk of Islamic banks in Pakistan?
3. Do macro and bank specific variables influence Pakistani Islamic banks' performance?

1.4. Objectives of Research

The main objective of the study is to re-investigate the changes in the correlation linking credit risk and performance of banks under study after the inclusion of macro variables. The attention will also be geared towards the following specific objectives.

a- What bank specific and macro variables affect credit risk of Islamic banks in Pakistan?
b- What bank specific and macro variables affect performance of these banks?

The scope of the study is confined to the analyses of association amid credit risk and performance of Pakistani full-fledged Islamic banks. Since, this study does not cover market, operational, liquidity and capital risks, the findings of this study should be viewed as an evidence of influence of bank specific and macro-economic variables' on credit risk and performance of Pakistani Islamic banks and extent of their nexus. This study is limited only to secondary data acquired from the

Islamic banks' quarterly reports of full-fledged Islamic banks rather than to all financial institutions in Pakistan. The study analyses only quarterly data because annual data has very short time series which is not enough for the analysis while, Islamic banks in Pakistan do not publish their monthly data.

1.5. Pakistan Financial Sector

The sector includes the State Bank of Pakistan, Commercial Banks and a mix of Non-Bank Financial Institutions that comprise Microfinance Banks (MFBs), Development Financial Institutions (DFIs), housing finance companies, Investment Banks, Mudarabah and mutual funds, leasing companies, brokerage houses and insurance companies.

Table 1: Structure of Pakistan Financial Sector as on 30th December, 2012

(Billion Rs.)

	Numbers	Assets	Advances-net	Investments-net
Banks:	38	8,652.8	3,573.4	3,275.3
Public Sector	5	1,618.0	768.6	335.1
Specialized	4	155.3	97.9	14.7
Islamic	5	560.0	420.0	199.3
Local Private	17	6,637.3	2,62.5	2,697.1
Foreign	7	241.8	63.7	90.8
NBFIs1:	235	600.7	131.6	182.3
State-owned	16	174.5	67.3	77.2
Private	219	426.2	64.3	105.1
CDNS:	1	1,888.5	-	-
Equity Markets	3	3,000.5	-	-
Total:	272	12,627.4	3,480.4	2,324.1

Source: State Bank of Pakistan

1.5.1 Pakistan's Islamic banking industry

In Pakistan, elimination of Riba started during 1970s but most of the significant and practical steps were taken in the 1980s. It was re-introduce in Pakistan and re-launched in 2001 as a parallel and compatible system to conventional system.

Table 2: Islamic Banking Industry in Pakistan as on 31st December 2012

Type	Name of Bank	# Branches
Islamic Banks	Al Baraka Islamic Bank	87
	BankIslami Pakistan Limited	71
	Dawood Islamic Bank Limited	42
	Dubai Islamic Bank Pakistan Limited	91
	Meezan Bank Limited	301
	Sub Total	**592**

Islamic Branches of Conventional	At present 13 conventional banks (including Foreign Banks)have Islamic branches	308
Sub Branches	Two Conventional & five Islamic Banks (except Al Baraka bank) have sub branches	48
	Grand Total	**948**

Source: State Bank of Pakistan

1.5.2 Islamic banks in Pakistan

Pakistan has five full-fledged Islamic banks and 17 conventional banks, operating dedicated Islamic banking branches as at the end of June 2012. The branch network of IBIs has increased to 948 branches in December 2012. The total assets of Islamic banking institutions (IBIs) increased to Rs 711 billion in December 2012 showing a growth of 8.2%.

Table 3: Pakistan Islamic Financial Industry Progress (Billion Rupees)

Period	Nos.	Branches	Assets	Deposits	Financing
December, 2012	5	948	711	603	543
June, 2011	5	799	560	452	420
Growth in %	0	18.7%	8.2%	8.9%	7.9%

Source: State Bank of Pakistan

2.1 Literature Review

This chapter reviews the literature on the analysis of credit risk, performance and link between credit risk and performance of Islamic banks. We focused on the credit risk models, performance measurement tools and methods used by the authors to identify link of credit risk with performance of Pakistani Islamic banks.

2.1.1 Studies on Credit Risk Analysis

Morokoff (2011) measured the performance of market-based credit risk models by evaluating them in different periods. The result showed that, financing structures and several bank specific variables have a significant relationship with credit risk. Pejman et al (2011) examined risk and stability of Islamic banking using. The results suggest that Islamic banks write-off credits more frequently than conventional banks.

Siddiqui and Shoaib (2011) discovered the agency cost hypothesis of Pakistani banking sector and found that, banks' size and consumer banking played important part in profit efficiency. Afsheen and Nasr (2010) investigated the risk management practices in Pakistan and found a general understanding about risk and its management among staff of commercial bank.

Lee and Yu (2010) anticipated the GMM estimation in eliminating fixed effects to begin with. This study is found useful in applying SUR model on panel data to analyze Islamic banks in Pakistan.

McNeil et al (2005) found that, lending activities in traditional banking system is considered as a credit risk business, however, the lending operations have been replaced with investment and

partnership contracts in Islamic banking system. Ahmad and Hayati (2003) inspected the factors affecting credit risk of banks in Malaysia. The study found that, the efficiency in managing the risky assets is crucial to reduce credit risk. Sundararajan and Errico (2002) examined the PLS modes and found that they may shift the direct credit risk of Islamic banks to their investment depositors. Berger and DeYoung (1997) analysed Islamic banks in USA and found that lagged risk-weighted asset found positively related to credit risk. They rationalized that a relatively risky loan portfolio will result in higher NPLs.

2.1.2 Studies on Performance Analysis

Rashidah and Tumin (2011) investigated the impact of bank-specific factors on their performance. The impact is measured by return on average assets and return on average equity. Ashraf and Rehman (2010) examined the Islamic and conventional banking system's performance, and found that banking performance of Islamic banks is less effective due to inefficiency of management. Awan (2009) revealed that Islamic banks outperform conventional banks in assets, deposits, financing, investments, efficiency, and quality of services and recovery of loans. Moin (2008) found that Meezan Bank Limited is less profitable, more solvent, and also less efficient comparing to the average of the 5 conventional banks in Pakistan.

Kuppusamy et al (2010) measured Islamic banks performance using a Shari'ah conformity and profitability model (SCnP). The findings indicated that the banks under study have shown a massive growth in credit facilities and in profitability. Sufyan (2010) analyzed the performance of Malaysia Islamic banks and found that credit risk exhibits negative relationship with Malaysian Islamic banks' profitability. Tahir (2009) observed that bank performance is related to internal and external factors. Study found that the performance measures represented return on equity (ROE), return on assets (ROA) and return on deposits (ROD) from balance sheets.

Rashid & Nishat (2009) recognized unique banking system and found poor performance of Islamic banks in Bangladesh. Saleh and Zeitun (2007) examined the Jordanian experience with Islamic banking and in particular the experience for Jordan Islamic bank for finance and investment and found that the efficiency and ability of both banks had increased and both had expanded their investment and activities and played an important role in financing projects in Jordan. Tobias and Themba (2011) assessed the effects of bank-specific factors; Asset quality, Capital adequacy, operational cost efficiency, liquidity, and income diversification on the profitability of commercial banks in Kenya. The results showed that all the bank specific factors had a statistically significant impact on profitability. Seref Turen (1996) investigated that Islamic banking performance and stability and found that the profit sharing concept of Islamic banking can achieve a higher profitability and lower risk than conventional banks.

2.1.3 Studies on relationship between credit risk and performance

Wan Ibrahim et al (2011) analyzed panel data to examine the interrelationship among the disclosure, the risk and the performance. The results indicated that leverage and profit were statistically significant in determining disclosure. Hassan (2011) examined to which extent, Islamic and conventional banks use risk management practices in the Middle-East region. The results showed that, there was a positive relationship between risk management, risk identification, risk management practices and understanding risk, risk assessment, risk monitoring, and credit risk analysis in Islamic banks and Conventional banks. Pooja and Balwinder (2009) explained the current state of Internet banking in India and discussed its implications for the Indian banking industry. Srairi (2009) examined the impact of bank characteristics, macroeconomic indicators and financial structure on the profitability of banks operating in the Gulf. Empirical results showed that the profitability of both conventional and Islamic banks was affected mainly by three variables: capital adequacy, credit risk and operational efficiency. Tafri et al (2009) scrutinized the connection between financial risks and profitability of the conventional and Islamic banks in Malaysia. The

relationship between interest rate risk and ROE found weak for the conventional banks and insignificant for the Islamic banks. Elitza Mileva (2007) examined the impact of capital flows on investment and found that lagged regressors are poor instruments for the first-differenced regressors.

Naveed et al (2010) determined the firm's level factors that significantly influenced the risk management practices of Islamic banks in Pakistan. The results indicate that size of Islamic banks have a positive and statistically significant relationship with credit risks.

Summarising the studies, it is found that few researchers analysing credit risk management system and few on the Pakistani banks performance. At present, we do not find even a single study that analyses credit risk, performance and link between performance and credit risk of Islamic banks in Pakistan. Our study is unique in a way that it fills out this gap in the literature on Islamic banks in Pakistan.

3.1 Research Methodology and Data

Nine bank specific variables each for credit risk and performance analysis and three macro-economic variables are used in three groups for the investigation of bank credit risk and performance relationship. The first group consists of nine bank specific credit risk variables and three macro-economic variables. The second group consists of nine bank specific performance variables and three macro-economic variables. And third group comprises the key identified variables from bank specific variables and macro-economic variables. Performance and credit risk are taken as exogenous variables.

This study analyses the relationship between performance and credit risks using Seemingly Unrelated Regression (SUR) model. At first phase, it analyses what bank specific and macro factors influencing credit risk of Islamic banks in Pakistan. Secondly, it analyses what bank specific and macro factors influencing performance of Islamic banks. And finally, using the specific factors identified in phase-1 and phas-2, it investigates the relationship between performance and credit risks.

3.1.1 Estimation of Panel Data

We consider first the model estimation that satisfies the zero conditional mean assumption for OLS regression. This rule out endogeneity of the regressors and the presence of lagged dependent variables. The model for panel data, the fixed effect estimator, addresses the issue that no matter how many individual-specific factors one may include in the regressors list, there may be unobserved heterogeneity in a pooled OLS model. This generally causes OLS estimates biased and inconsistent. Given longitudinal data (x, y), each element of which has two subscripts, the identifier 'i' and the time't'. Ignoring the nature of the panel data, the model is viewed as overly restrictive and has a very complicated error process for instance, heteroscedasticity across panel units, serial correlation within panel units and so forth. Consequently, pooled OLS solution is not often considered to be practical.

A technique applied to panel having small N, large T, is the method of Seemingly Unrelated Regression (SUR). The small N, large T setting refers to the notion that we have a relatively small number of panel units (here number of Islamic banks) with a lengthy time series (here number of quarters). As discussed earlier, we have unbalanced panel data; it would be wise to use most suitable models for the analysis. Another literature review to identify the suitable model found that SUR model is perfect for the analysis.

3.1.2 Seemingly Unrelated Regression Model

Arnold Zellner (1962) suggested an alternative method to analyze panel data, the SUR estimation. The basic idea is that, error terms of different equations are correlated amongst each other and same number of explanatory variables in each equation, not necessarily same. GLS method is applied in this model to utilize the association in the errors. SUR model is used for panel with small N and large T.

We analyze the variables of six Islamic banks over the 43 quarters. The SUR technique requirement is that, the number of time periods should not below the number of cross-sectional units. This type of correlation would arise when omitted variables are common to all equations. The method is appropriate only if the errors are generated by a true multivariate distribution. The two main motivations for SUR use comprise gaining efficiency in the estimation of different equations.

Im-Pesaran-Shin unit root test is carried out to test the stationary of the data. The data is diagnosed by applying LM test to identify presences of any serial correlation. To ensure that the coefficients are heteroskedastic or not, the study used White (1980) procedure.

Model-01: Credit Risk Analysis

Following regression model is used for the analysis.

$$Crit=\alpha 0+\alpha 1Meit+\alpha 2Lvit+\alpha 3Rlit+\alpha 4Rcit+\alpha 5LPit+\alpha 6Fcit+\alpha 7Rwit+\alpha 8Tait+\alpha 9Ldit+Infit+M2fit+Rrit+eit$$

Where, α 0 is constant, α 1 to α 9 are coefficients for the bank 'i' in time t.

Crit = Credit Risk = non-performing loan to total loan

Meit = Management efficiency = earning assets to total assets

Lvit = Leverage = tier 2 capital to tier 1 capital

Rlit = Risky sector loan exposure = risky sector loans to total loans where

Rcit = Regulatory capital = tier 1 capital to total assets

Lpit = Loan loss provision = loan loss provision/total loans

Fcit = Funding cost = non-interest expenses to total assets

Rwit = Risk weighted assets under Basel II

Tait = natural logarithm of total assets

Ldit = Proportion of Loan to deposit = total loans to total deposits

Infit = Inflation for time t

M2it = Broad money for time t

Rrit = Rate of return for time t

Negative relationship is expected of Crit with management efficiency, natural logarithm of total assets and regulatory capital. Details of other variables expected relationships are given in annex.

Model-02: Performance Analysis

Performance of a bank in terms of earnings and profitability reflects its ability to support present and future operations. More specifically, this determines the capacity to absorb losses by building an adequate capital base, finance its expansion and pay adequate dividends to its shareholders. Evaluating bank performance is a complex process that involves assessing interaction between the environment, internal operations and external activities. Financial management theories provide various indexes for measuring a bank's performance. One of them is accounting ratios. The uses of the financial ratios are quite common in the literature.

Performance measures are highly correlated with ROA, ROE and NIM that can be used concurrently with the conventional accounting ratios in determining Islamic banks performance. ROA and ROE are the indicators of measuring managerial efficiency [Ross (1994), Sabi (1996), Hassan (1999) and Samad and Hassan (1999)]. ROA is net earnings per unit of a given asset. It shows how a bank can convert its asset into net earnings. The higher ratio indicates higher ability and therefore is an indicator of better performance. Similarly, ROE is net earnings per rupee equity capital. The higher ratio is an indicator of higher managerial performance. We analyze the key factors influencing performance of Islamic Banks with the help of following regression model.

$$Perit = \beta0+\beta1ROAit+\beta2ROEit+\beta3NetLTAit+\beta4COSRit+\beta5LdADSFit+\beta6NLDBit$$

$$+\beta7EQTAi+\beta8EQNetLit+ \beta9IMLGL+Infit+M2fit+Rrit +eit$$

Where, Perit is the measure of performance (either non-interest margin or before tax profit margin), for the bank 'i' in time't' and β0 is constant, β1 to β9 are coefficients. To run the model, from both Asset & Liabilities and Income statements, we calculate following financial ratios.

ROAit = Net Income to Total Assets

ROEit = Net Income to Total Equity

NIMit = Net Interest Margin to Earning Assets

NetLTAit = Net Loans to Total Assets

COSRit = Cost to Income

LdADSFit = Liquid Assets to Total Deposits

NLDBit = Net Loans to Deposits & Borrowings

EQTAit = Equity to Total Assets

EQNetLit = Equity to Net Loan

IMLGLit = Total Impaired Loans to Gross Loan

Infit = Inflation for time t

M2it = Broad money for time t

Rrit = Rate of return for time t

ROA shows how competent the management is in allocating asset into profit, it is a good indicator of bank's financial performance. The higher the ROA, the higher is the financial performance of the banks. ROA has a positive impact on bank performance. ROE is net earnings per equity capital and its higher ratio indicates higher managerial performance. The higher the ROE, the more efficient is the performance of banks. ROE also has a positive impact on ban performance. Details of other variables expected relationships are given in annex.

Model-03: Credit Risk-Performance Relationship Analysis

The study expects that banks with better credit risk have lower loan losses (non-performing loans). The study uses performance (bank specific and macro variables) as proxy for credit risk management indicator. Accordingly, the study has the following hypothesis:

1. Banks with higher Performance (bank specific and macro variables) have lower loan losses

2. Banks with higher interest income also have lower bad loans (NPLs).

   Thus the hypothesis to be tested using following model:

$$Per = \alpha + \beta\ NPL/TL + \mu$$

Where Per is performance, NPL denotes non-performing loan, TL denotes total loan, α is the intercept, β is the parameter of explanatory variables and μ represents disturbance term. We replicate this model to identify relationship between credit risk and performance of Islamic banks in Pakistan and model can be written as:

$$Per = \alpha + \beta\ Cr + w$$

Where Cr denotes credit risk and 'w' represents disturbance term.

3.2 Underpinning theories

This study is conducted against the backdrop of theories developed by Markowitz (1952) diversification theory, Sharpe (1963) Capital Asset pricing theory, Diamond (1984) financial intermediation, and Palia and porter (2007) the agency theory. The models comprise financial ratios based on financial theory. The selection of bank specific variables, nine variables each for the analysis of credit risk and performance are based on these theories.

3.3 Stationarity

Stationarity in a random variable implies that its statistical characteristics do not change with time. If the variables in the regression model are not stationary, then it

Table 3.1 : Im-Pesaran-Shin Unit Root Tests

Variables	t-bar	t-tilde-bar	z-t-tilde-bar	Prob.
ME-	-2.0609	-1.9027	-1.3414	0.0899
LV-	-1.9500	-1.8329	-1.1278	0.1297
RL-	-2.0606	-1.9689	-1.5439	0.0613
RC-	-0.3225	-0.3183	-3.5073	0.9998
LP-	-1.3705	-1.3162	-0.4534	0.6749
FC-	-2.2057	-2.0017	-1.6444	0.0500
RW-	-1.5630	-1.4967	-0.0989	0.4606
TA-	-1.1983	-1.1452	-0.9768	0.8357
LD-	-2.5707	-2.1680	-2.1531	0.0157
ROA-	-3.5769	-2.9044	-4.6141	0.0000
ROE-	-3.0357	-2.6326	-3.7645	0.0001
NIM-	-3.5569	-2.9372	-4.7166	0.0000
NetLTA-	-1.8096	-1.7094	-9.8785	0.1898
COSR-	-2.2300	-1.8925	-1.4514	0.0733
LDADSF-	-10.3212	-3.4104	-6.1955	0.0000
NetLDB-	-3.8418	-3.5806	-3.6020	0.0002
EQTA-	-3.4928	-2.5755	-3.5861	0.0002
EQNL-	-6.5306	-3.0298	-5.0061	0.0000
IMLGL-	-1.7257	-1.6012	-0.5408	0.2943
M2	-1.0987	-1.1232	-0.8709	0.0009
CPI	-2.1324	-2.0012	-3.5607	0.0087
RR	-1.8704	-3.4512	-2.9827	0.0006
Asymptotic : T, N > Infinity sequentially ;				
Fixed-N exact critical value at 1% -2.280 ; at 5% -2.060 ; at 10% -1.950				
H0 : Panel contains Unit Root H1 : Some panels are stationary				
Number of panels = 6 ; Number of periods = 41				

Can be proven that the standard assumptions for the analysis will not be valid. The most famous test for unbalanced pan l data is Im-Pesaran-Shin Unit Root Tests. Above table 3.1 presents Unit Root Test results. It shows that all values except 'Rc' are larger than fixed-N exact critical values. This shows that the null hypothesis is rejected at 1%, 5% and 10% significance level. The test can be repeated to determine order of the series. If the series is non-stationary at first difference, the test can be repeated on a second difference of the series (Enders, 2004). Both models of credit risk and performance are found of I (1) order.

4.1 Empirical Analysis and Results

The main purpose of the research is to re-investigate the link of performance with credit risk of Islamic banks operating in Pakistan. For this, first we identify, what bank specific factors and macroeconomic variables influence performance and credit risk of these banks. We then use the identified bank specific and macroeconomic variables to investigate the relationship between performance and credit risk. The study uses SUR models for both analyses.

4.1.1 Findings of previous study

Table 6 reports the empirical results of the investigation of bank specific variables that influence credit risk of Islamic banks. Out of nine variables analyzed to see their impact on credit risk, five are found consistent with expected signs and statistical significance. They are Me, Lp, Rw, Ta and Ld. Among them, Rw and Ta have week impact on credit risk as compared to Me, Lp and Ld. Me has 95 percent inverse impact, while Ld 86 percent and Lp 95 percent direct impact on it.

Table-07 reports the empirical findings of the investigation of bank specific variables that influence performance of Islamic banks. Out of nine variables analyzed to see their impact on performance, five are found consistent with expected signs and probability. They are ROA, ROE, Netlta, Ldadsf and NetLDB. Among them, Ldadsf and ROA have week significance on credit risk as compared to ROE, Netlta and NetLDB. ROA has 8 percent direct impact; Ldadsf has 1 percent inverse impact, while ROE, Netlta and NetLDB have 11 percent, 3.0 percent and 1.0 percent direct impact on Islamic banks' performance.

Finally, we investigated the relationship between the finalized five performance's bank specific variables with credit risk. The study investigated the relationship of ROA, ROE, Netlta, Ldadsf and Netldb (performance variables) with Me, Rw, Ta, Lp and Ld (Credit Risk variables). Table 8 represents the empirical results as discussed below:

The results of relationship investigation of credit risk with ROA show that, Rw has 0.6 per cent inverse relationship with ROA. Contrary to this, Ta (0.3%) and Me (3.0%) direct relationship with ROA and showed week significance with dependent variable. These findings help us understand that if Islamic banks in Pakistan succeed in reducing their Rw and improve their assets and management efficiency, their performance will improve.

The investigation of relationship of credit risk with ROE shows that, Rw (4.0%) and Ld (1.0%) have inverse relationship with ROE. Contrary to this, Ta has 19 per cent direct relationship with ROE. These findings help us understand that if Islamic banks in Pakistan succeed in reducing their Rw and Ld and improve their assets, they will improve their performance.

Similar relationship investigation of credit risk with Netlta shows that, Rw (3.0%) and Lp (1.0%) have inverse relationship with Netlta. Contrary to this, Me has 47 per cent direct relationship with Netlta. These findings help us understand that Islamic banks in Pakistan can improve their performance if they reduce their Rw, Lp and improve their Me.

Alike investigation of credit risk to Netldb shows that, Rw (2.0%) and Lp (1.0%) have inverse relationship with Netldb. Contrary to this, though Me has week significance with dependent variable, it has 48 per cent direct relationship with Netldb. These findings help us understand that Islamic banks in Pakistan can improve their performance if they reduce their Rw and Lp and improve their managerial skills.

Correspondingly, the investigation credit risk relationship with Ldadsf depicts that, Lp (15%) and Ld (4.0%) have cent per cent inverse relationship with Ldadsf. Conversely, Me has 75 per cent direct relationship with Ldadsf. Further, all independent variables are statistically significant with Ldadsf. These findings help us understand that if Islamic banks in Pakistan succeed in reducing their Lp and Ld and improve further their Me, they will certainly improve their performance.

The investigative analysis of relationship of five bank specific variables of credit risk with five bank specific variables of performance reveals that Rw has strong inverse relationship, whereas Lp and Ld have moderate inverse relationship with performance of Islamic banks in Pakistan. Conversely, Me and Ta have shown direct relationship with performance. Bank managers may improve performance of their banks if they closely observe the behavior of these variables. Improvement of bank performance, is therefore, depends on the reduction of Rw, Lp and Ld. Better management of assets certainly will help improve efficiency, and consequently improve performance of all full-fledged Islamic banks.

Table 9 reports the empirical results of robust tests. A reverse relationship of five bank specific variables of credit risk with performance is investigated to test the robustness of analyses. Similar results are seen when the study investigated the relationship of Me, Rw, Ta, Lp and Ld (Credit Risk variables)with ROA, ROE, Netlta, Ldadsf and Netldb (Performance variables). Results divulge that credit risk of banks can be managed efficiently, if banks improve their ROA, ROE and Netlta. The reduction in the ratio of financing to deposits and borrowing will also help control credit risk of Islamic banks.

4.1.1 Findings of the current study

Table 10 reports the empirical results of the investigation of macro variables that influence credit risk of Islamic banks. All macro variables (M2, CPI and RR) are regressed to see their relationship with five variables of credit risk (Me, Lp, Rw, Ta and Ld) that were consistent with expected signs of coefficients and were statistical significant. Among them, M2 has weak relationship with all credit risk variables compared to CPI and RR. M2 has inverse impact, while CPI and RR have direct impact on all variables of credit risk.

Table 11 reports the empirical findings of the investigation of macro variables that influence performance of Islamic banks. All three macro variables (M2, CPI and RR) are analyzed to see their relationship with five variables of performance (ROA, ROE, Netlta, Ldadsf and NetLDB) that were consistent with expected signs and statistical significant. Among them, M2 has weak and inverse relationship with all performance variables as compared to CPI and RR. CPI has 2 percent to 20 percent direct impact as well as RR has 1percent to 8 percent direct impact on the Islamic banks' performance.

Finally, we investigated the relationship between the finalized five bank specific performance and credit risk variables, after inclusion of three macro variables in the model. The study investigated the relationship of ROA, ROE, Netlta, Ldadsf and Netldb (performance variables) with Me, Rw, Ta, Lp and Ld (Credit Risk variables) and M2, CPI and RR (macro variables). Table 12 represents the changes in the empirical results as discussed below:

Slight changes were seen in the results of relationship investigation of credit risk with ROA which shows that, Rw has 6 per cent inverse relationship with ROA. Contrary to this, Ta (0.3%) and Me (3.0%) direct relationship with ROA and showed week significance with dependent variable. These findings help us understand that if Islamic banks in Pakistan succeed in reducing their Rw and improve their assets and management efficiency, their performance will improve.

Similarly, minor changes were seen in the results of relationship of credit risk with ROE which shows that, Rw (4.0%) and Ld (3.0%) have inverse relationship with ROE. Contrary to this, Ta

has 8 percent direct relationship with ROE. These findings help us understand that, if Islamic banks in Pakistan succeed in reducing their Rw and Ld and improve their assets, they will improve their financial performance.

Furthermore, relationship investigation of credit risk with Netlta shows that, Rw (5.0%) and Lp (2.0%) have inverse relationship with Netlta. Contrary to this, Me has 8 per cent direct relationship with Netlta. These findings help us understand that Islamic banks in Pakistan can improve their performance if they reduce their Rw, Lp and improve management efficiency.

Alike investigation of credit risk link with Netldb shows that, Rw (2.0%) and Lp (7.0%) have inverse relationship with Netldb. Contrary to this, though Me has strong significance with dependent variable, it has 48 per cent direct relationship with Netldb. These findings help us understand that Islamic banks in Pakistan can improve their performance if they reduce their Rw and Lp and improve their managerial skills.

Likewise, the investigation credit risk relationship with Ldadsf depicts that, Lp (15%) and Ld (39.0%) have cent per cent inverse relationship with Ldadsf. Conversely, Me has 53 percent direct relationship with Ldadsf. Further, all independent variables are statistically significant with Ldadsf. These findings help us understand that if Islamic banks in Pakistan succeed in reducing their Lp and Ld and improve further their earning assets, they will certainly improve their performance.

The investigative analysis of relationship of five bank specific variables of credit risk with five bank specific variables of performance after inclusion of three macro variables revealed that Rw has strong inverse relationship, whereas Lp and Ld have moderate inverse relationship with performance of Islamic banks in Pakistan. Conversely, Me and Ta have shown direct relationship with performance. Bank managers may improve performance of their banks if they closely observe the behavior of these variables. Improvement of bank performance, is therefore, depends on the reduction of Rw, Lp and Ld. Better management of assets certainly will help improve efficiency, and consequently improve performance of all full-fledged Islamic banks.

Table 13 reports the empirical results of robust tests. A reverse relationship of five bank specific variables of credit risk with five bank specific variables of performance, after inclusion of three macro variables, is examined to test the robustness of the analyses. Similar results are seen when relationships of credit risk variables with performance variables are investigated. Results divulge that credit risk of banks can be managed efficiently, if banks want to improve their ROA, ROE and Netlta. The reduction in the ratio of financing to deposits and borrowing will also help control credit risk of Islamic banks.

4.2 Conclusion and Recommendations

This study investigated the relationship between macro variables, bank specific credit risk and performance variables of all Islamic banks in Pakistan operating over the period 2002-2012. Having quarterly unbalanced panel data, the study used Seemingly Unrelated Regression (SUR) models to examine relationship between macro variables, identified bank specific variables that affect credit risk and performance of banks. Investigations revealed that, five bank specific variables of credit risk have consistent relationship with bank performance. The results supported the statement that 'the credit risk is negatively related to bank performance.

Interesting and expected results from the study showed that credit risk specific variables have inverse relationship with performance. The investigative analysis of relationship of five bank specific variables of credit risk with performance reveals that Lp and Ld have moderate whereas Rw has strong inverse relationship with Pakistani Islamic banks performance. Further, 'Me' and 'Ta' have shown direct relationship with performance. Conclusively, the above results do not support

recent study conducted by Samuel et al (2012), who conclude that performance has positive relationship with credit risk of banks, rather confirms the findings of authors (Berger and DeYoung 1997, Bashir 1999, and Tafri et al 2009) which hold the views that credit risk does not improve performance. Bank managers are recommended to closely observe the behavior of variables discussed above to improve performance of their banks. Further, reduction of Rw, Lp and Ld will also help them Improve their bank performance. Same study is recommended to analyze Islamic banks operating in south Asian countries.

Inclusion of macro variables gave improved results of the relationship between performance and credit risk. One cannot deny the significance of the active part of macro variables for the performance of banks. Despite that, as it is also discussed above, macro variables are uncontrollable and cannot be managed, this study advises to drop macro variables from such analysis to have a real picture of impact of bank specific variables on credit risk and performance of banks. The reason behind this advice is that, bank specific variables are controllable and important for the investigation of correlation between performance and credit risk of Islamic banks.

This study recommends to replicate this exercise by broaden the coverage of Islamic banks from Pakistan to South East Asian countries. This may help develop appropriate policies help regulate Islamic banks in managing their credit risk and profitability.

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Annexure

Table 4: Variables Description

Category	Variables	Description/Calculation
Bank Specific Credit Risk Variables	ME-	It has been abbreviated for Management efficiency which is the percent ratio of earning assets to total assets.
	LV-	It is used for Leverage, while leverage is the ratio of tier 2 capital to tier 1 capital.
	RL-	It is Risky sector loan exposure and obtained as a ratio of risky sector loans (property loans, purchase of securities loans, and consumption credit loans) to total loans.
	RC-	It is Regulatory capital comprising ratio of tier 1 capital to total assets.
	LP-	It is symbolized for Loan loss provision that is the ratio of loan loss provision to total loans.
	FC-	It stands for Funding cost that is obtained by calculating a ratio of non-interest expenses to total assets.
	RW-	It is Risk Weighted assets under Basel II, and calculation based on the riskiness of a bank's assets.
	TA-	It stands for total assets and we have taken its natural logarithm.
	LD-	It represents proportion of loan to deposit while it is calculated by taking ratio of total loans to total deposits.
Bank Specific Perform	ROA-	It stands for Return on Assets which is the ratio of Net Income to Total Assets.

Category	Variables	Description/Calculation
	ROE-	It stands for Return on Equity which is the ratio of Net Income to Total Equity.
	NetLTA-	It is the ratio of Net Loans to Total Assets. Net loan is net of loans from its provisions.
	COSR-	It is a ratio of Cost to Income. The cost/income ratio is an efficiency measure similar to operating margin.
	LDADSF-	It is a ratio of Liquid Assets (asset must be readily negotiable and convertible into cash) to Total Deposits.
	Netldb-	It is a ratio of Net Loans to Deposits & Borrowings (amount of money a lender loans to a company/individual).
	EQTA-	It is a ratio of Equity to Total Assets. Equity is the value of stockholders' ownership interest in a corporation after all claims have been paid, and thus a claim on its assets in proportion to the number, and class, of shares owned.
	EQNL-	It is a ratio of Equity to Net Loan.
	IMLGL-	It is a ratio of Total Impaired Loans (loans to agribusiness, firms involved in the production and transmission of energy, residential and housing finances, credit cards and auto loans) to Gross Loan.
Macro Variables	M2-	M2 includes currency in circulation and demand deposits. M2 represents M1 and "close substitutes" for M1. It is a broader classification of money than M1. M2 is a key economic indicator used to forecast inflation.
	CPI-	It is a measure that examines the weighted average of prices of a basket of consumer goods and services. The CPI is calculated by taking price changes for each item in the basket. Sometimes referred to as "headline inflation."
	RR-	The gain or loss on an investment over a specified period, expressed as a percentage increase over the initial investment cost. Gains on investments are considered to be any income received from the security plus realized capital gains.

Table 5: Descriptive Statistics

Variables	Mean	Standard Deviation	Minimum	Maximum
CR-	-2.67334	2.42381	-11.97666	0.22171
ME-	-0.14430	0.16771	-0.72950	0.85302
LV-	-3.29925	2.53990	-10.98652	0.00420
RL-	-1.47933	1.76283	-8.03960	0.61586

Variables	Mean	Standard Deviation	Minimum	Maximum
RC-	-1.15683	1.01172	-2.99606	0.18143
LP-	-2.96430	2.58117	-12.48748	0.08340
FC-	-1.85670	1.89250	-7.40483	2.72173
RW-	-0.20545	1.16539	-1.15688	9.91656
TA-	6.89291	4.73060	0.00000	12.31892
LD-	-0.30205	0.43323	-2.25532	0.56808
ROA-	0.03775	0.02714	-0.01526	0.10243
ROE-	0.29629	0.34068	-0.11197	2.04931
NIM-	-0.13204	2.12354	-11.03266	15.90723
NetLTA-	0.45082	0.15571	-0.00438	0.71050
COSR-	2.05353	2.65437	0.64385	14.90493
LDADSF-	0.51790	0.61002	0.11574	5.43927
Netldb-	0.62998	0.29270	-0.00496	2.55166
EQTA-	0.23922	0.21825	0.04998	0.95843
EQNL-	0.70365	1.17138	0.14326	8.02368
IMLGL-	0.28828	0.38815	0.00000	1.79108
Per-	-0.00097	0.01411	-0.07577	0.02608
M2 (Rs.	4.3	1.8	1.8	7.6
CPI	134.6	20.7	104.9	176.5
RR	70.7	13.4	57.4	94.4

Table 6: Finalized Bank Specific Variables of Credit Risk

Variables	Coef.	Std. Err.	Z	P>|z|	[95% Conf. Interval]	
Const	0.01091	0.095808	0.11	0.9090	-0.17687	0.1986942
ME-	-0.95347	0.864286	-1.10	0.2700	-2.64744	0.7404974
LP-	0.86047	0.039805	21.62	0.0000	0.782451	0.9384856
RW-	-0.00398	0.018318	-0.22	0.8280	-0.03988	0.0319198
TA-	0.02884	0.093005	0.31	0.7560	-0.15344	0.2111335
LD-	0.78719	0.159471	4.94	0.0000	0.474633	1.099749

Table 7: Finalized Bank Specific Variables of Performance

Variables	Coef.	Std. Err.	Z	P>|z|	[95% Conf. Interval]	
Const	-0.02133	0.004135	-5.16	0.0000	-0.02944	-0.01323
ROA-	0.08060	0.06035	1.34	0.1820	-0.03768	0.1988893
ROE-	0.01138	0.005009	2.27	0.0230	0.001568	0.0212041
NetIta	0.03338	0.010456	3.19	0.0010	0.01289	0.0538764
LDASF-	-0.00744	0.006237	-1.19	0.2330	-0.01966	0.0047869
Netldb-	0.00711	0.003354	2.12	0.0340	0.00054	0.0136862

Table 8: Relationship of Credit Risk with Performance of Islamic banks

Variables	Sign	Coef.	Std. Err.	z	P>|z|	[95% Conf. interval]	
Panel A : ROA as Dependent Variable							
Const	?	0.007141	0.027038	0.26	0.7920	-0.04585	0.0601354
ME-	+	0.029902	0.025784	1.16	0.2460	-0.02063	0.0804378
RW-	-	-0.006292	0.002866	-2.20	0.0280	-0.01191	-0.000676
TA-	+	0.003489	0.00242	1.44	0.1490	-0.00125	0.0082315
Panel B : ROE as Dependent Variable							
Const	?	-1.647732	0.235781	-6.99	0.0000	-2.10985	-1.185606
RW-	-	-0.040582	0.017297	-2.35	0.0190	-0.0744	8 -.0066753
TA-	+	0.191957	0.024072	7.97	0.0000	0.144776	6 .239138
LD-	-	-0.013383	0.054843	-0.24	0.8070	-0.12087	5 .0941063
Panel C : NetIta as Dependent Variable							
Const	?	0.505167	0.029991	16.84	0.0000	0.446385	0.5639484

ME-	+	0.475806	0.155727	3.06	0.0020	0.170587	0.7810252
RW-	-	-0.033123	0.016403	-2.02	0.0430	-0.06527	-0.0009757
LP-	-	-0.008272	0.007366	-1.12	0.2620	-0.02271	0.0061672
Panel D : Netldb as Dependent Variable							
Const	?	0.382066	0.052019	7.34	0.0000	0.280111	0.4840211
ME-	+	0.478662	0.270104	1.77	0.0760	-0.05073	1.008056
RW-	-	-0.020242	0.02845	-0.71	0.4770	-0.076	0.0355257
LP-	-	-0.079352	0.012776	-6.21	0.0000	-0.10439	-0.0543118
Panel E : Ldadsf as Dependent Variable							
Const	?	-0.150414	0.10766	-1.40	0.1620	-0.36142	0.0606011
ME-	+	0.749212	0.308025	2.43	0.0150	0.145494	1.352931
LP-	-	-0.149092	0.024587	-6.06	0.0000	-0.19728	-0.1008979
LD-	-	-0.414813	0.09587	-4.33	0.0000	-0.60271	-0.2269088

Table 9: Relationship of Performance with Credit Risk of Islamic banks

Variables	**Sign**	**Coef.**	**Std. Err.**	**z**	**P>|z|**	**[95% Conf. interval]**	
Panel F : ME as Dependent Variable							
Const	?	-0.316925	0.0412674	-7.68	0.0000	-0.397808	-0.236042
ROE-	+	0.0218524	0.0367687	0.59	0.5520	-0.050213	0.0939178
NETLTA-	+	0.2227239	0.0804474	2.77	0.0060	0.06505	0.3803979
Panel G : LP as Dependent Variable							

Const	?	-3.385525	0.5025656	-6.74	0.0000	-4.370535	-2.400514
NETLTA-	-	-0.617347	0.9485397	-0.65	0.5150	-2.476451	1.241756
LDADSF-	-	-1.257121	0.2421202	-5.19	0.0000	-1.731668	-0.782574
Panel H : RW as Dependent Variable							
Const	?	0.0594322	0.2166712	0.27	0.7840	-0.365236	0.4840999
ROA-	-	-8.0912132	6.2834	-1.29	0.1980	-20.40088	4.229492
ROE-	-	-0.0621457	0.5023	-0.11	0.9110	-1.040667	0.9283533
LDADSF-	-	-0.0707442	0.1767893	-0.40	0.6890	-0.417245	0.2757567
Panel I : TA as Dependent Variable							
Const	?	9.580494	0.0830501	115.36	0.0000	9.417718	9.743269
ROE-	+	1.528843	0.1842534	8.30	0.0000	1.167713	1.889973
Panel J : LD as Dependent Variable							
Const	?	-0.967304	0.0610166	-15.85	0.0000	-1.086894	-0.847713
ROE-	-	-0.136536	0.0655304	-2.08	0.0370	-0.264973	-0.008099
LDADSF-	-	-0.473024	0.0387077	-12.22	0.0000	-0.548889	-0.397158
NETLDB-	+	1.290632	0.0837732	15.41	0.0000	1.126437	1.454822

Table 10: Relationship of Macro Variables with Credit Risk of Islamic banks

Variables	Sign	Coef.	Std. Err.	z	P>|z|	[95% Conf. interval]	
Panel K : ME as Dependent Variable							
Const	?	-0.210224	0.014264	-6.72	0.0003	-0.277512	-0.204036
M2-	-	-0.012475	0.062145	0.78	0.4257	-0.063123	0.034124
CPI-	+	0.132124	0.071742	2.35	0.0012	0.056141	0.70323
RR-	+	0.215427	0.025872	1.98	0.0027	0.061245	0.310213
Panel L : LP as Dependent Variable							
Const	?	-2.157214	0.303318	-5.52	0.0003	-3.262574	-2.014541
M2-	-	-0.527336	0.843725	-0.74	0.0210	-2.356214	0.153427
CPI-	+	2.012121	0.202925	-4.95	0.0004	-2.836821	-0.955587
Panel M : RW as Dependent Variable							
Const	?	0.069278	0.261257	0.29	0.8540	-0.625421	0.441245
M2-	-	-4.151245	7.751421	-2.15	0.1885	-5.006452	1.924572
CPI-	+	0.215214	0.721257	-0.19	0.7121	-1.754212	0.522463
RR-	+	0.060454	0.167183	-0.27	0.7025	-0.312521	0.210215
Panel N : TA as Dependent Variable							
Const	?	6.844522	0.173051	15.65	0.0015	7.707018	8.049124
M2-	-	-1.235872	0.148455	9.53	0.0018	1.123542	1.713258
RR-	+	0.121458	0.219803	8.58	0.0012	0.562321	1.024512

Variables	Sign	Coef.	Std. Err.	z	P>|z|	[95% Conf. interval]	
Panel O : LD as Dependent Variable							
Const	?	-0.845785	0.071524	-16.59	0.0013	-1.895214	-0.487325
M2-	-	-0.162514	0.075481	-1.87	0.0065	-0.213508	-0.019585
CPI-	+	0.552647	0.048282	-2.77	0.0085	-0.649021	-0.572552
RR-	+	1.368723	0.097853	5.58	0.0027	1.235757	1.582529

Table 11: Relationship of Macro variables with Performance of Islamic banks

Variables	Sign	Coef.	Std. Err.	z	P>|z|	[95% Conf. interval]	
Panel P : ROA as Dependent Variable							
Const	?	0.024014	0.075039	0.35	0.0025	-0.151862	0.521425
M2-	-	-0.030285	0.050785	1.64	0.0027	-0.042382	0.107085
CPI-	+	0.052284	0.035877	-2.57	0.0051	-0.081951	-0.011676
RR-	+	0.053972	0.072482	1.57	0.0110	-0.09125	0.0982315
Panel Q : ROE as Dependent Variable							
Const	?	-1.64773	0.235781	-6.99	0.0000	-2.109854	-1.185606
M2-	-	-0.050821	0.027254	-1.55	0.0072	-0.047485	0.077542
CPI-	+	0.201996	0.043029	6.78	0.0009	0.174759	0.293321
RR-	+	0.012358	0.046498	-0.28	0.0078	-0.110827	0.046535
Panel R : NetIta as Dependent Variable							

Variables	Sign	Coef.	Std. Err.	z	P>|z|	[95% Conf. interval]	
Const	?	0.505167	0.029991	16.84	0.0000	0.446385	0.5639484
M2-	-	-0.475806	0.155727	3.06	0.0020	0.170587	0.7810252
CPI-	+	0.03312	0.016403	-2.02	0.0430	-0.06527	-0.000975
RR-	+	0.00827	0.007366	-1.12	0.2620	-0.02271	0.0061672
Panel S : Netldb as Dependent Variable							
Const	?	0.382066	0.052019	7.34	0.0000	0.280111	0.4840211
M2-	-	-0.478662	0.270104	1.77	0.0760	-0.05073	1.008056
CPI-	+	0.02024	0.02845	-0.71	0.4770	-0.076	0.0355257
RR-	+	0.07935	0.012776	-6.21	0.0000	-0.10439	-0.054311
Panel T : Ldadsf as Dependent Variable							
Const	?	-0.15041	0.10766	-1.40	0.1620	-0.36142	0.0606011
M2-	-	-0.749212	0.308025	2.43	0.0150	0.145494	1.352931
CPI-	+	0.14909	0.024587	-6.06	0.0000	-0.19728	-0.100897
RR-	+	0.41481	0.09587	-4.33	0.0000	-0.60271	-0.226908

Table 12: Changes in Relationship results of Credit Risk with Performance of Islamic banks after inclusion of Macro Variables

Variables	Sign	Coef.	Std. Err.	z	P>|z|	[95% Conf. interval]	
Panel AM : ROA as Dependent Variable							
Const	?	0.011742	0.030035	0.21	0.0029	-0.055445	0.071145
ME-	+	0.030802	0.027245	1.05	0.0009	-0.071035	0.084325
RW-	-	-0.061227	0.002866	-2.20	0.0280	-0.071915	-0.000555

Variables	Sign	Coef.	Std. Err.	z	P>|z|	[95% Conf. interval]	
TA-	+	0.003489	0.00242	1.44	0.1490	-0.00125	0.0082315
Panel BM : ROE as Dependent Variable							
Const	?	-1.767432	0.315825	-6.52	0.0099	-2.018552	-1.055214
RW-	-	-0.04058	0.017297	-2.35	0.0093	-0.052758	-0.003668
TA-	+	0.075272	0.024072	5.72	0.0085	0.041476	0.239138
LD-	-	-0.032378	0.045857	-0.47	0.9752	-0.210524	0.041263
Panel CM : NetIta as Dependent Variable							
Const	?	0.750185	0.030905	6.47	0.0035	0.468702	0.834755
ME-	+	0.078705	0.170428	5.62	0.0031	0.057875	0.678273
RW-	-	-0.051224	0.014356	-1.98	0.033	-0.050231	-0.019551
LP-	-	-0.017075	0.070354	-1.25	0.026	-0.021918	0.002785
Panel DM : NetIdb as Dependent Variable							
Const	?	0.382066	0.052019	7.34	0.0000	0.280111	0.4840211
ME-	+	0.478662	0.270104	1.77	0.0060	-0.05073	1.008056
RW-	-	-0.02024	0.02845	-0.71	0.0073	-0.076542	0.0355257
LP-	-	-0.065354	0.022706	-4.27	0.0056	-0.104392	-0.014258
Panel EM : Ldadsf as Dependent Variable							
Const	?	-0.075489	0.167865	-1.52	0.0029	-0.162895	0.077621
ME-	+	0.529278	0.298572	2.35	0.0015	0.159546	1.053018
LP-	-	-0.150519	0.025725	-5.12	0.0021	-0.172272	-0.090781

Variables	**Sign**	**Coef.**	**Std. Err.**	**z**	**P>|z|**	**[95% Conf. interval]**	
LD-	-	-0.390851	0.085678	-3.45	0.0017	-0.58257	-0.262981

Table 13: Change in Relationship results of Performance with

Credit Risk of Islamic banks after inclusion of Macro Variables

Variables	Sign	Coef.	Std. Err.	Z	P>|z|	[95% Conf. interval]	
Panel FM : ME as Dependent Variable							
Const	?	-0.360294	0.039246	-6.57	0.0008	-0.390824	-0.034025
ROE-	+	0.025821	0.037807	1.63	0.0025	-0.061235	0.035927
NETLTA-	+	0.307297	0.084421	2.52	0.0032	0.052108	0.310292
Panel GM : LP as Dependent Variable							
Const	?	-3.392154	0.492151	-7.48	0.0054	-4.075735	-2.501152
NETLTA-	-	-0.727375	0.845537	-3.61	0.0015	-2.506053	1.157053
LDADSF-	-	-1.275157	0.225178	-6.13	0.0021	-1.853603	-0.727782
Panel HM : RW as Dependent Variable							
Const	?	0.060987	0.226708	0.32	0.0039	-0.353575	0.499123
ROA-	-	-7.120295	5.521857	-1.33	0.0042	-8.970758	0.090425
ROE-	-	-0.758109	0.425038	-0.19	0.0010	-1.006789	0.023557
LDADSF-	-	-0.065457	0.178796	-0.35	0.0015	-0.071742	0.050732

Variables	Sign	Coef.	Std. Err.	z	P>|z|	[95% Conf. interval]	
Panel IM : TA as Dependent Variable							
Const	?	9.670485	0.078055	17.68	0.0000	9.107102	9.769858
ROE-	+	1.627735	0.1752345	16.47	0.0000	1.170735	1.779675
Panel JM : LD as Dependent Variable							
Const	?	-0.878899	0.066655	-14.57	0.0000	-1.089556	-0.887785
ROE-	-	-0.140567	0.056357	-12.52	0.0000	-0.247578	-0.089243
LDADSF-	-	-0.483258	0.037976	-11.98	0.0000	-0.675895	-0.379166
NETLDB-	+	1.396035	0.087358	12.43	0.0000	1.106512	1.503252

Paper No. 24

Analyzing the Determinants of Rural Poverty and Human Deprivation in Western Development Region of Nepal

Arjun Kumar Thapa*

Abstract

Poverty, especially in rural parts of developing countries like Nepal persists despite decades of development efforts. This study intends to analyze the major determinants of rural poverty. The study depends on cross sectional data generated by randomly selecting 279 households from a Village Development Committee (VDC) of six districts of Western Development Region of Nepal via two stage sampling method. As per this study, more than one third of rural households lie below poverty line. Applying a binary logistic regression, the study identified age of household head, size of land holding, female involvement in service, family occupation and caste are identified as major determinants of rural poverty. Contrary to general view, remittance do not show any significant effect on rural poverty as per this study. So we can infer that poverty in rural parts of Nepal is entangled in structural and cultural web, and the remittance sent by migrant family members to rural households might have been siphoned off to urban pocket areas. With large chunk of young rural population engulfed by international labor market and existing socio-economic structures, the policy makers need to address the rural poverty via social and cultural aspects.

Key words: poverty, poverty score card, rural household, socio-economic factors

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I. Background

Most of the development agendas in developing countries and least developed countries revolve around poverty. It is understood that poverty is the root of all the evils. The causes of various uprising in Nepal can be lamented to the dearth of poverty and inequality in the country especially persistence of dual economy – rural, the subsistence sector and urban, the capitalist sector. Rural poverty is also webbed into social norms and practices, culture and traditions apart from material lacks. So poverty is easy to talk and difficult to define. Simply, poverty denotes the condition where basic needs of human beings are not being met. According World Bank (2001) poverty is the result of economic, political and social processes that interact with each other and frequently reinforce each other in ways that exacerbate the deprivation in which poor people live (World Bank, 2001). Whereas (Sen, 1987) defines poverty as the failure of basic capability to function, failure to satisfy basic elementary and crucially important functioning's. His stress is on the capacity of an individual to convert commodities into functioning (or happiness or freedom). UNDP (1996) defines poverty from array of human deprivations in terms of health, education and income. It is a holistic approach

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for capturing poverty on important spheres of an individual, community and a country (UNDP, 1996). Chambers (1988) tries to define poverty on the basis of multiple disadvantages traps like, powerlessness, voicelessness, material lack, low income: a badly off condition of people (Chambers, 2004).

Holistic Views on Poverty: Swami Anand Arun (Arun, 2007) rejuvenates development thinking by his striking holistic view on human suffering, poverty and human development. He is continuously stirring new ripples of thinking among academicians, political leaders, development workers and spiritual seekers by combining materialism and spiritualism ever since he came in contact with Osho during the decade of 70's. According to him, poverty is much more than mere lack of basic physical amenities like food, cloth and shelter which are just necessary to keep us alive. He has categorized poverty into aspects: (i) physical or Marxian poverty, (ii) psychological or Freudian poverty and (iii) spiritual poverty or Buddha's view on poverty. He asserts that it may be physical poverty, which Marx tried to address through revolution, psychological poverty as propagated by Freud through libido and spiritual poverty as indicated by Buddha through his golden truths.

Why there is poverty in the world? While some people are dying of obesity and some are starving for the piece of a loaf. Social Darwinian Theory of Poverty explains the cause of poverty in terms of the behavior and attitudes of the poor themselves (Islam, 2005). This theory lets fall the axe of blame over the head of the poor themselves. The poor are lazy; they gamble and lead an unscientific ways of life. This theory is also very strongly grounded theory which explains the causes of poverty in third world countries. But critics say think this theory a capitalist colored spectacle and the western view regarding the backwardness of the East. Similarly Cultural Theory of poverty acclaims that poor have a unique value system; poor remain in poverty because of their adaptations to burdens of poverty (Oscar, 1959). The Structural Theory of Poverty holds that economic, political ad social systems are the sources of poverty (Austin, 2006). This theory is pro-Marxist explanation of poverty and inequality. It blames on the socio-political structure of the society.

What determines poverty has been empirically explored by many researchers. A study made by Lohano (2009) focused on poverty dynamics and their determinants using panel survey found that the main cause of sharp rises in poverty was shocks in agriculture (Lohano, 2009). Agriculture sector is a source of livelihood of third world countries. Nepal also being rural agro based economy, poverty is more pronounced in rural parts. A study on determinants of poverty using data from DHS in Kenya found that, along with other demographic factors, age of the household head increases the probability of being poor (Achia, 2010; Achia, Wangombe & Khalid, 2010). The relationship of age and sex of household head and poverty signifies the role family and social structure of a society. In another study carried out in Mozambique found low levels of human capital, including low educational levels and the poor health of most of the population; low productivity in the agricultural sectors, high rates of fertility and corresponding high dependency ratios were major contributing factors of poverty (Datt, Simler, Mukherjee & Dava, 2000). A study on Household Determinants of Poverty in Punjab province of Pakistan using logistic regression model summarizes the household determinants of poverty as the age, gender and education of the household head, as well as remittance, agricultural land holding, dependency ratio, family size and employment situation (Sikandar, 2008). It means apart from remittance and land holding: economic factors, demographic factors like age, sex and education of household head, family size are important affecting factors of poverty.

Nepal, M. (2006) findings suggest that the increased poverty among the significant portion of the population accompanied by the accelerating inequality and polarization throughout the country has compounded the divide between the haves and the have-nots and provided a suitable atmosphere for the conflict.

Analyzing poverty in Nepal, Bhatt and Sharma (2006) using a multinomial logit model on NLSS I & II found education, wealth, agricultural land holding having stronger relationship with chronic poverty. The issues associated with poverty and inequalities those highlighted in introduction section above are equally serious in intra and inter country context (Bhatta, 2006). According to Nepal Living Standard Survey III (2011/12) around 25 percent of population is below the poverty line in Nepal. It is a drastic fall in the level of poverty within a decade period from 31 percent (as per Nepal Living standard Survey II) in 2003. NLSS III has identified educational attainment, sex and occupation of household head as important determinants of HHs being poor or not. Similarly remittance received HH size, caste and land holding affect poverty in Nepal. Both NLSS II and III surveys have used cost of basic needs approach to estimate poverty. The poverty line for Nepal in average 2010/11 prices has been estimated at Rs. 19,261per annum (food poverty line = Rs. 11,929; non food poverty line = Rs 7332) (CBS, 2011). But as per the head count index, rural poverty is 27.43 percent in comparison to 15.46 percent in urban areas of Nepal. An empirical study conducted by Thapa (2012) based on primary cross sectional data found caste, remittance and number of cattle holding as major determinants of poverty in rural pocket areas. He used simple socioeconomic and demographic questions in order to build a poverty score rather than income and money metric measures to measure poverty (Thapa, 2012).

So the main goal of this study is to estimate the level of poverty by using non monetary measure (poverty score card) and also determine its major determinants.

II. Source of Data And Methods

Study Area

This study is based on rural areas of Western Development region in which a traverse was drawn in north south direction covering three ecological belts (see Fig 1). The livelihood, economy and social structures notably differ in these ecological belts. The districts falling in this traverse are: i) Manang from Mountain Region. It lies on the northern part of the country which has colder climatic condition, mostly inhabited by Tibeto Burmese people; ii) Hill Region or Mahabharata range (Lamjung, Tanahun, Kaski & Palpa) lies in the middle parts of Nepal; it has cool temperate climate, mostly inhabited by Brahmin / Chettris / Thakuris / Dalits and ethnic groups; iii) Terai (Nawalparasi) is the plain region lying to the southern part of the country having tropical climatic condition and mostly inhabited by Madhesi, Tharu and other communities.

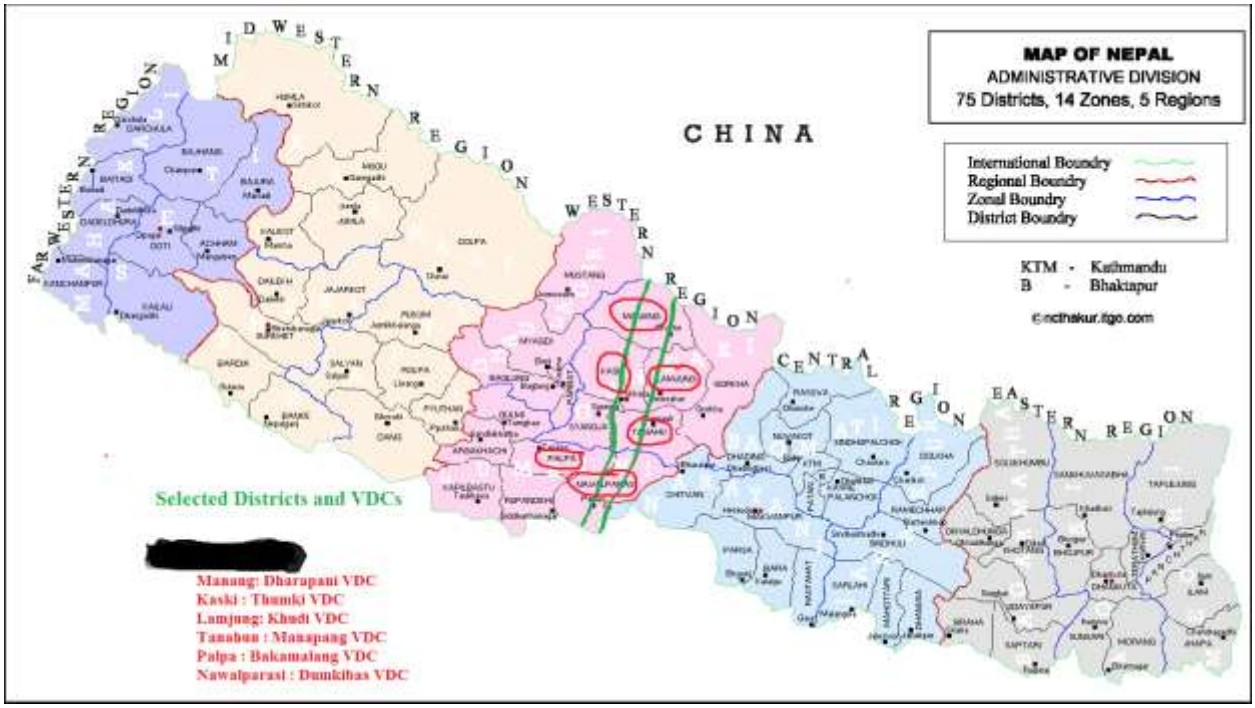


Figure 1: Map of Nepal

Research Design

This research aimed to estimate the poverty using poverty score card and to determine factors determining poverty in rural parts. This study is descriptive and analytical in nature and also a cross sectional study. It depends on primary data generated by field visits and door to door household interview. The parameters, the broad items of analysis are further disaggregated on variables as per the specific problems under study; which serves to simplify and refine research objectives. The parameters of this study include household, community and regional characteristics.

Population, Sample Size and Sampling

Out of five development regions, one region, i.e., was randomly drawn. Then a north south traverse that cut across the three main ecological zones of Western Development Region was drawn. The six districts cut through by the traverse direction were selected. Then 6 Village Development Committees, one from each district random selected. The total number of households of the selected districts were 6343 which was taken to be population of the study. Out of these households, 279 households were sampled by administering semi- structured questionnaire schedule in the field during mid 2012.

Setting the Poverty Line and the Model

Using logistic regression Sikandar & Ahmed (2008) model summarize the household determinants of poverty as the age, gender and education of the household head, as well as remittance, agricultural land holding, dependency ratio, family size and employment situation (Sikandar & Ahmed, 2008). Bhatta and Sharma (2006) used a multinomial logit model on Nepal Living Standard Survey I & II to analyze the determinants of poverty using variables like household size, sex HH head, age of HH head, dependency ratio, ethnicity, education, remittance, land holding and found education, wealth, agricultural land holding having stronger relationship with chronic poverty. By far the most widespread technique used to identify the contributions of different variables to poverty is regression analysis. There are two main types of analysis:

(i) Attempts to explain the level of expenditure (or income) per capita – the dependent variable – as a function of a variety of variables (the "independent" or "explanatory" variables). The independent variables are geographical location, community and social, household and individual characters. (ii) Attempts to explain whether a household is poor or not, using a logit or probit regression. In this case the independent variables are as in (i), but the dependent variable is binary, usually taking on a value of 1 if the family is poor and zero otherwise. It is logical to differentiate poor and non-poor. A poverty score constructed based on 10 questions like number of children below 12 years, literacy of HH, roof of house, types of toilets, fuel for cooking (Schriener, 2009). This score ranged between 0 to 100 scores and lower score meant more likely to be poor. A household is poor if it scores less than 50 scores based on those 10 questions. In this analysis the response variable has only two outcomes: an event either did (poor) or did not occur (not poor) which is referred to as a binary or binomial variable. A regression model with this type of response can be interpreted as a model that estimates the effect of the independent variable(s) on the probability of the event occurring.

A binary response, y, the expected value of y, E(y) = π, where π denotes P(y=1) is applied. The log model is:

$$\pi = \frac{\exp(\alpha_0 + \alpha_1 X_1 + \ldots + \alpha_k X_k)}{1 + \exp(\alpha_0 + \alpha_1 X_1 + \ldots + \alpha_k X_k)} \qquad (1)$$

with,
$$\ln\left(\frac{\pi}{1-\pi}\right) = \alpha_o + \alpha_1 X_1 + \ldots + \alpha_k X_k \qquad (2)$$

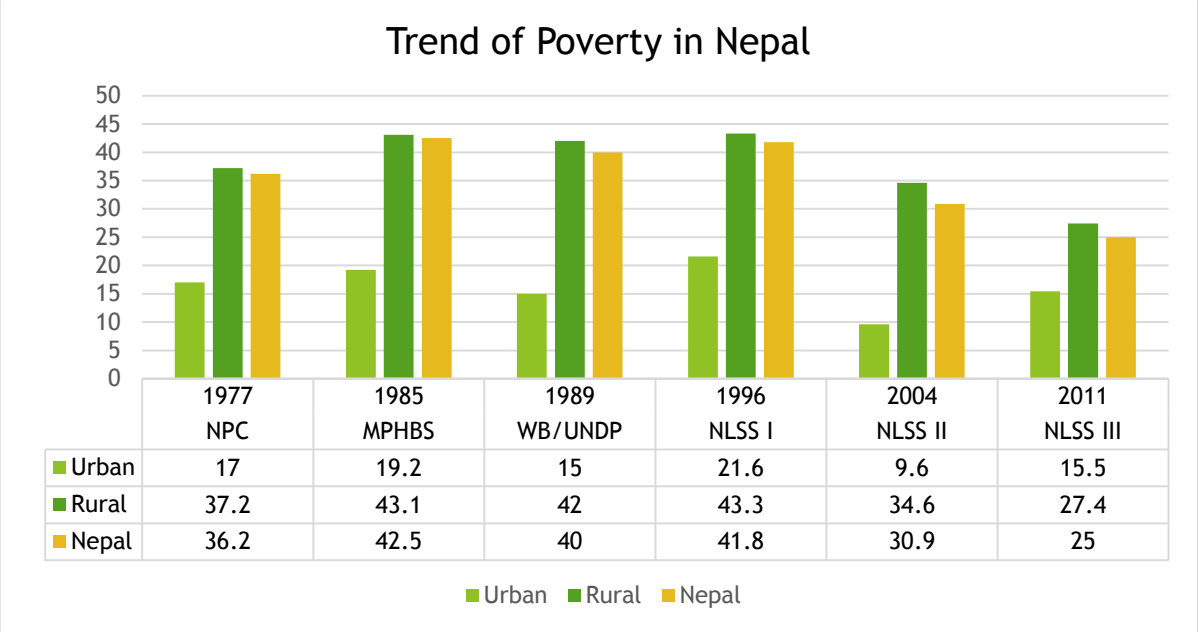
This function is not linear, as such the usual least squares methods can't be used to estimate the parameters. Instead, a method known as maximum likelihood was used to obtain these estimates. Here α0 , α1 ,… αk are parameters of the model to be estimated. The independent (i.e. right hand side) variables may be continuous variables, such as size of the households, dependency ratio and consumption income. But we have used categorical variable like educational level of household head, sex of household head, caste, region, religion and participation in social organizations. We have created dummy and reference categories for simplicity – for instance, the variable might be set to 1 if the person is a man and 0 for a woman and set one ecological zone as reference category for analysis. The fit of the equation is typically measured using R2 ("adjusted R squared"), which will vary between 0 (no fit) and 1 (perfect fit).

III. Data Presentation and Analysis

Trend of poverty in Nepal

The account of poverty in Nepal can be traced back to 1977's Nepal Planning Commission's data, whereby the people living below the poverty line was estimated to be 36.2 percent and 37.2 percent in overall and rural Nepal. But after adaptation of basic needs (BN) approach, during the year, 1985, 1989 and 1996, both rural and national poverty rate is above 40 percent level. Then the poverty level fell by around 10 percentage and 5 percentage points in the year 2004 and 2011 respectively (NLSS II & NLSS III). The poverty level of urban areas remain fairly stable no matter what sort of measurement rods were used in the past four decades. We can observe that the level of poverty in urban areas was not around 20 percent in 1996 to its down plunged to around 10 percent during 2004.

The poverty rates in the last decades seems uneven and illogical. Setting of poverty line and measurement rods were changed and refined along with the changing hegemony of development and poverty theories in course of time. But one thing we can be assured that poverty of Nepal has rural character as is evident from the pattern of pair of rural poverty bar and national poverty bars in the figure below. So the poverty levels of different time intervals calculated by different agencies may be incomparable or may not give us sequential poverty comparison insights but they are meaningful in themselves.



	1977 NPC	1985 MPHBS	1989 WB/UNDP	1996 NLSS I	2004 NLSS II	2011 NLSS III
Urban	17	19.2	15	21.6	9.6	15.5
Rural	37.2	43.1	42	43.3	34.6	27.4
Nepal	36.2	42.5	40	41.8	30.9	25

Figure 2: Trend of poverty in Nepal

Poverty level after nineties, especially after NLSS I is steadily falling. It seems stagnant during 10 years span from 1985 to 1996. The urban poverty shows an uneven trend within these years. The trend of rural poverty is steady along with the national poverty level.

Poverty score

The present study doesn't calculate the level of poverty by using income, consumption or any other money metric measures. Of course during the study, the respondents were asked regarding their incomes, consumptions and food sufficiency but they were not used for measuring level of poverty. From the very onset of the study, we have thought about using poverty score card for measuring poverty. The ten questions posed to the respondents (household head) are proxied to capture the level of poverty of the households. The direct benefit of these type of closed ended questions is the options can be assigned some scores and can be physically observed and can also be shown by the respondents. The problem of recall biasedness and under reporting of incomes and consumption by the households in Nepal could be overcome. Moreover, due to illiteracy and lack of record keeping habits of rural households, it is very difficult to capture the actual production, income and consumption in Nepal. Also the spatial (region wise) variability in living condition makes it difficult to put everybody on the same measuring rod via monetary means. But the poverty score card as developed by this study would capture the true picture of destitution irrespective of the region, caste/ ethnicity or any other divisions. The given table shows the responses of households about 10 straight closed ended questions put to them. First three questions are related to number of children and their schoolings. Studies have shown that poor households tend to have larger number of children than non poor households that is why scores 0, 6, 12, 16 and 24 are assigned to HHs having 4 or more, 3,2,1 and no children respectively below 12 years age. Two factors:

foreign labor (reproductive age groups) migration and overall fall in population rate (1.8), around 13 percent of the households have 3 or more below 12 years age.

Table 1: Poverty score responses

Variable	Category (=score)	Frequency	Percent
How many children are 12 years below?	≥4 children (=0)	9	3.2
	3 children (=6)	27	9.7
	2 children (=12)	64	22.9
	1 children (=16)	84	30.1
	No children (=24)	95	34.1
How many children of 5 - 12 years attend school?	Nobody (=0)	10	3.6
	No children are of those age (=2)	121	43.4
	All child attend (=5)	148	53.0
Do any child attend private school?	Nobody (=0)	175	62.7
	Yes attend (=8)	104	37.3
Can female HH head read and write letter?	Can't read (=0)	89	31.9
	No female head (=5)	60	21.5
	can read write (=8)	130	46.6
What is the roof of house?	Thatch/grass (=0)	44	15.8
	stone / Wood / plank (=4)	37	13.3
	Tin / concrete (=10)	198	71.0
Type of toilet in the house	No toilet (=0)	52	18.6
	Have toilet (=7)	227	81.4
Type of oven used in HH	Open oven / traditional (=0)	135	48.4
	Modern / gas / Kerosene (=5)	144	51.6
How many radio, tap, cd players in house	None (=0)	91	32.6
	One (=5)	94	33.7
	Two (=6)	2	0.7

Variable	Category (=score)	Frequency	Percent
	More than 2(=13)	92	33.0
Do the HH have bicycle, motocycle, scooter, horse	Don't Have (=0)	196	70.3
	Have (=5)	83	29.7
Do hh have tv	Don't Have (=0)	126	45.2
	Have (=11)	153	54.8
	Total	279	100

Source: Field visit, 2012

Similarly, children within 5-12 years not attending schools were only 3.6 percent only which indicates that children belonging to poor HHs also encouraged to attend schools (The enrollment campaign of government). The 'equal to figures in the parenthesis shows the scores assigned to possible answer. In Nepal private schools, which are generally located in urban areas and district headquarters are regarded better educational institutions. But unlike government schools they are expensive where poor cannot afford. So only a non-poor households can send their children to such schools. Females are less literate than males. So if a household is headed by females and she is illiterate also, then such response is punished by assigning 0 score and otherwise.

The physical and economic aspects are captured by accounting about the roof of house, type of oven, toilet and some household gadgets. The roof of the household can also be was categorized into thatched / mud roof, stone / wooden plank roof and tin/concrete. The households residing under thatched /mud roof can be proxy as poor, so the score 0 and also the households with stone / wooden planks roof are likely to fall under poverty. Having toilet or not and modern cooking stove also capture poverty (see the score assigned). So having them or not indicates the health hygiene and health hazards faced by the household members. Similarly, other physical gadgets like tv, radio, mobiles and means of transports are household wealth but they also indicate access to information and mobility.

On the basis of the ecology Nepal can be divided into three ecological regions: Himalayan regions where climatic condition is cold which is inhabited mostly by Tibeto-Burmese people, The Hill and Mahabharata range which is inhabited by Indo- Aryan and other races, The plain or Terai region which is inhabited by mixture of all races. Based on the findings of previous studies and theories the variables which are likely to affect the living condition of a household and community are taken into consideration. The existing customs, traditions, culture and distribution of physical endowments greatly affect a households falling into poverty or not. For convenience of description and analysis all the factors are grouped into three broad clusters: cultural factors, socio-structural and economic factors.

Table 2: Spatial and caste/ethnic distribution of poverty

Variable	Category	poor		Non Poor	
		Number	Percent	Number	Percent
Geographic Region	Himalayan Region	6	12.5	42	87.5

Variable	Category	poor		Non Poor	
		Number	Percent	Number	Percent
	Hill Region	67	36.0	119	64.0
	Terai region	21	46.7	24	53.3
Ethnic / caste	Brahmin/chettri	23	27.4	61	72.6
	Ethnic/janajatis	46	31.3	101	68.7
	Dalits & deprived castes	25	52.1	23	47.9
Total		94	33.7	185	66.3

Source: Field visit, 2012

In this study a third of the population is below poverty line, which is some 7 percentage point higher than NLSS III poverty estimates. Poverty is highly pronounced in Terai (around 47 percent) while it is very low in Himalayan region (13 percent), a contrasting result. But the methodology of poverty estimation of NLSS III (money metric) but this study has estimated poverty by using poverty score card. Among the caste / ethnicity, dalits and deprived castes are found to be highest who are falling under poverty line.

Descriptive Analysis

Household is the unit of analysis for this study. The rural households are characterized by peasant farming system. Therefore the characteristics of HH like age, sex and education of HH head, and family size are crucial in analyzing rural poverty. The table shows that around 15 percent of the HHs are headed by females. It is similar to national data. Simillarly, a third of the household head are literate and mean age of household head is 50 years. But the average HH size is 5 which is above national average of 4.8 members per family. Even though this study pertains to rural parts of the Nepal but nearly a third of the households have embraced non agricultural activity as their main family occupation. It means that now slowly agriculture activity has been slowly offset by other activities like petty businesses, subsistence livelihood sustained by remittance or other commercial activities. Almost 43 percent of HHs have at least one family member in foreign employment overseas which is similar to national average.

Nearly 43 percent of the households hold less than 2 ropanies of land. It shows a dire situation of land fragmentation which may not support commercialization of agriculture production by using modern equipment's. The question relating to female members meaningful economic participation meant females involvement in salaried jobs. It was also taken as a proxy of women economic empowerment but only 7 percent of HHs had a female member involved in some type of salaried job.

Table 3: Socio demographic, economic and spatial distribution

Variables		Category	Number	Percent
Demographic Factors	Sex of household head	Female	41	14.70
		Male	238	85.30
	Education of the household head	Illiterate	74	26.52
		Literate	205	73.48
	Age of HH head (minimum =22 and Max = 84; Mean = 50)			
	Family size (Min & Max 1 and 11; average = 5 persons)			
Economic Factors	Family occupation	Agriculture	203	72.76
		Non Agriculture	76	27.24
	Regions	Himalayan Region	48	17.20
		Hill region (Mahabharat)	186	66.67
		Terai (plain)	45	16.13
	Remittance received by family	any member foreign employ	119	42.65
		No foreign employment	160	57.35
	Total area of land (1 ropani = 0.0508 hectares or 5476 sq.ft)	less than 2 ropani	121	43.37
		2-4 ropani	34	12.19
		4-10 ropani	60	21.51
		10-20 ropani	39	13.98
		more than 20 ropani	25	8.96
Socio-Cultural Factors	Caste / ethnicity	Brahmin, Chhettri	84	30.11
		Janajatis	147	52.69
		Dalits	48	17.20
	Religion	Hindu	220	78.85
		Buddhist & other	58	20.79
		Yes participate	20	7.17

Variables		Category	Number	Percent
	Female meaningful economic participation	No participation	259	92.83
	Family involved in Social organizations	yes involved	168	60.22
		Not involved	111	39.78
	Total		279	100

Source: Field survey, 2012 data summarized by the researchers

Involvement in social organization can also be seen as being in mainstream of community and national development. Social involvement is an important proxy of social empowerment. If any member of the family is involved in some social organization then that family would not remain isolated and voiceless. In our study around 40 percent of the households are not involved in any social organizations (they are likely to be poor).

Regression Analysis

Further parts of the empirical results of the study are presented and analysed in subsequent sections. The data analysis was done using SPSS version 16. The basics of model specification is given in Table 4.

Table 4: Model specification

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	79.631	18	.000
	Block	79.631	18	.000
	Model	79.631	18	.000

The presence of a relationship between the dependent variable and combination of independent variables is based on the statistical significance of the model chi-square at step 1 after the independent variables have been added to the analysis. In this analysis, the probability of the model chi-square (79.631) was <0.001, less than or equal to the level of significance of 0.05. The null hypothesis that there is no difference between the model with only a constant and the model with independent variables was rejected. The existence of a relationship between the independent variables and the dependent variable was supported.

Goodness of Fit of the Model

The statistics related to the goodness of fit of the model are summarized in Table 5. The classification table shows that we have 279 cases and 47 out of 94 poor are correctly explained.

Table 5 :Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelker R Square
1	276.915a	.248	.344

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Source: Source: Authors' calculation.

Similarly 160 out of 185 non- poor are correctly explained at cut value 0.5. Generally higher the percentage of correct predictions (in this case 207/279 = 74%) the better. The regression model has good fit as Cox and Snell R square is around 25 percent which is acceptable for qualitative regression analysis. It states that around 25 percent of variations in dependent variable are explained by predictors used in this regression model. (But in logistic regression analysis it does not tell much about strength or accuracy of the model).

Multicollinearity in the logistic regression solution is detected by examining the standard errors for the b coefficients. A standard error larger than 2.0 indicates numerical problems, such as multicollinearity among the independent variables, zero cells for a dummy-coded independent variable because all of the subjects have the same value for the variable, and 'complete separation' whereby the two groups in the dependent event variable can be perfectly separated by scores on one of the independent variables. None of the independent variables in this analysis had a standard error larger than 2.0. This regression does not show any multicollinearity. The major regression results are given in Table 6.

Table 6: Regression result

Variables	**coefficients**	**S.E**	**P value**
Sex of head HH; male (ref.)	.028	.454	.951
Literacy of HH head; illiterate (ref.)***	-.935	.359	.009
Age of head HH	-.117	.076	.124
Family size*	.022	.012	.077
Occupation of HH Agriculture (ref.)***	-1.092	.389	.005
Himalayan Region (ref.)			.748
Hill region (Mahabharata range)	-.109	.339	.540
Terai (plain)	-.320	.586	.585
Foreign employment; yes (ref.)	-.669	.687	.330
Less than 2 ropani (ref.)	-.717	.628	.254

Variables	coefficients	S.E	P value
2-4 ropani	-.971	.661	.142
4-10 ropani***	.960	.300	.001
10-20 ropani**	1.958	.860	.023
More than 20 ropani (ref.)**			.019
Social involvement; yes (ref.) ***	-1.276	.453	.005
Female in service; yes (ref.)**	-0.771	.425	.070
Caste (Brahmin/Chettri)	-.150	.511	.770
Janajatis/ ethnic (ref.)			.114
Dalits**	1.359	.688	.048
Religion; Hindu (ref.)	.117	.420	.781
Constant	.343	1.096	.754
*** Significant at 1%; ** significant at 5%; *significant at 10% level.			

The predicted variable is binary response; the household poor = 1, or household not poor = 0. Among the broadly categorized predictors of demographic factors, only literacy of household head and family size are statistically significant. The household head being literate decreases log odds of family being poor by 0.935 times. An unit increase in size of family increases log odds of household being poor by 0.022 times or an increase in size of family by one person increases the log odds of household being poor by 0.022 times. Among the economic factors, family occupation and land holding are statistically significant. A household whose main occupation is non agriculture decreases log odds of family being poor by 1.092 times. In case of land holding, 4 ropanis and above increases odds of household being poor by 0.960 and 1.958 times in the categories of 4 to 10 and 10-20 ropanies. This result is beyond the scope of explanation because land is an important kind of wealth to reduce poverty rather than increasing poverty. We can only assume that the large land holdings are just either open barren land or grazing land (Pakho bari). One more valid reason may be due to lack of young agriculture labor in rural areas for cultivation or have been left due to low productiveness in comparison to its production cost or subsistence living met via remittance, or combination of reasons. The coefficients of other two categories (less than 2 ropanies) have negative sign which indicates that holding /having land reduces poverty but they are statistically insignificant. Among the socio-structural predictors of poverty, being dalit caste and family social involvement increases log odds of family being poor by 1.359 and 1.27 times respectively. The increase in female member involvement in service (having job) decreases log odds of household being poor by 0.771 times. On contrary to general expectations remittance donot determine rural poverty. In overall, except land, as an economic factor, all other factors that determine rural poverty in Nepal are socio-structural factors.

IV. Conclusion

The study focusing on the poverty dynamics in the western rural region of Nepal found that only fifteen percent of households are headed by females and one third of household head are illiterate.

Average size of the household is above national household size. The main occupation of the households in the study area is agriculture but there is growing tendency of household members seeking foreign employment. The incidence of poverty based on poverty score along the rural traverse of Western Development Region was around 33 percent which is quite higher than level of national poverty(i.e., 28 percent for western rural cluster as per Nepal Living Standard Survey third, NLSS III). The binary logistic regression shows that age of household head, family occupation, region, caste and female involvement in service are the significantly affecting variables in determining rural poverty in Western Development Region of Nepal Contrary to the national scenario, Mountain region is less likely to be poor than households in Terai region. We can infer that poverty in rural parts of Nepal is entangled in structural and cultural web, and the remittance sent by migrant family members to rural households might have been siphoned off to urban pocket areas. With large chunk of young rural population engulfed by international labor market and existing socio-economic structures, the policy makers need to address the rural poverty via social and structural aspects. By identifying the poor households, a poverty card system can be issued by district level offices for the purpose of issuing transfers and subsidy to the poor. We hope this study would be highly useful to our policy makers, academicians, GOs and NGOs, and researchers in pursuit of better world and quest for knowledge.

V. Recommendations

- Continue and focus on adult education (prodh siksha) because the findings of the study shows a negative association between household level poverty and education. The literacy level / education of household head is highly effective in rural poverty reduction.
- Population is not a problem for Nepal as its growth rate is near about optimum. But the study shows that increase in family size would also perpetuate poverty because poor families tend to have larger families. So there are plenty of room to do something for child health and child development from the government's part.
- There is a need for enforcement of anti land fragmentation laws even though the study shows larger is the land holding (4-10 ropani & 10 – 20 ropani) the more likeliness of a household being poor. It may be due to large barren land or grazing land (pakho bari) which does not produce any food crop or cash crops.
- Enhance social involvement of voiceless and faceless persons and families and bring them in the mainstream of development. It may be through positive discrimination, public works and social awareness programs.
- The government needs to speed up positive discrimination like reservations in jobs and develop women friendly environment in workplaces to reduce rural poverty. It can also hint and encourage other sectors also.
- There is a need to enhance caste / ethnicity harmony. Government programs like skill development, training, education should target the deprived sections of the people.
- Foreign employment and migration is fueling day by day which has also become the major source of income and scarce foreign reserve for the country, so proper labor recruitment, training and education be focused.

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Acronyms

CBN	Cost of Basic Needs
CBOs	Community Based Organizations
CBS	Central Bureau of Statistics
DDC	District Development Committee
GOs	Government Organizations
HCI	Head Count Index
HDI	Human Development Index
HPI	Human Poverty Index
MDGs	Millennium Development Goals
NGOs	Non Government Organizations
NLSS	National Living Standard Survey
NPC	National Planning Commission
IMF	International Monetary Fund
PAF	Poverty Alleviation Fund
UN	United Nation
UNDP	United Nation Development Program
WB	World Bank
WCED	World Commission on Environment and Development
WDR	Western Development Region
WDR	World Development Report
WHO	World Health Organization

Paper No. 25

Beyond Financial Access Reassessing the Promise of Microfinance in Promoting Women's Empowerment

Tara Bajracharya

Abstract

The study attempts to look at the role that microfinance programs have played in empowering women beyond the immediate benefits of financial access. Assessing gender gaps and empowerment status of women at the organizational as well as the client level, the study finds that there is ample room for innovations, and a further need for gender-sensitivity within the Nepalese microfinance institutions. Assessments were made along four main categories: i) Women's Representation in Microfinance; ii) Gender-sensitivity of Institutional Operating System, Policies, and Programs, iii) Loan Utilization and Entrepreneurship Development of Women, and iv) Women's Access to and Control over Economic Resources.

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Executive Summary

Microfinance has played an important role in bringing the issue of women's empowerment to the forefront of the development agenda across continents. Microfinance has not only addressed the need for financial access to women, but also reinforced the credibility of poor women through figures such as those of high repayment rates among female microfinance clients. Issues were brought forward, beneficiaries were targeted, interventions made. The question to be asked now is, "what has financial access done to empower women?" Variations of this question have been addressed with mixed findings about the impact of microfinance across the world. This study looks at the Nepalese case.

The study paints a rather modest picture of the impact of the sector in empowering women beyond financial access. At the same time, it also highlights the unused potentials of the sector in pushing forward the goal of gender equality at all levels of society. Assessing gender gaps and empowerment status of women at the organizational as well as the client level, the study finds that there is ample room for innovations, and a further need for gender-sensitivity within the Nepalese microfinance institutions. Assessments were made along four main categories: i) Women's and Men's Representation in Microfinance; ii) Gender-sensitivity of Institutional Operating System, Policies, and Programs, iii) Loan Utilization and Entrepreneurship Development of Women, and iv) Women's Access to and Control over Economic Resources.

Women's and Men's Representation in Microfinance

At the organizational level, women's representation in decision-making is still low among MFIs, excluding women's cooperatives. On average, women were found to represent 31% of the

governing body of MFIs (not counting women's cooperatives). This figure paints quite a positive picture in terms of women's representation. However, a third of these MFIs had no women in the governing board. Similarly, excluding women's cooperatives, about 65% (17 out of 26) of the MFIs had no women in senior level management.

As clients, although women represent almost 75% of the clientele of MFIs, these women are rarely involved in the decision-making processes of matters such as interest rate structure or the repayment schedule. The common approach of MFIs is a top-down delivery system whereby women are given the details of the loan mechanism fixed by microfinance service providers.

Gender-Sensitivity of Institutional Operating System, Policies, and Programs

Most MFIs reported having no formal gender policy in place, even though informally they may be practicing positive discrimination towards women in matters such as recruitment. Only 34% of the MFIs surveyed reported as having a formal gender policy in place. Some of the cited material in formal gender policy documents includes maternity leaves, positive discrimination towards women during recruitment process, and quota for women's representation in the executive committee.

At the program level, one of the most common feedbacks that came from female clients on the role of microfinance in women's empowerment was to make larger loans accessible to women. It is the general conviction among MFIs that women "prefer" or can only handle small loans to start up small businesses. However, studies find that this is true only in the initial phases of financial access, and that such an outlook can carry the risk of keeping women in lower income economic activities compared to men. The study finds that almost 90% of the loans taken most recently by respondents were below NRs 25,000.

In terms of a loan monitoring system, the presence of a formal monitoring mechanism was not reported by any of the MFIs surveyed. Moreover, one of the main complaints from the clients was regarding the lack of a monitoring process to ensure productive usage of loans. This was particularly the case in cooperatives. Loan misuse can have the negative effect of indebting women if the loans are used for unproductive purposes. It can also give rise to duplicity of loan-intake among microfinance clients.

Some positive trends adopted by MFIs towards gender equality at the client level include inclusion of women, Dalit, and indigenous groups in membership, priority to women in loan disbursement, and provision of childcare facilities for female participants.

Some of the MFIs had innovative loan products that were particularly targeted towards women's wellbeing and empowerment, for example, pregnancy loans and loan for daughter-in-laws' education. Such loans can be easiliy monitored and have the potential to directly enhance women's living standards.

About half of the clients surveyed reported having received some form of skill trainings from the MFIs. Most trainings received were conventional skill trainings, rarely challenging the preconceived notion of "women's role" in society. For instance, the most common trainings were either farming-related or those related to provision of products and services used predominatntly by women, such as beautician training and tailoring.

Loan Utilization and Entrepreneurship Development

Majority of the women (70%) were found to be involved in income generation activities. The most common economic activities were related to agriculture and livestock rearing (80%), followed by

shop/hotel ownership (14%) and tailoring or selling women's products and services (6%). These activities are largely seasonal and women hardly benefit at all from economies of scale. Based on the average monthly income of a little over Rs. 10,000 with monthly expenses of over Rs. 6000, not including interest payments, there is little surplus left from such businesses. About 91% of the respondents have loans registered in their names. However, when it came to decision-making about loan utilization, more than 70% of them said they are involved in joint-decision making about loan usage.

Women's Access to and Control over Economic Resources

As far as access to economic resources are concerned, although, more than 90% of the women have loans registered in their names, most women were found to be involved in joint decision-making about loan utilization with their husbands. The burden of repayment, as such, lies primarily on the women, even though both men and women may use the loan. Similarly, most women also reported as being involved in independent/joint decision-making in matters such as household finances, profit utilization, and child education. Although, joint decision-making is a valued feature of any household or society, power-inequalities can surface in such decision-makings.

The study finds some major areas where the microfinance sector can improve its services to empower women. Some of the recommendations include:

1) Institutionalization of a Formal Gender Policy: A formal policy on gender equality must be designed and communicated with all levels of staff in a participatory, inclusive process. The content of the gender policy should portray both practical needs of men and women and must aim to promote gender equality within the institution. Measurable gender-disaggregated indicators must be used to monitor progress and identify gaps on a regular basis. A designated position for a Gender Expert may be necessary to oversee progress in gender mainstreaming in the organization. Finally, gender trainings must be followed up with pre- and post-evaluations.
2) Access to Markets: A careful market assessment and a demand-driven skills package should be provided to the clients to guarantee highest returns to their investment.
3) Non-traditional Activities and Economies-of-Scale: For women who do not own land, promotion of collective land ownership or setting up of producers' cooperatives to benefit from greater market monopoly versus increased competition may be needed.
4) Promoting Women's Entrepreneurship
    a. Risk-taking behavior: Group guarantees often discourage risk-taking behavior because the risk is borne by the entire group. Therefore, for promising entrepreneurs with good track records, independent loans should be made available.
    b. Flexible Repayment Schedules: Depending on the type of entrepreneurial activities, women may or may not have weekly/monthly cash flow required to meet the repayment schedule fixed by the microfinance service providers. Studies show that when women are allowed to set their own repayment schedules, repayment rates are higher and women invest more strategically.
    c. Larger Loans: Although the larger MFIs do have a provision for larger loans, the smaller cooperatives often lack the capacity. In such cases, the cooperatives should provide women with a channel to tap into resources offered by larger MFIs or other financial sources. In any case, such larger loans often require collateral which the women may not be able to provide. Savings account is one form of collateral commonly used by MFIs. Based on case studies collected by Mayoux, she finds that many women prefer to have larger loans which she argues should be given on

d. the condition that they register any assets purchased in their names, and are involved in loan activity such as accounting, managing, and business planning (Mayoux, 2002, p.29). This meets the dual goal of promoting women's entrepreneurship as well as their access to and control over economic resources

e. d. Skills Trainings: Most skills trainings provided by the MFIs such as beautician training and tailoring training, training on agricultural and livestock farming, rarely challenge gender roles and are often catered towards married women. In fact, majority of the clients interviewed were married. Such skill sets do little to move women up the economic ladder. Non-traditional trainings such as computer training or off-seasonal vegetable farming may have a better scope of increasing women's economic empowerment.

5) Monitoring of Loan Use: One of the feedbacks that came form the clients themselves was the need to monitor the use of loans in purposes that the loans were taken for initially. Without a formal monitoring mechanism, loans taken for productive purposes may end up being used for household consumption, and the clients end up indebted. Such misuse of loans also fosters duplication of loan services. One way to counter misuse of loans is by offering diversified loans such as those for healthcare only. However, without strict monitoring, even such loans were found being used for other purposes.
6) Increasing Women's Asset Ownership: Mayoux suggests that for an empowerment approach, MFIs should go beyond offering financial access to women based on social collateral in the form of group guarantee. Instead, MFIs should go a step further to register any assets bought by women using the loans in their own names, which can also be seen in the form of collateral, but more importantly, which will guarantee a way forward in women's control over assets.
7) Shared Liability of Loans: About 91% of the respondents have loans registered in their names. However, when it came to decision-making about loan utilization, more than 70% of the said they are involved in joint-decision making about loan usage. In such a case, it calls for loans to be a liability for both the husband as well as the wife.
8) Gender-Disaggregated Data Collection For MFIs and researchers to say anything positive or negative about the contribution/impact of microfinance towards gender equality and women's empowerment, collection of gender-disaggregated data from the clients' households is crucial.
9) Non-complacency towards increased household income

Joint decision-making, it was argued by some, is already a progress from the position that women held in the past. This notion is true to some extent; however, the final decisions in such types of agreements are more likely to be made by the husband. It's not bad at all in terms of increasing family income, but because microfinance service providers are in a position to possibly make women more independent and self-reliant, and by doing that to challenge centuries old gender inequality, complacency over increase in household income is not the best position to take. On the other extreme, by doing so, MFIs may even be perpetuating discriminatory gender roles in society. The wisdom of the phrase "question everything" applies to microfinance practitioners as much as it does to development practitioners. In fact, microfinance practitioners are inevitably development practitioners themselves and it'd be the best-case scenario for MFIs to train staff not as commercial banking staff, but those who are more inclined towards development studies.

1. Introduction

"If purposive interventions can help to direct resources to women, thereby overcoming the past barriers which have led to the suppression of their entrepreneurial potential, then they must be welcomed on grounds of efficiency and equity."-Naila Kabeer

The quote by Naila Kabeer encapsulates the important role that microfinance has played in bringing women to the forefront of the mainstream development process, while also reflecting the untapped potential of the sector to actively address gender inequalities. While acknowledging the importance of women's economic participation and the unique position of the microfinance sector in promoting the same, Kabeer also hints towards the missed opportunities by microfinance in promoting gender equality. This reflection follows what most microfinance practitioners consider a truism—the idea that women's empowerment automatically follows their access to finance. Many microfinance institutions are self-absorbed in meeting the canonical requirements of institutional financial sustainability, while the objective of wider social development is either considered a concomitant occurrenceto access to finance, or a job that is beyond the scope of microfinance.

1.1. Gender Equality: Setting the Context

In a reflective piece called The Many Faces of Gender Equality, Nobel Laureate, Amartya Sen, discusses the varying natures of gender equality across cultures, societies, and professional spheres. He distinguishes between various types of inequalities between men and women ranging from sex-selective abortion in favor of a boy child, to inequalities in property ownership rights or professional development opportunitiesbetween men and women. One of the most potent breeding grounds for gender inequality, it can be argued, can be found in the norms related to gender roles and responsibilities within the household. Such inequalities are arguably the most deep-rooted and pervasive across all cultures. Even in a society with no discrimination against women in terms of professional income or sex preference of a newborn, within the household, women may still be expected to play the principal role in childrearing activities. To work in the public sphere, therefore, women are uncompromisingly expected to manage their disproportionate share of household duties. Sen terms this form of social experienceby women "accumulation of labor", a juxtaposition to the concept of "division of labor" which should logically take place within a household where both men and women are responsible to 'put food on the table'.

Although Nepal has made significant progress in the MDG indicators related toareas such as education and maternal health , a national study conducted by Shtrii Shakti which looks at women's empowerment status from1981-2010, concludes that women's experiences and roles in society have remained largely unchanged over the years. The study cites structural and ideological barriers that maintain a stronghold in Nepal's patriarchal culture as keeping women from truly participating in the development process. The empowerment status of women in the country has improved overall; however, the study underlines some of the differences across ethnicities and geographical locations in the exercise of decision-making power. For instance, compared to the study in 1995, Tharu women are still submissive to men in all matters of household decision-making. Not surprisingly, the study finds that educated women in both rural are urban areas are better able to participate in household decision-making processes.

Compared globally, Nepal's performance seems far poorer than one would think looking at the national development trends. Nepal stands 86th among 99 countries that were ranked on the Gender Empowerment Measure (GEM), which measures women's economic and political participation and decision-making, and control over economic resources. Although the Nepalese parliament boasts one of the highest numbers of women, women still lag behind in decision-making roles in all professional spheres as well as within the household. Similarly, property ownership among women is minimal in both urban and rural areas.

Numerous studies have assessed the impact of microfinance on poverty alleviation and women's empowerment. Their findings, on many occasions, have been contradictory. Without getting into the world of inconclusive scholarly debate on the matter, it may still be safe to say that microfinance has been an important tool in poverty alleviation by making accessible to the poor, particularly poor women, that which was beyond their reach just a few decades ago—money. Many women have been freed from dependence on usurious moneylenders and their breadwinning

husbands. Many women are now able to contribute as breadwinners themselves by doing what was inconceivable to them during their own lifetimes—business. Yet, without gender-sensitive power sharing and division of responsibilities, majority of the female microfinance borrowers have experienced an increase in responsibilities of managing family and work. Dealing with this issue is considered beyond the scope of microfinance by many of the experts involved in the field.

1.2. Objectives of the study

This study was conducted with the following objectives:

- To identify gaps in gender mainstreaming among practitioner institutions of microfinance at the organizational as well as the client level.
- To assess the empowerment status of female microfinance clients
- To recommend strategies to move the agenda of gender equality forward by microfinance institutions
- To disseminate findings to related stakeholders for further dialogue and identification of roles of various stakeholders in the process of gender mainstreaming.

2. Review of Literature

2.1. Overview of Microfinance Institutions in Nepal: Examining Supply and Access

There are four types of institutions offering microfinance services in Nepal. Following is a list of the types of institutions active in Nepal.

- Cooperative Societies, also known as 'finance cooperatives'
- NGOs that are registered under the Financial Intermediary Societies Act (1999), also known as Financial Intermediary NGOs (FINGOs)
- Micro-credit Development Banks registered with the NRB under Development Banks Act, 1996.
- Regional Rural Development Banks that are registered with the NRB under the Commercial Banks Act (1984) or the Development Banks Act, 1996.

According to the Banking and Financial Statistics published by Nepal Rastra Bank (NRB), as of mid-January 2011, there were 21 Micro-finance Development Banks classified under category 'D' licensed by the NRB. Likewise, 15 Savings and Credit Cooperatives (SCCs) with limited banking activities and 45 Financial Intermediary NGOs (FINGOs) under a non-classified category were licensed by the NRB. There are over 20,000 cooperatives that are not licensed under the NRB. Among them, 2,912 cooperatives were registered under the Department of Cooperativesas of 2006.

In terms of access to finance, a 2006 World Bank report by Ferrari et al. finds that only about half of the Nepali households have access to formal financial services. Only 28 percent of the households in Nepal have a bank account or a loan from a bank, 25 percent of households are served by other non-bank institutions, about 28 percent are served only by informal financial sector (which includes moneylenders, family members, employers, etc.), while 20 percent have no access to financial services at all. Furthermore, according to the Nepal Living Standards Survey II of 2004, only 28 % of households (a meager 10% of the poorest quintile) of Nepal can access the nearest commercial bank within 30 minutes of travel. It takes three or more hours to get to a commercial bank for 27% of the country's households. Access to commercial banks for rural households is implausibly low (16%) compared to the urban households (86%).

On average, about 18% of the households have accounts in FINGOs or cooperatives, while microfinance institutions and regional development banks serve a meager 4 percent of households. Most households in hills and mountains are served by FINGOs and cooperatives. In fact, these two groups of institutions are the second largest providers of deposit accounts, and are preferred by the poorer households. About 43 % of the rural areas are served by these two institutional categories (Ferrari et al., p.17-19).

2.2. Gender and Microfinance

As a development intervention, microfinance has an indisputable potential to challenge traditional gender roles of patriarchal societies. By simply making credit accessible to women, the title of a breadwinner is no longer restricted to usage by male household members. Similarly, increase in women's economic activities and participation in markets means that women have greater mobility and greater involvement in community activities. Group-lending programs also increase women's social capital in the form of solidarity and support from other women, which can further act as a buffer against domestic violence against women. Group networking can also lead to new income generating ideas and knowledge sharing on business management and expansion among women. Participation in group-meetings has repeatedly been proven to increase women's self-confidence and further improve their networking skills. Linda Mayoux refers to these rings of benefits as "virtuous spirals" of women's empowerment that can be brought about by microfinance programs (Mayoux, 2002, p. 28).

Conversely, there are also many ways in which microfinance programs that are insensitive to gender inequalities can lead to potential negative or even disempowering impacts on women. Mayoux (2002) asserts that even those MFIs that are financially sustainable may have little impact on women's empowerment if they are gender- insensitive. For instance, microfinance programs that are not gender-sensitive may bring about no changes in the fact that even though access to credit can make women more economically active, women may still remain in low-income economic activities. A study by the Asian Development Bank(ADB) on the impact of Rural Microfinance Project of the Rural Microfinance Development Centre(RMDC) Nepal found that most women surveyed in the study were still involved in low-income seasonal activities such as agriculture, livestock rearing, and tailoring. As such, profit reinvestment in businesses was uncommon as there was hardly any surplus left after meeting household requirements. The impact assessment study of the RMDC project assesses five MFIs and their clients. Among major outputs, the study finds that voluntary saving was still minimal among the female clients, even though they appreciated the deposit requirements of the program for it prevented male control over the money. It was also found that most women, in order to pay back the loans, had to rely on other sources besides their enterprise, including borrowing from other sources for some of them. Positive impacts on women's empowerment cited in the study include increase in women's self-confidence, access to finance and microenterprises, increase in basic literacy skills, and respect in household and community.

Similar findings were echoed in a study by Dhakal which finds that 84 percent of the female beneficiaries surveyed from different categories of microfinance service providers were all still involved in traditional economic activities such as agriculture and livestock rearing and other small trade/service related activities that are generally considered to be "women's work" outside of the private sphere. The study also finds that most of the clients received no support from microfinance institutions in venturing out into non-traditional businesses.

Microfinance programs that do not carefully study the gender roles and needs in a given context can also have the effect of overburdening women with both household chores as well as income generating activities. Besides, decisions on expenditure may still be in the hands of the man of the household. Such intra-household inequalities can also be seen in the preference of sending a boy child to school while the girl child is left with household chores, even if the woman of the household is economically active. A study by Christian Lehmann on microfinance programs in rural Mexico

finds that the probability of child labor in a household increases by 43 per cent when a mother starts to work, irrespective of the household's economic status. In this case, mothers find it a better option to take the children to work with them due to lack of childcare facilities. As such, children support them in their entrepreneurial activities and end up participating in child labor.

Theories on the relationship between microfinance and women's empowerment is fraught with scholarly conflict. Naila Kabeer uses her work on an impact assessment study of the Small Enterprise Development Project (SEDP) in Bangladesh to fill in some of the gap in current literature concerning tangible and intangible impacts of microfinance on women's empowerment. From qualitative as well as quantitative assessments, Kabeer finds that male microcredit borrowers are more likely to be primary decision makers of loan access and utilization, profit utilization, as well as general household matters; whereas, female borrowers were more likely to report joint decision making in all areas. The study also finds that female borrowers were more likely to invest part of their loans in enterprises managed by men than men invested in enterprises managed by women. Furthermore, when male borrowers did invest in women's enterprises, they were more likely to exercise greater authority in managerial decision-making than women when they invested in men's enterprises.

On the positive side, the study finds that women reported increased self worth and dignity even though their workloads may have increased significantly as a result of new entrepreneurial investments. Kabeer also reports that although women from one of her sample areas were found to spend more on household consumption rather than on productive enterprises, it has more to do with the fact that they come from poorer households that need to first meet their basic needs of food, clothing, and shelter. On the other hand, she finds that women from a better-off community wanted to invest more in future security measures, such as purchasing land or mortgaging.

2.3. Gender Mainstreaming in Microfinance: What it Means and How it Can Be Achieved

A study by INAFI Bangladesh on the empowerment of microfinance borrowers describes gender mainstreaming as a process that involves a thoughtful analysis of a microfinance institution, its policies, programs, as well as products that can potentially affect men and women differently. Gender mainstreaming would then lead to making these processes and tools more suited to meet the differentiated needs of men and women, as well as to contribute to women's empowerment.

The common trend among most MFIs, following the popularly received Grameen model, has been that of prioritizing female clients for product and service delivery. Literature presents many advantages of offering financial access to women for the microfinance service providers. The most commonly cited reasons are high repayment rates among women, less chances of the money being misused is wasteful activities, and the idea that women's access to income increases not only her own well-being but that of her children and family as a whole in terms of improved nutrition, health, and education. As such, positive discrimination towards women to promote women's economic independence through income generation and asset building is seen by most practitioners as an automatic path from poverty alleviation to women's empowerment. Unfortunately, this line of reasoning has the potential to overlook persisting intra-household inequalities, which may trigger negative outcomes of credit access to women, including household conflict and domestic violence.

Gender inequality is an all-pervasive phenomenon that transcends economic and geographical boundaries. As such, microfinance is at a unique position to not only promote gender parity at the client level, but through organizational gender mainstreaming, female staff will also be in a position to challenge traditional gender roles prescribed to them by society. To that end, mainstreaming gender requires women not be confined to stereotypical gender roles even within an organization

(such as that of a secretary, receptionist, or junior staff). Where and when possible, women should be given equal access to leadership and management positions. Since one of the reasons women may not be recruited in higher positions is because of the structural barriers, such as access to education and adequate training background, efforts should be made to build up their human capital.

3. Conceptualizing Gender Issues in Microfinance

"In practice, gender mainstreaming means identifying gaps in gender equality through the use of gender-disaggregated data; developing strategies to close those gaps; putting resources and expertise into implementing strategies for gender equality; monitoring implementation; and holding individuals and institutions accountable for results"

3.1. Mayoux's Paradigms

Linda Mayoux has been working towards the goal of mainstreaming gender in microfinance across continents in Asia, Latin America, and Africa. She has summarized the predominant strategies of microfinance organizations and donors towards women's empowerment into a set of "paradigms of best practice": the feminist empowerment paradigm, the poverty alleviation paradigm, and the financial sustainability paradigm. Mayoux is of the view that gender and women's empowerment issues are approached only on the surface levels in the last two paradigms. These paradigms provide a good reference point to analyze the priorities taken up by the MFIs being studied in light of the goal of women's empowerment.

3.1.1. Feminist Empowerment Paradigm

This paradigm considers microfinance as an "entry point" in the process of the empowerment of women. The goal is transformation of power relations within society in favor of women's humans rights and gender equality. Microfinance service delivery can go beyond access to credit and financial services to linking up women's businesses to local markets, providing access to technology that may be less labor-intensive, and strengthening access to information, services, and networking among women. Organizations providing access to financial services have the potential to challenge gender discrimination. Several organizations, such as Self-Employed Women's Association (SEWA), in addition to providing access to credit, have also supported women's organizations, legal rights of women, and gender advocacy. Financial service providers can play a role in access to property rights for women and intervene when necessary to deal with intra-household gender power disparity.

3.1.2. Poverty Alleviation Paradigm

Under this paradigm, the primary focus of programs is in promoting livelihoods and household wellbeing. Women's empowerment is seen as a controversial and political matter best left untouched by "outsiders". Rationale for providing microfinance services for women is that women are among the poorest of the populace, and since they are mostly found in the role of caretaker for a household's wellbeing, providing credit to them is thought to have more impact of poverty alleviation. Increased income and wellbeing is automatically thought to empower women to challenge gender disparities.

3.1.3. Financial Sustainability Paradigm

The main focus of this paradigm is financial self-sustainability of the organization through increase in cleintele, group-based structures to lower delivery costs, and higher interest rates to cover operational costs. Women are targeted for their high repayment rates and contribution in economic activities. Empowerment is seen as a direct consequence of access to credit which allows women to make financial decisions and increase their wellbeing as well as contribute to economic growth.

4. Methodology and Limitations

For the purposes of the study, a gender checklist was identified for the institutional level and the client level. Organizational level survey on practice and perceptions related to gender mainstreaming was conducted in 43 MFIs from Kathmandu, Biratnagar, and Chitwan (See Annex 2 for the list of MFIs). Similarly, client level interviews on empowerment indicators were condcuted of 168 clients from 16 MFIs in Banke, Bardiya, Morang, Jhapa, and Chitwan districts. All sampling was done purposively.

One of the limitations of the study is the small sample size. Given the nature of the study and the short time frame, a widescale study could not be conducted which inhibits the external validity of the study. The second limitation has to do with the fact that client surveys were only collected from local level cooperatives and NGOs, and findings may differ from other types of MFIs. Finally, since this is not an impact assessment study, it does not use client surveys from the same organizations that were surveyed for organizational indicators.

5. Data Analysis

As mentioned above, two levels of data were collected for the purposes of the study. The first level of data collection constituted of surveys collected on gender profile of microfinance institutions (MFIs). The second level of data collection consisted of surveys of female microfinance clients on indicators related to women's empowerment.

5.1. Organizational Level Data Analysis

Data on organizational indicators were collected from Kathmandu, Biratnagar, and Chitwan. Altogether, 43 MFIs were surveyed on organizational gender profile and commitment to gender equality. Among the 43 MFIs, there were 21 cooperatives, 11 women's cooperatives, 4 NGOs with microfinance components, and 7 microfinance development banks. The list of MFIs surveyed can be found in Annex 2.

The following table provides a summary of the findings:

Table 1.1. Description Statistics of Organizational Level Variables

Continuous Variable	Description	Obs	Mean	Std. Dev.	Min	Max
ECFemale	Number of women in the Governing Board/Executive Committee	42	11.57	43.0	0	282
ECMale	Number of men in the Governing Board/Executive Committee	42	14.26	60.5	0	396
ECFemPercent	Percentage of women in the Governing Board/Executive Committee	42	48.86	40.4	0	100
SenFemale	Number of women in senior level management	33	0.67	0.8	0	3
SenMale	Number of men in senior level management	33	2.42	2.7	0	9
MidFemale	Number of women in mid level management	33	1.24	2.1	0	11
MidMale	Number of men in mid level management	33	8.94	17.6	0	74
FieldFemale	Numbe of women as field staff	34	7.76	15.7	0	58
FieldMale	Number of men as field staff	33	33.64	68.5	0	223
OtherFemale	No. of women in other positions	33	3.39	7.9	0	30
OtherMale	No. of men in other positions	33	10.67	33.2	0	177
TotFemale	Total no. of female staff	43	11.21	19.9	0	89
TotMale	Total no. of male staff	43	42.60	90.9	0	389

Continuous Variable	Description	Obs	Mean	Std. Dev.	Min	Max
FemPercent	Women as a percetage of total staff	40	55.30	38.5	0	100
FemaleClie~s	No. of female clients	38	18155	38558	25	147718
MaleClients	No. of male clients	38	266.58	509.5	0	2635
femclientp~t	Women as a percentage of total no. of clients	36	74.45	28.6	20.3	100
IntWomen	Interest rate for women	31	15.48	4.1	8	24
IntMen	Interest rate for men	16	13.55	3.4	8	19
GenPolicy	Presence of a gender policy. 1=Yes, 0=No	38	34%			
GenTraining	Provision of gender training to staff members. 1=Yes, 0=No	38	42%			
WomensGroup	1 if the MFI is a women's cooperative; 0 otherwise	43	26%			

5.1.1. Governance

On average, about 49% of the governing body members were female. Although this figure projects a situation of gender parity, the standard deviation is a high 40%, which reflects a wide variation in gender parity at the governance level among the different MFIs. A further analysis sheds light on a fuller picture. When the 11 women's cooperatives are excluded from the sample, the average comes down to about 31%. Moreover, 7 out of remaining 21 MFIs had no female representatives in their governing board, and 4 of these were development banks. On the other hand, excluding the women's cooperatives, 3 MFIs had a 100% board representation by women. All women's cooperatives had a 100% female board representation.

5.1.2. Staff Profile

Women represented about 55% of total staff on average, once again with a high standard deviation of 39%. The average fell down to 41% when women's cooperatives were excluded from the sample. Among women's cooperatives only, female staff as a percentage of total staff was a high 94% with a relatively lower standard deviation of 19%. Average number of total female staff in a given MFI was 11 and total male staff was 43.

Excluding women's cooperatives, about 65% (17 out of 26) of the MFIs had no women in senior level management; 38% (n=10 out of 26) had no women in mid-level management, 38% (10 out of 26) had no women as field staff. Four MFIs (15%), excluding women's cooperatives, did not have any men in senior-level management, 5 MFIs (19%) had no men in mid-level management, 5 had no men as field staff.

5.1.3. Gender Policy and Gender Training

Only 34% (n=38) of the MFIs surveyed reported as having a formal gender policy in place. Some of the cited material in the content of formal gender policy included maternity leaves, positive discrimination towards women during the recruitment process, and quota for women's representation in the executive committee. Some positive trends adopted by MFIs towards gender equality at the client level include inclusion of women, Dalit, and indigenous groups in membership, priority to women in loan disbursement, and provision of childcare facilities for female participants.

Sixteen out of 38 (42%) MFIs reported having provided gender training to their staff. However, follow-up and monitoring, as we as full staff participation in such trainings were rare.

5.1.4. Rationale for Working withFemale Clients

The MFIs were asked to share their reasons for serving women. A total of 15 responses were received on the question. The following table shows the reasoning provided by MFIs classified into Mayoux's three paradigms. Most of the responses provided by MFI representatives belong to the

Feminist Empowerment Framework and the Financial Sustainability Framework. One of the reasons received frequently for serving women was the fact that they either belong to a Women's Cooperative or own shares/are the founding members. I have placed these in the Feminist Empowerment Framework. Not surprisingly, most responses in the Feminist Empowerment Framework came from Women's Organizations.

Table 1.2. Rationale for Serving Women- Mayoux's Paradigms

Financial Sustainability Framework	Poverty Alleviation Framework	Feminist Empowerment Framework
Women are reliable and sincere.	To empower the poor and the disadvantaged.	To respect women because women are hard working, patient, and disciplined
Women are very loyal and make repayments on time. They do not misuse the loans	Once women are empowered, the whole family benefits from it	To empower women
Women lack financial access	Men and women must work together for household wellbeing	It is a women's cooperative; they are the shareholders; the founding members are women
Most women don't have assets to use for collateral. Therefore, providing collateral- free loans is a step towards narrowing the gap between men and women in terms of access to credit		Women are more disadvantaged than men in most aspects of social and family life. Participation in the program can improve their status and wellbeing
Men are diverted in many social and political issues, and are less attracted to income generation through small loans		Women's work is still not evaluated economically. This program is directly connected with economic empowerment of women, which can bring social and household level recognition to women.
		Most women are deprived economically and socially. They dependent on men for even basic needs. So our target groups are women and ethnic minorities

5.1.5. Portfolio

- Clientele: On average, women represented about 74% of the total number of clients. The average composition of women in MFIs excluding women's cooperatives was about 67% with a standard deviation of about 29%. The minimum percentage of female client composition in these MFIs was 20% and the maximum was a 100%. About 42 % of the MFIs (16 out of 38) had no male clients, while women represented some portion of the clientele of all MFIs.
- Interest Rates: MFIs were asked to provide an average interest rate figure that was commonly used in loans given to men and women. Given the use of a diverse range of MFIs in the sample and the variation of interest rates with loan size and products in some MFIs, the median value of the interest rate was used when a range was given (for e.g. if the interest rate was between 18-24, 21% was taken as the interest rate for the purposes of the study. The average rate of interest for female clients in the given sample was 15% (n=31) with a standard deviation of 4%, a maximum of 24% and a minimum of 8%. The average rate of interest for the male clients was 13.5% (n=16) with a maximum of 19%, a minimum of 8%, and a low standard deviation of 3%.

5.1.6. Monitoring women's control over loans

None of the MFIs surveyed had a formal mechanism for monitoring control over the loans by women. Although some reported as having routine visits as part of their loan monitoring activities, it was not made clear whether the visits were designed to assess and reinforce women's ownership of the loan.

5.1.7. Financial and Non-financial Products and Services:

Table 1.3 provides a list of financial and non-financial products and services provided by the MFIs.

Table 1.3. List of Products and Servicesfor Women

	For Women
Financial Products and Services	• Loans: group guarantee loan, collateral loan, home loan, health loans, education loan; income generation loan; pregnancy loans; loan for daughter-in-law's education; disaster relief loans; provision for loan repayment in kind, hire purchase loans; loans for migration; seasonal and regular loan • Savings: Children's savings plan, women's saving plan, pension savings • Insurance: microloan insurance, Livestock insurance • Remittance: money transfer • Other: membership discount card; discount for ambulance services; discount on drugs and ambulance services for disadvantaged community members; discount for poor members; funeral expenses; support to the needy from cooperative fund; loan delivery service for elderly clients
Non-Financial Products and Services	• Agriculture and Livestock: Shed repair, animal feed production, livestock medicines, chemical fertilizers, seeds, • Trainings: beautician training, tailoring training, business development trainings, cooperative management training for women from disadvantaged communities • Community Development: Social activities and trainings: health camps, disaster relief funds, scholarship programs, • Health: basic health check up services; free health care services for members above age 100, free check ups for pregnant women; • Other: membership granted with lower shareholdings; Hat Bajar (periodic market) services

5.2. Client Level Data Analysis

Surveys of 168 microfinance clients were collected from Banke, Bardiya, Morang, Jhapa, and Chitwan districts for client level data analysis. The microfinance clients surveyed belonged to local partner organizations of three NGOs: Development Exchange Center Nepal (DEC Nepal) Chitwan, Digo Samajik Bikas Kendra, Nepalgunj, and Shrot Bikas Kendra, Biratnagar. The list of NGOs and cooperatives whose clients were surveyed for this research can be found in Annex 1.

The following indicators were used to analyze women's empowerment at the client level:

Table 1.4. Descriptive Statistics of Client Level Variables

Continuous Variable	Description	Observations	Mean	Std. Dev.	Min	Max
No. ofLoans	No. of loans taken from the current MFI	166	3.28	2.22	0	12
FirstLoan	First loan size	117	8428.20	6952.59	500	30000
RecentLoan	Recent loan size	75	16220.00	17021.70	2500	100000
Busiexpense	Monthly business expense	82	6903.20	13904.56	0	100000
Total income	Total income per month	78	10233.92	14969.20	0	65000
Categorical Variables	***Description***	***Obs***	***Dummy Variable=1 (% of Sample)***			
NoSchool	No formal schooling. 1=Yes, 0=No	166	0.54			
SomeSchool	Some schooling (Below 10th grade). 1=Yes, 0=No	166	0.37			
Grade10	10th grade and above. 1=Yes, 0=No	166	0.10			
Married	1 if married; 0 otherwise	168	0.98			
Husbandwork	Does husband work? 1=Yes, 0=No	160	0.98			
OtherLoans	Previous involvement in loan programs with other organizations. 1=Yes,0=No	165	0.35			
YearsofLoan	No. of years in loan program (1=five or less; 0=more than 5)	166	0.52			
Collateral	Use of collateral. 1=Yes, 0=No	162	0.12			
Interest	Satisfaction with current interest rate. 1=Yes, 0=No	166	0.90			
Entrepreneurship	Involvement in entrepreneurship activities. 1=Yes, 0=No	168	0.70			
SkillTrain	Skill trainings received. 1=Yes 0=No	166	0.54			
Governing		166	0.16			

Continuous Variable	Description	Observations	Mean	Std. Dev.	Min	Max
	Governing member of the group. 1=Yes, 0=No					
FamApp	Family approval for joining the group. 1=Yes, 0=No	168	0.93			
LoanUser	Independent/Joint loan user.(1= Yes, 0 =no, i.e.no decision-making power)	166	0.76			
LoanUseIG	Loan use for income generating activities. 1=Yes, 0=No	166	0.52			
LoanUse2	Loan use for other activities such as healthcare, children's education, festivals, etc.	166	0.62			
DaughterEdu	Does daughter go to school? 1=Yes, 0=No	136	0.82			
SonEdu	Does son go to school? 1=Yes, 0=No	153	0.83			
Findecision	Independent/joint decisions on household finances. 1=Yes, 0=No	163	0.70			
Loandecision	Independent/ joint decision on how to use the loan. 1=Yes, 0=No	164	0.70			
Profitdecision	Independent/joint decision on how to use the profit. 1=Yes, 0=No	165	0.72			
ChildEdu	Independent/ joint decision on children's education. 1=Yes, 0=No	163	0.71			
LoanOwner	Client has a loan registered in her name.1=Yes, 0=No	168	0.91			
Landowner	Client owns land. 1=Yes, 0=No	168	0.29			
Husabandland	Client's husband owns land. 1=Yes, 0=No	161	0.80			
BusinessOwner	Client owns business. 1=Yes, 0=No	167	0.42			
AssetOwner	Client owns asset besides land, such as rickshaw, livestock, house, or bank account. 1=Yes, 0=No	167	0.69			

Continuous Variable	Description	Observations	Mean	Std. Dev.	Min	Max
AssetControl	Ability to buy and sell one's assets. 1=Yes, 0=No	163	0.45			

5.2.1. General Client Profile

Most of the clients surveyed belong to the age group 25-45 with 36% of the sample (n= 61) between 25-35 years of age and 35% of the sample (n=58) between 35-45 years of age.

In terms of schooling, about 54% (n=89) of the respondents have had no formal schooling. Among those who have had some years of formal education, about 10 % (n=16) had completed 10th grade or above, and about 37% (n=61) have received some schooling below the 10th grade.

Almost 98% (n=164) of the clients were married. Among the married, 156 women reported their husbands to be involved in some form of income generation activities, while 4 said their husbands did not work. Four of the respondents were married but single (either because the husband died or because the husband married someone else).

5.2.2. Loans

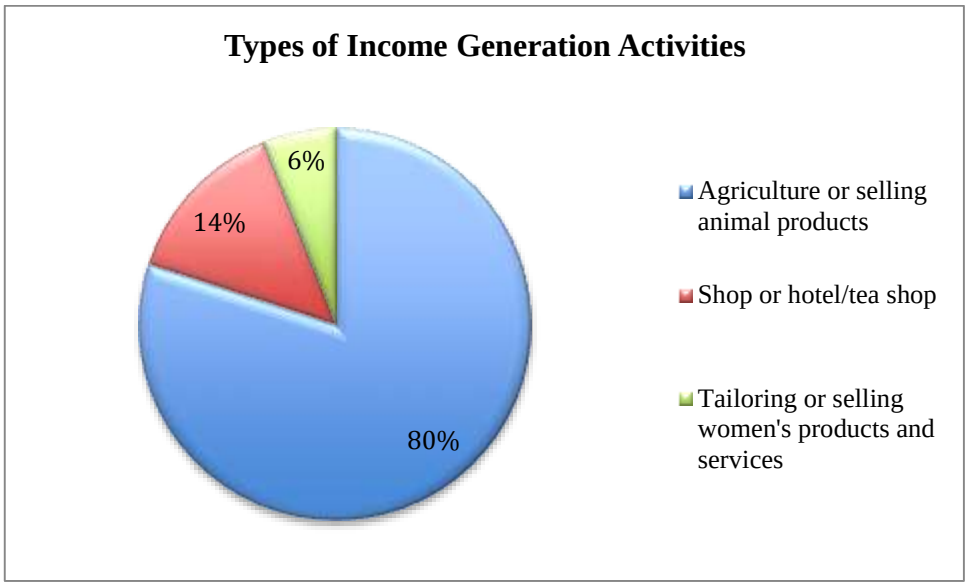
About 52% of the clients have been involved in the current loan program for less than five years, while 48% have been in the loan program for more than five years. About 30% of the respondents have been previously involved in loan programs with other providers. The average number of loans taken per respondent is about 3, with a maximum of up to 12 loans. Most recent loans of the respondents were taken between 2005 and 2011. The average loan size is Rs. 16220 with a minimum of Rs. 2500 and a maximum of Rs. 100000. However, almost 90% of the loans taken most recently were below Rs 25000. The one person who borrowed Rs 100000 had to use land as collateral. The loan was not taken for income generating activities.

Most respondents reported not having to use any collateral for the loans. Twelve percent of the respondents used collaterals. Most common form of collateral used was savings account. About 90% of the respondents reported being satisfied with the interest rate.

5.2.3. Entrepreneurship

Seventy percent (n=118) of the respondents reported being involved in some form of income generation activities. The most common economic activities were livestock rearing and farming. Among those who were economically active (n=108), about 80% were involved in farming, livestock rearing, or selling animal products, while 14% had a shop or a food place, and 6% were involved in tailoring or selling women's products and services (cosmetics and hairdressing).

Chart 1. Types of Income Generation Activities



The average monthly business expense is Rs. 6903, not including loan payments. The average monthly income is Rs. 10234.

5.2.4. Skills

About 54% of the respondents have received some form of skills training from the microfinance organization they are currently involved with. Trainings received included those on off-seasonal vegetable farming, livestock rearing, tailoring, precaution against snake- bites, and awareness programs on the importance of higher education.

5.2.5. Loan Use

About 91% of the respondents have loans registered in their names. Loan usage varied from use in income generating activities to that in household consumption. About 52% of the respondents borrowed money for income generation activities, while 62% (including someof those who borrowed for income generating activities) used the loans for other activities such as children's education, festival expenses, healthcare, and buying durable goods.

5.2.6. Financial Access and Decision-making

Most women reported being involved in either independent or joint decision- making with their husbands at the household level. Majority of the women who said they were involved in independent decision-making were either married but single, or those whose husbands were abroad. About 76% of the respondents reported as being involved in using the loans either independently or in joint partnership with their husbands. On financial decision-making regarding household expenses, 70% of the women said they were involved in either independent or joint decision-making, which means a significant 30% of the women have no say in financial matters at the household level. Similarly, about 30% of the women reported as having no say on how to use the loans, and approximately 28% of the women said they had no say in the utilization of profits. Within the household, 29% of the women have no control over decision-making regarding children's education.

5.2.7. Access to and Control over Assets

Although majority of the women work on farm-related activities, only 29% of the women own land. On the other hand, 80% of the respondents' husbands own some amount of land. About 42% of

the women said they own some type of business (agriculture-related inputs, livestock, corner shops/hotels, tailor shops, or beauty parlors). Besides land, 69% of the women said they have other assets in their name, the most common assets being livestock and bank account. However, only 45% respondents said they could buy and sell asset as they pleased.

6. DISCUSSION OF FINDINGS

i) Women's and Men's Representation in Microfinance

At first glance, women's representation in the governing board of MFIs seems on par with that of men. However, when women's cooperatives are excluded from the sample, women's representation is only 31%. Furthermore, a third of the remaining 21 MFIs had no women in their governing body. Similarly, not counting the women's cooperatives, 65% of the MFIs had no women in senior-level management. Excluding the women's cooperative, women represented, on average, 41% of total staff. The need for mainstreaming gender is acute at the organizational level. Studies show that women in leadership positions are more responsive and sensitive to the needs of female clients. Similarly, women play a unique role at each level of staffing. For instance, female clients may feel safer to confide in female field staff in cases of loan misuse by their husbands.

As clients, although women represent almost 75% of the clientele of MFIs, these women are rarely involved in decision-making processes of matters such as the interest rate structure or the repayment schedule. The common approach of MFIs is a top-down delivery system where women are given the details of the loan mechanism fixed by the MFIs. Clients are normally givena Pre-Group Training (PGT), which explains the interest and repayment mechanism. The importance of setting the interest rate has been deemed most necessary for covering operational costs of MFIs, as well as making up for the small-sized loans and any losses incurred on the provision of collateral-free loans. However, studies find that the methods of interest rate caluclation and repayment schedules have a significant effect on loan usage and income. According to Mayoux, both of these instruments need to be based on a participatory decision-making among the clients. Some communities may prefer fixed interest rates for ease of calculation, while others my prefer declining interest rates which allows women to pay back as soon as the money becomes available, rather the having the money be spent somewhere unproductive. Similarly, Mayoux finds that when borrowers set the repayment schedules themselves, the repayment rate as well as strategic use of loans is likely to be positively afftected. These repayment rates need to take into account factors such as the limits in cash-flow during the initial phases of a business.

The fact that more than 40% of the MFIs had no male clientscan also play a negative role on promoting gender equality. For gender mainstreaming to take place, men and women should be equal participants in the change process. As such, microfinance programs should also focus on targeting strategic gender needs of women by involving men in both credit and savings programs. By providing credit to both men and women, there will be a higher chance of loan usage by the female borrower. Similarly, promoting saving habits among men can have a positive impact on their hosuehold contributions and future security of the household members.

Only one organization, SOLVE Nepal, reported as having female clients represent a certain percentage of their board.

ii) Institutional Operating System, Policies, and Programs

Gender Policy and Training

Only 34% (n=38) of the MFIs surveyed reported as having a formal gender policy in place. The importance of formalizing a gender policy can be seen in different ways. A policy that is formalized is systematic and has the potential to reinforce institutional accountability. Making the staff as well

as clients aware of the gender policy is an important, inclusive step towards making them better informed and increasing a sense of ownership and responsibility among them. Among those with an existing formal gender policy, the content of gender policy included maternity leaves, positive discrimination towards women during the recruitment process, and quota for women's representation in the executive committee. Although 42 of the MFIs reported having provided gender training to their staff, there was rarely any follow-up and monitoring on the utilization of such trainings.It was also seen that gender training was only provided to some staff members. Such trainings should be provided strategically at all levels of staffing.

Services for Female Clients

It is the general conviction among MFIs that women "prefer" or can handle only small loans to start up small businesses. Mayoux argues that this is only true in the initial phases, and such an outlook has the potential of keeping women in the lower paying economic activities compared to men. The findings of this study support Mayoux's argument. The average loan size was Rs 16220 and almost 90% of the loans taken most recently were below Rs 25000.One of the most common feedbacks that came from female clients on the role of microfinance in women's empowerment was to make larger loans accessible to women.

Some loan products that were particularly targeted towards women's wellbeing and empowerment included pregnancy loans and loan for daughter-in-laws' education. Such loans can be easiliy monitored and have the potential to directly enhance women's living standards. Non-financial services provided by the MFIs included beautician and tailoring training, business development trainings, and cooperative management trainings. Non-traditional trainings (such as computer training or driving training for women) were not reported.Since more than 90% of the clients surveyed were married, the trainings may have been tailored for such women and the social envrionment that surrounds them. However, there are drawbacks to such an approach which will be discussed further in Section VII.

iii) Loan Utilization and Entrepreneurship Development

Majority of the women (70%) were found to be involved in income generation activities. The most common economic activities were related to agriculture and livestock rearing (80%), followed by shop/hotel ownership (14%) and tailoring or selling women's products and services (6%). These activities are largely seasonal and women hardly benefit at all from economies of scale. Based on the average monthly income of a little over Rs. 10,000 with monthly expenses of over Rs. 6000, not including interest payments, there is little surplus left from such businesses. Trainings provided by the organizations may be demand-driven, and hence, also mostly support traditional activities. The only innovative training provided was that on off-seasonal vegetable farming, which again brings best results when farmers are able to scale up. With only 29 percent of the women owning any land, women are directly dependent on their husbands, (80% of whom own some amount of land) for economic resources.

About 91% of the respondents have loans registered in their names. However, when it came to decision-making about loan utilization, more than 70% of them said they are involved in joint-decision making about loan usage.

In terms of loan monitoring, the presence of a formal monitoring mechanism was not reported by any of the MFIs surveyed. Regular field visits are a part of the protocol, but rarely address the issue of resource sharing within a household. One of the main complaints from the clients was regarding the lack of a monitoring mechanism on what activities the loans are used for.

iv) Women's Access to and Control over Economic Resources

Most women reported as being involved in independent/joint decision making in decisions regarding loan utilization, household finances, profit utilization, and child education. Those who reported making decisions independently were mostly either married but single or whose husbands are working abroad. Although, joint decision-making is a valued feature of any household and society, power-inequalities can and do surface in such decision-making. It would take a similar survey of male clients to see whether men are more likely to make decisions independently, or whether joint decision-making is truly a part of the Nepali culture. The study cited earlier by Shtrii Shakti finds that there are differences among ethnic groups in terms of women's decision-making power.

As mentioned earlier, the study finds that although most women work on farm-related activities, they are still dependent on their husbands who are often the owners of the household property. Besides land, women also have assets such as livestock and bank accounts. However, only 45% of them said they could control their assets (buying and selling) independently.

7) Conclusion and Policy Recommendations

"What is particularly worrying about the current situation is that financially sustainable minimalist microfinance is being promoted as the key strategy to poverty alleviation and empowerment in response to ever-decreasing official assistance budgets. Unless microfinance is conceived as part of a broader strategy for transformation of gender inequality, it risks becoming yet one more means of shifting the costs and responsibilities for development onto very poor women."

Mayoux's statement quoted above aptly describes the stage that the microfinance sector has evolved to in most developing countries such as Nepal. Access to credit is promoted as the most important contribution of microfinance towards the primary goal of poverty alleviation and women are seen as a buffer to risks borne by MFIs since their repayment rates are higher and they are more reliable and tractable than men when involved in income generation activities. Women's empowerment and gender equality are seen as by-products of access to finance and entrepreneurship.

On an optimistic note, the study also highlights some positive trends in MFIs in Nepal towards promoting gender equality through positive discrimination towards women at the organizational level in some of the MFIs and innovative products that target Strategic Gender Needs (SGN) of women.

The following are some recommendations that have emerged from this study:

1) Institutionalization of a Formal Gender Policy

A formal policy on gender equality must be designed and communicated with all levels of staff in a participatory, inclusive process. The content of the gender policy should portray practical needs of men and women and must aim to promote gender equality within the institution. Measurable gender-disaggregated indicators must be used to monitor progress and identify gaps on a regular basis. A designated position for a Gender Expert may be necessary to oversee progress in gender mainstreaming in the organization. Finally, gender trainings must be followed up with pre- and post-evaluations.

2) Access to Markets

One of the feedbacks from microfinance clients included not only access to skills but also to markets for products that use those skills. A careful market assessment and a demand-driven skills package should be provided to the clients to guarantee highest returns to their investment. An interesting case of a minority ethnic group, the Badis, highlights this fact. The women were given livestock rearing skills but the community would not buy milk from them, as they are considered untouchable. In such cases, awareness trainings are equally important.

3) Non-traditional Activities and Economies-of-Scale

For women who do not own land, promotion of collective land ownership or setting up of producers' cooperatives to benefit from greater market monopoly versus increased competition may be needed.

4) Promoting Women's Entrepreneurship

a. Risk-taking behavior: Group guarantees often discourage risk-taking behavior because the risk is borne by the entire group. Therefore, for promising entrepreneurs with good track records, independent loans should be made available.

b. Flexible Repayment Schedules:Depending on the type of entrepreneurial activities, women may or may not have weekly/monthly cash flow required to meet the repayment schedule fixed by the microfinance service providers. Studies show that when women are allowed to set their own repayment schedules, repayment rates are higher and women invest more strategically.

c. Larger Loans: Although the larger MFIs do have a provision for larger loans, the smaller cooperatives often lack the capacity. In such cases, the cooperatives should provide women with a channel to tap into resources offered by larger MFIs or other financial sources. In any case, such larger loans often require collateral which the women may not be able to provide. Savings account is one form of collateral commonly used by MFIs. Based on case studies collected by Mayoux, she finds that many women prefer to have larger loans which she argues should be given on the condition that they register any assets purchased in their names, and are involved in loan activity such as accounting, managing, and business planning (Mayoux, 2002, p.29). This meets the dual goal of promoting women's entrepreneurship as well as their access to and control over economic resources

d. Skills Trainings: Most skills trainings provided by the MFIs such as beautician training and tailoring training, training on agricultural and livestock farming, rarely challenge gender roles and are often catered towards married women. In fact, majority of the clients interviewed were married. Such skill sets do little to move women up the economic ladder. Non-traditional trainings such as computer training or off-seasonal vegetable farming may have a better scope of increasing women's economic empowerment.

5) Monitoring of Loan Use

One of the feedbacks that came from the clients themselves was the need to monitor the use of loans in purposes that the loans were taken for initially. Without a formal monitoring mechanism, loans taken for productive purposes may end up being used for household consumption, and the clients end up indebted. Such misuse of loans also fosters duplication of loan services. One way to counter misuse of loans is by offering diversified loans such as those for healthcare only. However, without strict monitoring, even such loans were found being used for other purposes.

One interesting response received from an MFI representative was that "men and women are part of a family." This view that whatever benefit accrues, it will be shared by the family should be challenged through microfinance. Household inequalities in access to resources such as education

and economic opportunities should be studied carefully and interventions designed accordingly through microfinance practitioner institutions.

6) Increasing Women's Asset Ownership

Mayoux suggests that for an empowerment approach, MFIs should go beyond offering financial access to women based on social collateral in the form of group guarantee. Instead, MFIs should go a step further to register any assets bought by women using the loans in their own names, which can also be seen in the form of collateral, but more importantly, which will guarantee a way forward in women's control over assets. Some programs, including Grameen Bank's, already have similar schemes. Men who take large loans, such as housing loans or loans for productive assets such as a rickshaw, are required to register the asset in joint name to access the loan.

7) Shared Liability of Loans

About 91% of the respondents have loans registered in their names. However, when it came to decision-making about loan utilization, more than 70% of the said they are involved in joint-decision making about loan usage. In such a case, it calls for loans to be a liability for both the husband as well as the wife.

8) Gender Disaggregated Data Collection

Over a series of interactions and workshops related mainstreaming gender in microfinance, I was able to interact with a number of MFI officials from managerial level and higher. One of the comments received was about the need for research on the contribution of microfinance in women's empowerment. Self-confidence as seen in group meetings in the presence of outsiders is only one indicator of empowerment.For MFIs and researchers to say anything positive or negative about the contribution of microfinance towards gender equality and women's empowerment, collection of gender-disaggregated data from the clients' households is crucial.

9) Non-complacency towards increased household income

Joint decision-making, it was argued by some, is already a progress from the position that women held in the past. This notion is true to some extent; however, the final decisions in such types of agreements are more likely to be made by the husband. It's not bad at all in terms of increasing family income, but because microfinance service providers are in a position to possibly make women more independent and self-reliant, and by doing that to challenge centuries old gender inequality, complacency over increase in household income is not the best position to take. On the other extreme, by doing so, MFIs may even be perpetuating discriminatory gender roles in society. The wisdom of the phrase "question everything" applies to microfinance practitioners as much as it does to development practitioners. In fact, microfinance practitioners are inevitably development practitioners themselves and it'd be the best-case scenario for MFIs to train staff not as commercial banking staff, but those who are more inclined towards development studies.

Annex 1

S.N.	Name of Organization	Type of Organization	District
1.	Mrigakunja Saving and Credit Cooperative Ltd., Bachhauli	Cooperative	Chitwan
2.	BachhauliNariChetana Saving and Credit Cooperative Ltd., Bachhauli	Cooperative	Chitwan
3.	Sana Kisan Saving and Credit Cooperative Ltd., Bachhauli	Cooperative	Chitwan

S.N.	Name of Organization	Type of Organization	District
4.	Shree KumrojKrishiSahakariSanstha Ltd.	Cooperative	Chitwan
5.	NariMukti Saving and Credit Cooperative Ltd., Hadikhola	Cooperative	Chitwan
6.	SrijanaSwabalamban Saving and Credit Cooperative Ltd., Hadikhola	Cooperative	Chitwan
7.	RajdeviMahila Saving and Credit Cooperative Ltd.	Cooperative	Chitwan
8.	ParivartanMahila Saving and Credit Cooperative Ltd.	Cooperative	Chitwan
9.	SarwanginSamajiUdhyamiMahila Cooperative Ltd.	Cooperative	Chitwan
10.	Shree KrishnasarAdharshaSamuha	Cooperative	Bardiya
11.	KalpataruKrishnasarKrishi Cooperative Ltd.	Cooperative	Banke
12.	SamudayikBikasSangathan		Bardiya
13.	SangamSamudayikSanstha, Kerabari	NGO with microfinance component	Morang
14.	HimshilaSamudayikBikasSanstha, Yangshila	NGO with microfinance component	Morang
15.	SamuhikBikasAviyan, Dhaijan	NGO with microfinance component	Jhapa
16.	AapasiSamajBikasSamiti, Duhagadhi	NGO with microfinance component	Jhapa

Annex 2

List of MFIs for organizational surveys

S.N	*Name of Organization*	*Type of Organization*
1	Annapurna Madhyavarti Savings and Credit Cooperative Ltd., Chitwan	Cooperative
2	AmritDharaDudhUtpadak Cooperative Ltd., Chitwan	Cooperative
3	Yeti Multipurpose Cooperative Ltd., Chitwan	Cooperative
4	NirdhanUtthan Development Bank Ltd., Chitwan	Microfinance Development Bank
5	Chhimek Microfinance Development Bank Ltd., Chitwan	Microfinance Development Bank
6	Kisan Savings and Credit Coopearive Ltd., Nawalparasi	Cooperative
7	SahajSwasthyaSahakariSanstha Ltd., Chitwan	Cooperative
8	Unique Saving and Credit Coopeartive Ltd., Chitwan	Cooperative
9	Baseni Savings and Credit Cooperative Ltd., Chitwan	Cooperative
10	Shanti KunjSamajikUdhyamiMahila Cooperative Ltd., Chitwan	Cooperative
11	Deprosc Microfinance Development Bank, Chitwan	Microfinance Development Bank
12	Sana KisanKrishi Cooperative Ltd., Chitwan	Cooperative
13	Jana Pragati Cooperative Ltd., Chitwan	Cooperative

S.N	*Name of Organization*	*Type of Organization*
14	Atmahirbhar Women's Coopeartive, Chitwan	Women's Cooperative
15	Shree GodhakSamajik Women's Cooperative Ltd., Chitwan	Women's Cooperative
16	Bees HajariSamajikUdhyami Cooperative Ltd., Chitwan	Women's Cooperative
17	SarwanginSamajikUdhyami Women's Cooperative Ltd., Chitwan	Women's Cooperative
18	NariMukti Savings and Credit Cooperative Ltd., Chitwan	Women's Cooperative
19	UjjwalMahilaBikas Cooperative Ltd., Chitwan	Women's Cooperative
20	Ratna Shree Multipurpose Cooperative Ltd., Chitwan	Cooperative
21	Alpine Development Bank Ltd., Chitwan	Cooperative
22	Hansa Multipurpose Cooperative Ltd., Chitwan	Cooperative
23	Sumnima Savings and Credit Cooperative Ltd., Chitwan	Cooperative
24	NariChetana Women's Saving and Credit Cooperative Ltd., Chitwan	Women's Cooperative
25	Prabhat Women's Saving and Credit Cooperative Ltd., Chitwan	Women's Cooperative
26	Sana KisanKrishi Cooperative Ltd., Kumenda	Cooperative
27	Shree SrijanaSwabalamban Saving and Credit Cooperative Ltd., Hodikhola, Chitwan	Cooperative
28	Pancha Tara Women's Saving and Credit Cooperative Ltd., Chitwan	Women's Cooperative
29	Shree KumrojKrisi Cooperative Ltd., Kumroj, Chitwan	Cooperative
30	MrigaKunja Saving and Credit Cooperative Ltd., Chitwan	Cooperative
31	Tarapunja Saving and Credit Cooperative Ltd., Chitwan	Cooperative
32	Jyoti Development Bank Ltd., Chitwan	Microfinance Development Bank
33	Arniko Saving and Credit Cooperative Ltd., Biratnagar	Cooperative
34	Forward Nepal, Sunsari	NGO
35	JeevanBikasSamaj, Biratnagar	NGO
36	Nerude Microfinance Development Bank Ltd., Biratnagar	Microfinance Development Bank
37	Swabalamban Microfinance Development Bank Ltd., Itahari	Microfinance Development Bank
38	BiratlaxmiBikas Bank Ltd., Biratnagar	Microfinance Development Bank
39	Swati Saving and Credit Cooperative Ltd., Biratnagar	Cooperative
40	Rajswati Women's Multipurpose Cooperative Ltd., Biratnagar	Women's Cooperative
41	Women's Cooperative Society	Women's Cooperative
42	DEC Nepal	NGO
43	SOLVE Nepal	NGO

Annex 3

Questionnaire for Microfinance Client Survey

I. General Questions

1) Name of the Organization (to be filled by the interviewer):

2) Current Age
   a. Less than 25 years
   b. Between 25-35
   c. Between 35-45

d. Between 45-55
e. Between 55-65
f. Above 65 years

3) Education level:
   a. Less than 5 years
   b. 5 to 10 years
   c. 10 to 12 years
   d. 12 years and up

4) Marital status:
   a. Single
   b. Married
   c. Married but separated/divorced
   d. Widowed

5) How long have you been involved in the loan program of this organization?
   a. Less than 1 year
   b. Between 1-5 years
   c. More than 5 years

6) Have you ever been affiliated with loan programs of other organizations?
   a. Yes
   b. No

7) Are you involved in income generating activities?
   a. Yes
   b. No

8) If yes, please list.
   .....
   .....

9) What is the operating cost per month in your current business?

10) How much do you pay per month in loan payment?

11) What is your total earning per month (not discounting cost and loan interest payment)?

12) Does this organization provide any other trainings or support services for your business development?
   a. Yes
   b. No

13) If yes, please list the ones that you have benefited from.....

II. Questions on Empowerment

14)What is your position in the group?

a. Member
b. Elected Official (please specify position).....

15) Did your husband or parents (if not married) approve of you being in the group initially?

a. Yes
b. No

16)If no, how did you find a way to be in the group?

17) Who controls the usage of the loans? (Replace "husband" by "family" in case of unmarried women)

a. Used by myself
b. Joint usage with husband/family
c. Used by husband/family

18)What activities do you use the loans for (Please tick one or more)

a. Children's education
b. Small businesses
c. Household expenses
d. Festival expenses
e. Purchasing durable goods (e.g. jewelry, furniture, bricks to build a house, etc.)
f. Other (Please specify).....

19) What activities do you use your returns/profits (if any) on? Please tick (√) the most significant ones.

a. To buy necessities for myself
b. To buy household goods
c. For son's education
d. For daughter's education
e. To pay for the loan interest
f. Based on my husband's/ parents' (if not married) decisions
g. Other (Please specify).....

20)Do your daughters go to school?

a. Yes
b. No

21)Do your sons go to school?

a. Yes
b. No

22) In you opinion, what are the most common reasons for dropouts among children?
   a. For girls:
   b. For boys:

23) Do you encounter any difficulties/obstacles in your occupation? If so, what types of difficulties?
   a. Negative attitude of society towards working women
   b. Negative attitude of husband/family (if not married) towards working women
   c. Lack of educational background
   d. Lack of business experience
   e. Lack of confidence
   f. Difficulty balancing work/family
   g. Other (please specify).....

III. Questions on Mobility:

24) How often does your group meet per month?

25) Do you have difficulties getting to your group meeting (e.g. commuting or lack of husband's/family's support)? If so, please specify.

26) Can you travel by yourself to local places such as doctors', relatives, marketplace, etc.?
   a. Yes
   b. No

IV. Questions on decision-making

(Replace "husband" by "family" in case of unmarried women for questions 27-32)

27) Who makes financial decisions at home (what to buy, how much to save, where to invest, buying and selling household goods, etc.)?
   a. Myself
   b. My husband/family
   c. Joint decision with equal contribution from me and my husband/family
   d. Other.....

28) Who decides how to use the loans?
   a. Myself
   b. My husband/family
   c. Joint decision with equal contribution from me and my husband/family
   d. Other.....

29) Who decides how to use the returns?
   a. Myself
   b. My husband/family
   c. Joint decision with equal contribution from me and my husband/family
   d. Other.....

30) Who makes decisions regarding children's education?

a. Myself
b. My husband/family
c. Joint decision with equal contribution from me and my husband
d. Other.....

31)Who makes decisions about children's (particularly daughters') marriage?
a. Myself
b. My husband/family
c. Joint decision with equal contribution from me and my husband/family
d. Other.....

32)Do you have a say in family planning? (For married women only)
a. Myself
b. My husband
c. Joint decision with equal contribution from me and my husband
d. Other.....

V. Questions on Control over Resources:

33)Are the loans taken in your name?
a. Yes
b. No

34)Do you own (are entitled to) any land?
a. Yes
b. No

35)Does your husband own land?
a. Yes
b. No

36)Do you own any businesses?
a. Yes
b. No

37)Do you own any other assets?
a. Yes
b. No

38)If yes, what kind of assets?
a. Rickshaw
b. Bank account
c. Cattle
d. House
e. Other (please specify).....

39)Do you get to buy and sell assets if you want?
a. Yes
b. No

40) If no, why not?

VI) Question of Impact of Microfinance

41) In your opinion, what are some of the ways in which you have benefited from the loan program? (May require probing)

42) In your opinion, what are some of the negative impacts of the loan program? (May require probing)

43) In your opinion, what are some of the ways in which women's position in society can be improved? (May require probing)

Annex 4

Questionnaire on Organizational Gender Mainstreaming, August 2011

Organization's Name:

Respondent's Name and Position:

General Information

1. How many governing body/EC members do you have in your organization?

   Male:
   Female:

2. What is the total number of staff?

   Male:
   Female:

3. Number of staff in senior management

   Male:
   Female:

4. Number of staff in mid-level management

   Male:
   Female:

5. Number of field staff

   Male:
   Female:

Program Details

1. Number of clients

   Male:
   Female:

2. Average age of clients

   Men:
   Women:

3. Interest rate

   For Men:
   For Women:

4. Average loan size

   For men:
   For women:

5. List of Products and Services

   For men:
   For women:

On Gender Mainstreaming

1. What do you understand by gender mainstreaming?

2. Is there a gender policy in the organization? (Please tick one)
   Yes
   No

3. If yes, what is in the content of the gender policy?
4. Is the staff (both men and women) consulted during program design, planning, and implementation? Please explain.

On Women's Leadership

1. Do you think female leaders are different from male leaders? (Please tick one)
   Yes
   No

2. If yes, in what ways?

3. Are formal and informal trainings provided for female staff (such as those on leadership and assertiveness)? Please list.

4. Has the staff received gender training? (Please tick one)
   Yes
   No

5. Do women face any challenges in accessing leadership roles in the organization? (Please tick one)
   Yes
   No

6. If yes, what type of challenges? (Please tick one or more)
   a. Social stigma
   b. Lack of educational qualifications
   c. Lack of experience
   d. Negative attitude of staff towards female leaders
   e. Difficulty balancing work/family
   f. Other (please specify).....

On Program Methods and Impact

1. How does the program impact men? State positive and negative impacts.

   Positive:

   Negative:
2. How does the program impact women? State positive and negative impacts.

   Positive:

   Negative

3. Are loans accessible to men? Why or why not?

4. What is the rationale behind 'women-only' projects?

5. Does the organization give supplementary trainings (such as business trainings or leadership trainings) to female clients? If so, please list them.

6. Are clients consulted about repayment schedules and methods of interest rate calculation? Please explain.

7. Tools for dissemination of promotional and awareness materials? (Please tick one or more)
   a. Booklets with lots of Pictures

b. Booklets in Nepali
c. Booklets in local languages
d. Street theater performances
e. Presentations by field staff
f. Other (Specify).....

8. What are the most common reasons for borrowing among women? (Please tick one or more)
   g. Children's education
   h. Small businesses
   i. Household expenses
   j. Festival expenses
   k. Purchasing durable goods (e.g. jewelry, furniture, bricks to build a house, etc.)
   l. Other (Please specify).....

9. What are the most common reasons for borrowing among men? (Please tick one or more)
   a. Children's education
   b. Small businesses
   c. Household expenses
   d. Festival expenses
   e. Purchasing durable goods (e.g. jewelry, furniture, bricks to build a house, etc.)
   f. Other (Please specify).....
   g. N/A

10. Is there a mechanism to ensure that men do not use the loans given to women? Please explain.

Abbreviations

ADB	Asian Development Bank
CGAP	Consultative Group to Assist the Poor
DEC	Development Exchange Center
DSL	Deprived Sector Lending
FINGO	Financial Intermediary Non-Governmental Organizations
FISA	Financial Intermediary Societies Act, 1999
GA	Gender Analysis
GEM	Gender Empowerment Measure
ILO	International Labor Organization
INAFI	International Network of Alternative Financial Institutions

MDG	Millennium Development Goals
MFI	Microfinance Institutions
MOs	Member Organizations
NGO	Non-Governmental Organizations
NORAD	Norwegian Agency for Development Cooperation
NRB	Nepal Rastra Bank
OGA	Organizational Gender Assessment
OGM	Organizational Gender Mainstreaming
RMDC	Rural Microfinance Development Centre
RSRF	Rural Self-Reliance Fund
SCC	Savings and Credit Cooperative
SGN	Strategic Gender Needs
UNDP	United Nations Development Program

Paper No. 26

Quantification of M2, RM and BOP for Monetary Programming of Bangladesh

Imam Abu Sayed*

Abstract

Monetary aggregates M2 and RM and balance of payments accounts are quantified examining economic variables for formulation monetary and credit programming of Bangladesh. GDP growth rate, inflation rate and income velocity of money the related elements of quantity theory of money have tested before quantifying yearly monetary growth of Bangladesh. Considering Bangladesh GDP growth model and quantity theory of money ultimately participatory and judgemental approach are pursued in quantifying M2, RM and BOP growth numbers. Monetary, external, fiscal and real sector have been analyzed in this paper in order to predict the related monetary variables and understanding the relationship between money supply and inflation. Literature survey found that the money demand function in Bangladesh is stable and highly dominated by the transaction motive for holding money. In this paper emphasis has been given in the supply side of money assuming stability in money demand. Central banks prudential policy impact the supply side, while mainly income and interest rate influence the demand for money. The objective of this paper is better arriving the components of M2, RM and BOP programming numbers ensuring desired inflation and economic growth. For this reason monetary and credit program numbers have derived scrupulously using economic tools for implementation effective monetary policy in Bangladesh.

Key words: Monetary and credit (M2) programming, reserve money (RM) programming, balance of payments (BOP) and Monetary policy.

JEL classification: E51, E58, F30 and E52.

Introduction

Monetary programming of Bangladesh determines how much money will be supplied in a fiscal year interacting monetary, external, fiscal and real sector shown in tabular form. Accordingly, trend, seasonality and future outlook of the economy is considered for deriving quarterly different components (NFA and NDA) of monetary (M2 and RM) programming numbers path, which is mentioned next. Surplus or deficit of overall balance of BOP contributes to determine the NFA of M2 and RM. Derivation of BOP numbers are also shown in this paper as a part of monetary programming. Broad money (M2) is the intermediate target of monetary policy. While, reserve money (RM) is the operating target to achieve monetary objectives. Deviation of programmed and actual paths is scrupulously monitored by the BB authority using direct and indirect (OMO) instruments. Monetary targeting is important for financial deepening and achieving final goals inflation and GDP growth in desired direction. Milton Friedman's quantity theory is used to quantify the money supply and money demand. Stability in money demand is assumed taking into consideration the transaction motive of holding money reflected in the aggregate demand function of Bangladesh. Real GDP, correlation of GDP and inflation and income velocity of money as additive factor are examined before solving quantity theory of money equation. Economic balance sheet of

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M2, RM and balance of payment (BOP) is considered in arriving programme numbers. Undesired monetary expansion comparing demand will adversely impact the inflation and output. The relation of money supply and CPI inflation exhibits especially the core inflation is monetary phenomenon. The headline inflation is impacted by seasonality, demand pull and cost push factors for instance apart from money supply. Interactions of monetary variables are the basis of this paper, which help to economic analysis in achieving two-pillar of monetary policy with stable inflation and GDP growth.

At the outset we can highlight the monetary aggregates and BOP interactions. Credit to the private sector, government sector (net) credit and net foreign assets (NFA) are the main elements of M2 from the asset side. Comparing private and government (net) sector credit of M2 the share of private and government sector is eighty percent and twenty percent respectively. Private sector credit is random or stochastic elements. Stability of private sector credit depends on micro foundation of individual and firms. This relies on among others assets and liabilities, credit rating, proper collateral, less asymmetric information and the level of moral hazard of the agents, risk proposition of individual and institution, Know Your Client (KYC) rule and global economic situation relating to micro and macro prudential policy. Success of credit to the government sectors are supported by proper securitization of treasury bills and bonds and effective secondary market. RM is the economic balance sheet of Bangladesh Bank (BB). NFA of RM arises from BOP. Substantial amount of foreign exchange reserves based on import is the cushion from the external sector perspective. Current and blocked nature debt including government bills and bonds outstanding minus deposit comprises government (net) account in RM. Open Market Operation (OMO) instruments and budgetary tools impact the credit to Deposit Money Banks (DMB's) accounts of BB. Overall surplus of BOP and foreign exchange sale and purchase impacts the NFA of RM. The BOP is prepared according to IMF definition consisting current account, capital account and financial accounts. In financial programming of Bangladesh these core elements are considered crucially taking into account quantity theory of money, econometric exercise and financial issues. Accordingly, we will derive quarterly and yearly program numbers of M2, RM and BOP in this paper due to lack of study in this area. For public sensitivity previous (FY 12-13) data is used as reference to quantify the M2, RM and BOP.

Monetary aggregates M2 and RM both have liabilities and assets. Currency outside banks and deposits includes demand and time deposits are the component of liabilities of M2. Currency issued and DMBs balance with BB as reserves encompasses liability of RM. Money multiplier indicator of financial deepening basically arises expounding currency deposit ratio and reserve deposit ratio. The effort of monetary policy is to decrease the cash currency growth and increase the time deposits for financial deepening. Our economy is sixty percent monetized. In M2 the share of deposits are growing comparing currency. This provides momentum in bringing interest rate sensitivity in the economy.

Research methodology

Monetary and economic analysis the two-pillar of monetary policy has been highlighted in this paper from sectoral economic balance sheet perspective. Macro-monetary analysis relating to quantity theory of money is verified with real term outcome. NFA, NDA of M2 and RM and BOP programme numbers are quantified linking sectoral economic balance sheet to formulate stable financial programming in Bangladesh.

Organization of the paper

Literature review is articulated in section-I. Formulation of monetary program number is described in section-II. Section-III deals with reserve money programming number in brief. Balance of

payments accounts program in short is presented in Section IV. Conclusion is represented in section-V.

Section-I

Literature review

Literature review is conducted to comprehend the interactions of M2, RM and BOP and money demand functions of Bangladesh in the cross country perspective. Pragmatic study on money demand function exists in Bangladesh (see Taslim 1983 and 1994). These studies used regression technique to estimate money demand function in Bangladesh using time series data. One of the Bank of England's two core purposes is monetary stability. Monetary stability means stable prices with low inflation and confidence in the currency. Stable prices are defined by the monetary authority's inflation target, which the Bank seeks to meet through the decisions taken by the Monetary Policy Committee. Canadian monetary policy is concerned with how much money circulates in the economy and what that money is worth. By keeping inflation low, stable and predictable, the Bank contributes to solid economic performance and rising living standards for Canadians. In the United States, the Federal Reserve is in charge of monetary policy. Monetary policy is one of the ways that the U.S. government attempts to control the economy. If the money supply grows too fast, the rate of inflation will increase; if the growth of the money supply is slowed too much, then economic growth may also slow. In general, the U.S. sets inflation targets that are meant to maintain a steady inflation of 2 % to 3%.

The money supply and money multiplier related issues of developed and developing countries have been widely worked out. Johannes and Rasche (1979), Bomhoff (1997), Park (1980), Arby (2000), Ford and Morris (1996), Baghestani and Moot (1997) have pursued studies on money supply and money multiplier of different countries. They highlighted the degree of controllability over money supply by the monetary authority, stability and predictability of money supply, determinants of money supply and policy implications for governing monetary policy.

Nasiruddin (2012) investigates the existence of a long run money demand function for Bangladesh during the period 1975-1997 using the co-integration and error correction modelling approach. It also examines the parameter stability of the money demand function. The empirical results suggest that there exists a unique long-run relationship between real broad money balance, real GDP, and the real exchange rate. The short- term dynamic behaviour of money demand has been investigated by estimating an error correction model in which the error correction term has been found to be correctly signed and statistically significant. Real GDP and the real exchange rate have emerged as important determinants of the demand for money in Bangladesh.

Islam (2000) provides new evidence on the money demand function for Bangladesh using co-integration techniques and a longer quarterly time series data than previously used. Co-integration results indicate that a single co-integrating vector describes the long-run equilibrium money demand relationship in Bangladesh for both the narrow and broad money categories. It is also found that the money demand function is stable and is highly dominated by the transaction motive for holding money. The effects of alternative opportunity cost variables on money demand were not found to be significant. The short-run money demand function was found to be stable and the speed of adjustment to the long-run equilibrium was found to be reasonable for both money categories.

Mahboob and Anisul (2012) empirically tested the money supply function for Bangladesh using annual time series data. Authors observed that high-powered money played a very significant role in the money supply process of Bangladesh, particularly with respect to the narrow money supply M1, thus providing some support for the monetarist model. However, beyond the monetarist view,

additional variables in the light of the Keynesian and structuralist analysis, such as bank rate, external resources, and financial liberalization need to be taken into account in understanding the money supply process of the country. Other aforesaid variables were also found to exert some influence on the broad money supply in Bangladesh. However, given the poor performance of the narrow money model and the existence of multicollinearity issue in both models, the estimated results, even for the broad money model, needed to be interpreted with caution.

Section-II

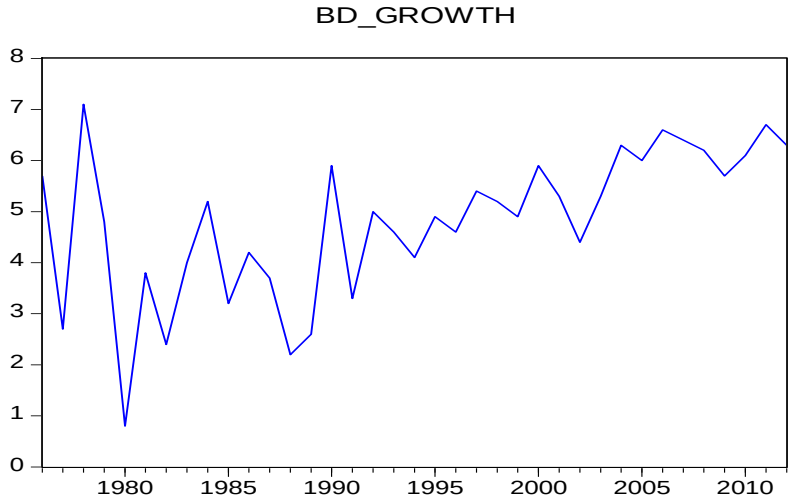
Formulation of monetary program number

Before determination of money supply we assume that money demand function is stable and is highly dominated by the transaction motive for holding money. The left hand side of quantity theory of money equation is money supply (M2). The right hand side shows the demand for money considering nominal GDP and income velocity of money. Besides, BB conducts series of meeting with the financial expert, think-tank and stakeholders before devising monetary numbers of Bangladesh. The dialogue is mainly based on interest rate, exchange rate, inflation rate, GDP growth and related macroeconomic variables of the country. BB also consult with the government in formulates monetary program. The outcome of these interactions is reflected in the M2, RM and BOP program numbers. BB publishes MPS half yearly basis assessing current situation and unfolding economic outlook for the next six months. Consequently stakeholders can form rational expectation. Study reveals apart from stochastic approach Bangladesh M2, RM and BOP data have structural adjustment issues in different decades. Subsequently, different econometric tests are applied in related variables before formulating monetary programming. Excess money supply comparing money demand will create inflation deviating equilibrium level. In Bangladesh long run equilibrium relationship exists among monetary variables, which identified exercising unit root test of related variables. ARIMA and seasonality are also consulted as part of programming. Therefore, Bangladesh GDP growth model, quantity theory of money, simultaneous equation, cointegration test and ARIMA inferences participatory and judgemental approach is pursued in quantifying M2 growth numbers of Bangladesh. Here, the growth rate of M2 for FY 2012-13 is calculated solving real GDP growth, inflation rate and percent changes in income velocity of money bearing in mind other sectoral developments. The Bangladesh's GDP growth model and inflation and income velocity of money in calculating M2 growth following quantity theory of money is mentioned next.

Bangladesh GDP growth model

The GDP growth rates of Bangladesh from 1976 to 2012 are shown in Chart-1. The growth rate of Bangladesh was fluctuated during 1976 to 1980 and afterwards it receives positive trend (Chart-1).

Chart-1



After visual inspection of the plot we estimate different growth models. The 1st model is an autoregressive process, AR(1), which is given below.

bd_growth = c + a bd_growth(-1) + u (1)

By using OLS we get the following results

bd_growth = 3.20 + 0.33bd_growth(-1) (1.e)

Adjusted R2 =0.08 Schwarz criterion = 3.66

Here the coefficient of BD_Growth(-1) is statistically significant , but the goodness of fit is not robust.

The 2nd model is an autoregressive process, AR(1) with a trend shown below.

bd_growth = c + a bd_growth(-1) + trend+ u (2)

Solving OLS we get the following outcome

bd_growth = 3.34 - 0.08bd_growth(-1) + 0.10 trend (2.e)

Adjusted R2 =0.40 Schwarz criterion = 3.31

In this observation the coefficient BD_Growth(-1) is not statistically significant, the trend is statistically significant and goodness of fit is better comparing first equation.

The 3rd model is an autoregressive proce, AR(2) mentioned below.

bd_growth = c + a bd_growth(-1) + b bd_growth(-2) + u (3)

The OLS provides the following results

bd_growth = 2.24 + 0.29bd_growth(-1) + 0.26bd_growth(-2) (3.e)

Adjusted R2 =0.15 Schwarz criterion = 3.63

Here none of the coefficients is statistically significant, but the coefficient of BD_growth(-1) is only tending toward statistical significance and goodness of fit is negligible.

The 4th model is an autoregressive process, AR(2) with a trend, which is given below.

bd_growth = c + a bd_growth(-1) + b bd_growth(-2) + trend + u (4)

By using OLS we get the following results

bd_growth = 3.33 - 0.06bd_growth(-1) - 0.001 bd_growth(-2) + 0.09 trend (4.e)

Adjusted R2 =0.40 Schwarz criterion = 3.44

In this model none of the coefficients is statistically significant, but the trend is statistically significant and goodness of fit is improved.

From the results of different AR processes, we infer that the more the lagged growth term the more the coefficient becomes to be insignificant. The model uses yearly data. In AR processes only coefficient of AR(1) is significant and AR processes with trend is not also suitable because of insignificant coefficient of lagged growth.

We will now deploy ARMA process. Therefore, The 5th model is an autoregressive moving average process, ARMA(1,1) describes below.

bd_growth = c + a bd_growth(-1) +ma(1) + u (5)

By using OLS we get the following results

bd_growth = 0.13 + 1.00 bd_growth(-1) -1.0 ut-1 (5.e)

Adjusted R2 =0.39 Schwarz criterion = 3.33,

Here all the coefficients are highly significant and goodness of fit is improved.

The 6th model is an autoregressive moving average process, ARMA (1,1) with a trend, which is describe below.

bd_growth = c + a bd_growth(-1) +ma(1) + trend +u (6)

By using OLS we get the following results

bd_growth = 4.64 -0.47 bd_growth(-1) +0.65ut-1+0.13trend (6.e)

Adj R2 =0.42 Schwarz criterion = 3.34

Here, bd_growth(-1) coefficients is insignificant but trend is significant and goodness of fit is improved.

The 7th model is an autoregressive moving average process, ARMA (3,3) process with one lag interval, which is mentioned below.

Here all coefficients of growth and error terms are highly significant. But goodness of fit is remained the same.

bd_growth = c + a bd_growth(-1) + b bd_growth(-3) + ma(1) + ma(3) + u (7)

bd_growth = 2.95 - 0.27 bd_growth(-1) + 0.67 bd_growth(-3) +0.71 ut-1+ 0.67 ut-3 (7e)

Adjusted R2 =0.37 Schwarz criterion = 3.42

The 8th model is an autoregressive moving average process, ARMA(5,5) process with one lag interval, which can be elaborated as

bd_growth = a + b bd_growth(-1) + c bd_growth(-3) + d bd_growth(-5) +

ma(1) + ma(3) + ma(5) + u (8)

bd_growth = 0.19 + 0.88 bd_growth(-1) - 0.26 bd_growth(-3) + 0.37 bd_growth(-5)

-0.99 ut-1+ 0.39 ut-3 -0.36 ut-5 (8e)

Adjusted R2 =0.62 Schwarz criterion = 2.85

Here coefficients of growth at lag 1, lag 5 and with error term at lag 1 are highly significant; coefficient of growth at lag 3 and coefficients of error term at lag 5 are statistically significant; and coefficients of error term at lag 3 is tending toward statistical significance. Goodness of fit is improved significantly.

From the above models, the model 8 is better than all other models from the viewpoint of goodness of fit, the significance of the coefficients and Schwarz criterion.

However, in determination of appropriate model, it has to satisfy the conditions of no serial correlation, no heteroskedasticity and non-normality error. The diagnosis' of these tests for model 8 are given below:

Serial Correlation test: The correlogram of residuals (Q-stat) at lag 4, 8 and 12 are shown below:

Q-stat at lag 4: 3.57 (0.06), lag 8: 5.21(0.39), lag 12 :7.69 (0.57)

Q-stat at all conventional lags indicates that there is no serial correlation in the residual.

Heteroskedasticity test: The correlogram of squared residuals at lag 4, 8 and 12 are shown below:

lag 4: 3.35 (0.07), lag 5.23 (0.39), lag 12 : 5.59 (0.78)

After taking correlogram of squared residuals, we do not find any evidence of heteroskedasticity at conventional lags length.

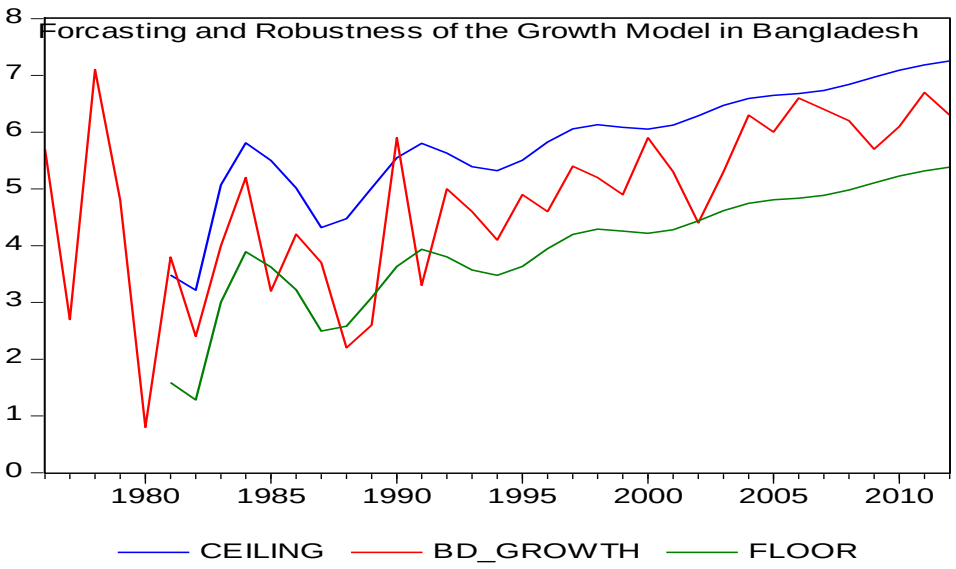
Non-normality test: To test non-normality error, Jargque-Bera test is made and found the following results

Jarque-Bera : 1.83 (0.40)

The value of Jarque-Bera indicates that there has been non-normality error in the distribution. Basically the distribution has an excess kurtosis.

Thus model satisfies the conditions of no serial correlation, no heteroskedasticity, but not free from non-normality error. Therefore, model 8 is guided for growth model for Bangladesh. The forecasting and robustness of the growth model in Bangladesh is shown in Chart-2.

Chart-2



After analyzing the stability of growth model with trend of Bangladesh's GDP we can incorporatethis as an element for M2 expansion calculation following quantity theory of money.

GDP and inflation

The econometric exercise of correlation coefficient between real GDP growth and inflation is -38% (Box-1). The t-statistics is 2.4 and the probability is 0.02%. All the statistics indicate the parsimonious relationship exists between inflation and GDP. We can use inflation number in quantity theory of money equation prudently taking into account negative relationship between nominal GDP and inflation. Ahmed and Mortaza (2005) estimated threshold level suggests 6% inflation as the threshold model level (i.e., structural break point) of inflation above which inflation adversely affects economic growth. The empirical evidence demonstrates that there exists a statistically significant long-run negative relationship between inflation and economic growth for Bangladesh (Ahmed and Mortaza 2005). In the long run money has neutral effect on real GDP.

Box-1

Box-1

Correlation Analysis:

Sample: 1976 2012

Included observations: 37

Correlation

t-Statistic

Probability	INFLATION	BD_GROWTH
INFLATION	1.000000	

BD_GROWTH	-0.377730	1.000000
	-2.413484	-----
	0.0212	-----

Finally, income velocity of money derives dividing nominal GDP by M2, which is declining trend region in the U shaped curve. Change in income velocity of money for FY 2012-13 is estimated on average at -2%. Quantity theory of money can be resolved plugging annual GDP growth rate (7.2%), annual inflation rate (7.5%) and annual percentage changes in income velocity of money (-2%). GDP growth and inflation rate is found from the national budget for upcoming year for quantifying monetary growth in a year. Considering real economic developments these numbers may change.

We know MV=PY.

Log function is required to work out the equation.

Thus, we get lnM+lnV= lnP+lnY

=lnM=lnP+lnY-(-lnV)

=7.5+7.2%+2% =16.7% M2 growth is expected for FY 2012-13. In this equation the left hand side is money supply and the right hand side is money demand.

Here, M= M2 growth; V= change in income velocity of money in percent; P= inflation rate and Y= real GDP growth rate. Income velocity of money is declining over time. Velocity for a particular year can be derived as:

MV=PY

Or, $(1+\hat{M})\ (1+\hat{V}) = (1+\hat{P})\ (1+\hat{Y})$ [^percentage change (in terms of ratio)]

Or, $\hat{V} = ((1+\hat{P})\ (1+\hat{Y})/\ (1+\hat{M}))-1$

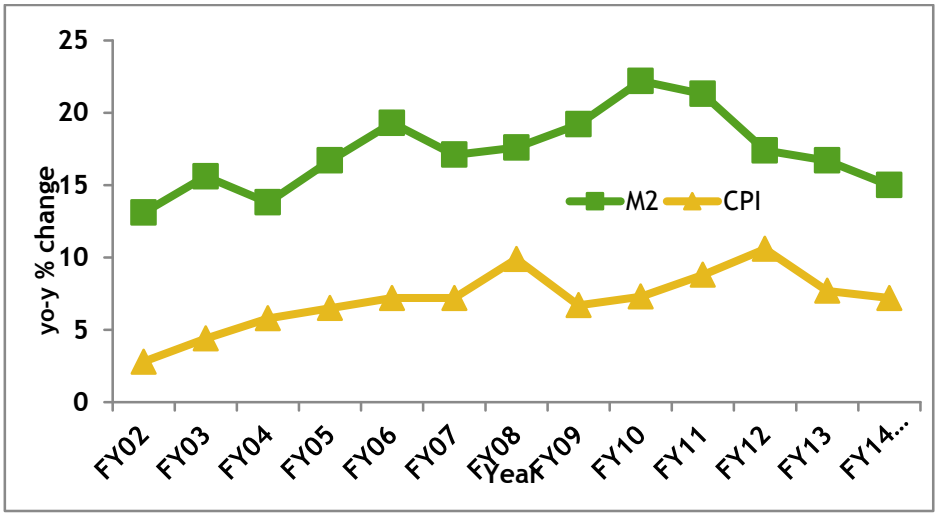
= ((1.075) (1.072)/(1.1655))-1 [M2 growth programmed as 16.55% for FY 2012-13]

= -0.0112399 = -1.124%

M2 growth also can be determined calculating income elasticity of nominal demand for money. The equation can be formulated as $E= \hat{M}/\hat{Y}$ [$\hat{M}$= growth of nominal broad money stock and $\hat{Y}$= growth of nominal income]. Thus $\hat{M}=E((1+\hat{Y})/\ (1+\hat{P})-1)$. E =1.1 assumed to be stable. Therefore, $\hat{M}$ (growth of M2) =1.1((1.072)(1.075)-1)=0.1676 or 16.76%.

Hence real GDP growth, inflation and percentage change in income velocity of money provides us safe limit of monetary expansion in a financial year considering the money demand. In the quantity theory of money equation if we assume GDP and velocity are constant then the direct relationship between money (M2) and inflation (P) can be established (Chart-3). In Chart-3 the actual and programmed number of M2 for FY12-13 is close. M2 affect inflation with few lags. In FY 12-13 declining in M2 also contributes to decline in CPI inflation. Especially in core inflation the relation of money and inflation is clear. Seasonality, demand pull and cost push factors may create volatility in head line inflation apart from money supply.

Chart-3



Component wise monetary and credit program

Historical data and current demand observed from the quantity theory of money have been observed in deriving monetary programming numbers of Bangladesh. Maintenance of optimum inflation and GDP growth is central aspect of monetary policy. BOP end June 2012 overall surplus US$ 89.4 crore (Table-2) is added with RM end June 2012 NFA to arrive June 2013 number, which is equivalent to Tk. 76123.70 crore (Table-3). In this conversion exchange rate used Tk. 80.0 against 1 US$ at the end of June 2013. DMBs asset and liabilities of foreign exchange holdings is added with the NFA of RM in order to get relevant NFA of M2 (Table-1).

Table-1 Monetary and credit program

Particulars	Outstanding stock (Actual)			Program 2012-13			
	June, 2010	June, 2011	June 2012	September 2012	December 2012	March 2013	June 2013
	1	2	3	4	5	6	7
A. Net Foreign Assets of banking system	**67073.70**	**70620.00**	**78860.30**	**90112.10**	**81795.20**	**83697.10**	**86496.00**
		(+5.29)	(+11.67)	(+14.27)	(+3.72)	(+6.13)	(+9.68)
B. Net Domestic Assets of banking system	**295957.50**	**369899.90**	**438249.20**	**445991.00**	**476207.50**	**493707.10**	**516207.10**
		(+24.98)	(+18.48)	(+1.77)	(+8.66)	(+12.65)	(+17.79)
a) Domestic credit	340213.70	433525.90	518214.30	529960.70	567201.00	584198.90	616209.30
		(+27.43)	(+19.53)	(+2.27)	(+9.45)	(+12.73)	(+18.91)
Public sector	69453.00	92813.20	110312.70	109923.30	120542.80	123142.30	132654.10
		(+33.63)	(+18.85)	(-0.35)	(+9.27)	(+11.63)	(+20.25)
Govt.(net)	54392.30	73436.10	91906.80	91901.20	103119.10	105919.10	115530.80
		(+35.01)	(+25.15)	(-0.01)	(+12.20)	(+15.25)	(+25.70)
Other Public	15060.70	19377.10	18405.90	18022.10	17423.70	17223.20	17123.30
		(+28.66)	(-5.01)	(-2.09)	(-5.34)	(-6.43)	(-6.97)
Private sector	270760.70	340712.70	407901.60	420037.40	446658.20	461056.60	483555.20
		(+25.84)	(+19.72)	(+2.98)	(+9.50)	(+13.03)	(+18.55)
b) Other items (net)	-44256.20	-63626.00	-79965.10	-83969.70	-90993.50	-90491.80	-100002.20
		(+43.77)	(+25.68)	(+5.01)	(+13.79)	(+13.16)	(+25.06)
C. Broad money (A+B)	**363031.20**	**440519.90**	**517109.50**	**536103.10**	**558002.70**	**577404.20**	**602703.10**
		(+21.34)	(+17.39)	(+3.67)	(+7.91)	(+11.66)	(+16.55)
i) Currency outside banks	46157.10	54795.10	58417.10	61214.50	63072.71	65361.80	67573.50
		(+18.71)	(+6.61)	(+4.79)	(+7.97)	(+11.89)	(+15.67)
ii) Deposits	316874.10	385724.80	458692.40	474888.60	494929.99	512042.40	535129.60
		(+21.73)	(+18.92)	(+3.53)	(+7.90)	(+11.63)	(+16.66)
a) Demand deposits	41831.30	48305.90	51304.30	49794.90	74729.79	72904.50	76892.50
		(+15.48)	(+6.21)	(-2.94)	(+45.66)	(+42.10)	(+49.88)
b) Time deposits	275042.80	337418.90	407388.10	425093.70	420200.20	439137.90	458237.10
		(+22.68)	(+20.74)	(+4.35)	(+3.14)	(+7.79)	(+12.48)

Note:Figures in brackets indicate percentage changes over end June.

Government sector credit expansion from the banking system to implement the Annual Development Program (ADP) is expected to Tk. 23624.00 crore for FY 2012-13. The borrowing amount declares in the national budget, which is subject to change according to revised annual ADP. Subsequently, additional amount can also be estimated bearing in mind declining trend of non-bank and foreign funds maintaining overall budget deficit at 5% level of GDP. Through treasury bills and bonds government obtain money from DMBs. This mode of financing will be elaborated later in section V. Other public sector credit is expected to decline due to privatization process of the state owned enterprises (SOEs). Negative growth rate 6.97% is assumed in this sector. Public sector credit programmed 20.25% expansion for FY 2012-13 (Table-1). Private sector credit component is elaborated in the SBS of BB. This is the thrust sector of the economy. Private sector credit is ranged from personal loan to manufacturing industry. Housing loan, auto loan, crop loan, credit card to the common people like developed country encouraging financial inclusion as well as monetization in Bangladesh. Following related economic standpoint private sector credit growth is expected to 18.55% in FY 2012-13 (Table-1). Private sector growth is estimated at 9.50% and 13.03% the end of December, 2012 and March 2013 respectively. The main component of other item (net) is inter-bank asset of unclassified asset inter-bank liabilities and contingent liability of unclassified liability. Other item (net) can be plus or minus nature in the balance sheet.

Section III

Reserve money programming number in brief

In the NDA of RM (Table-2) claims on DMBs depend on liquidity need maintained through repo, special repo, LSF, refinancing program, loan reverse repo. Refinancing is provided to export and small and medium enterprise (SME) for poverty alleviation generating employment. The growth programmed in this sector 5.29% at the end of June, 2013. The government sector credit is programmed 6.35% growth subject to over draft (current) and overdraft (blocked) account adjustment and loan requirement of the government for supporting development works. The RM growth is programmed as 6.26%, 10.35% and 14.95% at the end of December, 2012, March, 2013 and June, 2013. Accordingly, the money multiplier are calculated as 5.17, 5.14 and 5.36 at the end of December, 2012, March,2013 and June,2013.

The government deposits all its cash balances with BB free of interest. BB provides up to Tk. 2000 crore for day to day operation of the government using wage and means account with reverse repo rate (5.75%) as government has taxing capacity. Government can borrow money through overdraft paying reverse repo rate plus one percent (6.75%) with seigniorage effect and inflation. 91-Day government treasury bill rate is applicable for government blocked account loan taken through over draft from BB. Claims on other public sector include SOEs elaborated in the SBS. According to exercise improvement of balance sheet position of SOEs is expected during FY 2011-13.

Table-2 Reserve money program

(In crore taka)

Particulars	Outstanding stock (Actual)			Program 2012-13			
	June, 2010	June, 2011	June 2012	September 2012	December 2012	March 2013	June 2013
	1	2	3	4	5	6	7
Net Foreign Assets of Bangladesh Bank	**61204.90**	**61388.70**	**68971.70**	**78730.50**	**71139.20**	**74060.90**	**76123.70**
		(+0.30)	**(+12.35)**	**(+14.15)**	**(+3.14)**	**(+7.38)**	**(+10.37)**
Net Domestic Assets of Bangladesh Bank	**19305.40**	**28345.70**	**28831.00**	**21228.30**	**32787.20**	**33865.50**	**36302.70**
		(+46.83)	**(+1.71)**	**(-26.37)**	**(+13.72)**	**(+17.46)**	**(+25.92)**
Claims on Govt.(net)	22320.60	32049.70	38044.00	35859.10	37298.00	37800.10	40458.20
		(+43.59)	**(+18.70)**	**(-5.74)**	**(-1.96)**	**(-0.64)**	**(+6.35)**
Claims on other public	830.70	736.70	1181.90	1027.30	604.30	600.21	580.03
		(-11.32)	**(+60.43)**	**(-13.08)**	**(-48.87)**	**(-49.22)**	**(-50.92)**
Claims on DMBs	6613.90	18608.80	22627.40	15297.60	21824.33	23123.90	23824.21
		(+181.36)	**(+21.60)**	**(-32.39)**	**(-3.55)**	**(+2.19)**	**(+5.29)**
Other items (net)	-10459.80	-23049.50	-33022.30	-30955.70	-26939.43	-27658.71	-28559.74
		(+120.36)	**(+43.27)**	**(-6.26)**	**(-18.42)**	**(-16.24)**	**(-13.51)**
Reserve money	**80510.30**	**89734.40**	**97802.70**	**99958.80**	**103926.40**	**107926.40**	**112426.40**
		(+11.46)	**(+8.99)**	**(+2.20)**	**(+6.26)**	**(+10.35)**	**(+14.95)**
Currency Issued	**50465.40**	**60526.90**	**64896.50**	**68244.90**	**69702.01**	**72279.60**	**74582.40**
		(+19.94)	**(+7.22)**	**(+5.16)**	**(+7.40)**	**(+11.38)**	**(+14.93)**
i) Currency outside banks	46157.10	54795.10	58417.10	61214.50	63072.71	65361.80	67573.50
		(+18.71)	**(+6.61)**	**(+4.79)**	**(+7.97)**	**(+11.89)**	**(+15.67)**
ii) Cash in tills	4308.30	5731.80	6479.40	7030.40	6629.30	6917.80	7008.90
		(+33.04)	**(+13.04)**	**(+8.50)**	**(+2.31)**	**(+6.77)**	**(+8.17)**
Deposits held with BB	**30044.90**	**29207.50**	**32906.20**	**31713.90**	**34224.39**	**35646.80**	**37844.00**
		(-2.79)	**(+12.66)**	**(-3.62)**	**(+4.01)**	**(+8.33)**	**(+15.01)**
Of which: Excess reserves	12402.90	4082.50	3363.30	490.10	6586.39	3846.80	3444.00
		(-67.08)	**(-17.62)**	**(-85.43)**	**(+95.83)**	**(+14.38)**	**(+2.40)**
Reserve money multiplier	**4.51**	**4.91**	**5.29**	**5.36**	**5.37**	**5.35**	**5.36**

Note:Note:Figures in brackets indicate percentage changes over end June.

BBs other item (net) comprises among others interest suspense account of unclassified assets Asian Clearing Union (ACU) and IMF Trust Fund (PRGF) of foreign liabilities. IMF loan increasing liability contributes in gross foreign exchange reserve building.

Gross foreign exchange reserve US$ 10111.0 million for end February 2012 covering different foreign currency (USD, pound, euro and other currency totalling US$ 8717.0 million), SDR holdings (US$727.61 million), Gold (US$654.08 million), reserve position in the IMF (US$0.66 million) and other foreign accounts (US$11.77 million). Exchange rate of end June 2011 is used in this calculation to comprehend the erosion of foreign exchange over time in the BOP frontier. Appreciation of Dollar against SDR for instance will generate less amount of Dollar in a contract with the IMF. The gross foreign exchange reserve using current market rate is US$ 10066.77 million for end February 2012. Stated that NFA of BB is equivalent to gross foreign exchange reserves deducting liabilities includes for example Asian Clearing Union (ACU) balance, project FC account and FC clearing account.

Following monetary aggregates RM and M2 liabilities side currency figure is stochastic. Currency data of different period shows it's positively related to transaction demand with respect to GDP and inflation and inversely related to interest rate of banks and national savings certificates (NSC). Precautionary demand for money represented by broadly demand deposit (checking account) of real money balance (M1) is positively related to income. Speculative demand (time deposit) is inversely related to interest rate. It may be pointed out that printing of notes (Taka) for a year depends on GDP growth, inflation rate and amount of torn notes. Financial innovations include debit card, credit card and mobile banking reducing the amount of cash demand. DMBs maintain reserves with BB for daily transaction consequences. DMBs target is to acquire marginal efficiency in terms of keeping minimum reserves in Taka denomination. DMBs demand and time deposits 6% (CRR) along with foreign currency clearing account balance is preserved as reserves in the balance sheet of BB. To avoid the liquidity shortfall arising from cheque clearing DMBs retain Taka with BB more than cash reserve requirement (CRR). For liquidity management purpose excess reserves is calculated deducting CRR from local currency balance. Growth in currency reduces the excess reserves of DMBs. Largely deposit growth depends on financial engineering.

High currency deposit ratio and reserve deposit reserve ratio lower the money multiplier increasing high powered money (RM). Accordingly OMO, repo, reverse repo and foreign exchange sale/purchase is deployed allowing for short term liquidity management and keeping the desired rates. Auction of government treasury bills and bonds is used for debt management tools. These are the indirect instrument of monetary policy. Apart from those direct instruments CRR, SLR, bank rate and discount window is used sparsely. RM is mainly deterministic. BB reins M2 through money multiplier. Currency deposit ratio and reserve deposit ratio elements of liability side of M2 and RM determine the magnitude of money multiplier. RM is the operating target of monetary policy. Credit to government from the DMBs is complementary (necessary) element. On the other hand claim on government from BB is substitute owing to opportunity cost of funds with seigniorage and inflation effect. Eventually the holders of Taka need to bear the cost of government seigniorage gain. Concentration of asset due to unproductive investment in private and public sector stimulate the income inequalities in the country impacting the benefit of GDP growth.

Money multiplier

Money multiplier of Bangladesh observes volatility in some extent influencing interest rate, exchange rate and inflation. Currency deposit ratio (c/d) and reserve deposit ratio (r/d) determines the magnitude of money multiplier. Deposit growth depends on currency demand and financial engineering. The monetization rate in Bangladesh is sixty percent of GDP in relation to interest rate sensitivity and its pass-through in the economy. Currency is a random factor. Excessive government borrowing from BB enlarge the RM creating volatility in money multiplier. Money multiplier can enter solving (1+c)/(c+r). Programmed currency and deposit amount for end June

2013 is Tk. 67576.50 crore and Tk.535129.60 crore. Reserve amount Tk.44852.90 crore contains cash in tills and balances with BB. To arrive money multiplier 5.36 for end June 2013 the calculated c/d is 0.12628 and r/d is 0.08382.

Section-IV

Balance of payments accounts program in short

Export and import growth for FY 2011-13 is programmed 12.598% and 13.54% (Table-4) correspondingly keeping the momentum of the economy. Workers remittance is expected to uphold stable growth at 10.71%. As a result US$ 1251 million will be surplus in the current account. MLT loans expected to generate US$ 2163 million (Table-3) in the financial account channelizing pipeline credit. Other long-term loan (net) will reach at US$ 101 million at the end of June 2013. DMBs contribute about US$ 55 million. Altogether the overall surplus US$ 894 million is intended. Increase of BBs asset position US$ 686 million and decrease of liabilities number US$ 208 million is calculated in this regard.

According to IMF Balance of Payment Manual (BPM-6) Income and Current Transfer head of BPM-5 will be termed as Primary Income and Secondary Income of Current Account Balance (CAB). There is also among others difference in sign treatment between BPM-5 and BPM-6 for debit and credit entry. Export of Trade Balance is compiled using Export Promotion Bureau (EPB) data on value of goods without shipment cost (f.o.b. price). BB data is used for calculation of Import at f.o.b. (freight on board) price. Service head Debit mainly includes transportation and travel cost for instance comprising medical and education cost abroad. FDI, Portfolio Investment, Other long-term and Short-term interest is included in the Debit account of Primary Income. Grant component Food aid and Commodity aid is included in the Official Transfers of Secondary Income of CAB.

Table-3 Balance of payments program

(In million US$)

Particulars	FY 2010-11[@A]	FY 2011-12[R@@]	FY 2012-13[@@]
Trade balance	**-7328**	**-7995**	**-9304**
Exports f.o.b(including EPZ) [1/]	23008	23992	27013
		(+4.28)	(+12.59)
Imports f.o.b(including EPZ)	-30336	-31987	-36317
		(+5.44)	(+13.54)
Services	**-2398**	**-2566**	**-2345**
Credit	2570	2684	2780
Debit	-4968	5250	5125
Primary income	**-1354**	**-1508**	**-1865**
Credit	119	195	140
Debit	-1473	1703	2005
Of which:Official interest payment	*-220*	*373*	*193*
Secondary income	**12075**	**13699**	**14765**
Official transfers	127	105	160
Private transfers	11948	13594	14605
of which : Workers' remittances	*11650*	*12843*	*14218*
		(+10.24)	(+10.71)
Current account balance	**995**	**1630**	**1251**
Capital account	**600**	**469**	**512**
Capital transfers	600	469	512
Others	0	0	0
Financial account	**-1584**	**-955**	**-869**
i) Foreign direct investment(net)	768	995	1017
ii) Portfolio investment (net)	-28	198	28
iii) Other investment(net)	-2324	-2148	-1914
MLT loans [2/]	1051	1460	2163
MLT amortization payments	-739	789	889
Other long-term loans (net)	-101	-57	101
Other short-term loans (net)	531	242	-139
Trade credit (net)	-1895	-1450	-1890
Other assets	-1011	-1606	-1315
DMBs & NBDCs(net)	-160	52	55
Assets	-452	443	440
Liabilities	292	495	495
Errors and omissions	**-936**	**-650**	**0**
Overall balance	**-925**	**494**	**894**
Reserve assets	925	-494	894
Bangladesh Bank(net)	925	-494	894
Assets	749	293	686
Liabilities	176	-201	-208
	@= Considering BPM-5	**@@= Considering BPM-6**	

1/ Excludes local sales reported by EPB. Some adjustments necessiated by BOP considerations have been made.

2/ Excluding supplier's credit, reclassified as trade credit below.

A=Actual; R= Revised

Project aid is integrated in the Capital Account. Portfolio Investment relates to investment in the capital market. FDI is the most precious investment of Financial Account. Financing through Economic Relations Divisions such as loan from World Bank, ADB or other agencies together with specific country is counted in the Medium and Long Term Loans head of Financial Account. Other long-term loans (net) speak about private sector loan. Bangladesh Petroleum Corporation loan is built-in Other short-term loan account. Difference between EPB and BB export data is known as Trade Credit (net). Difference mainly relating to export and import of Export Promotion Zone (EPZ) is captured in Other Assets account. Reporting error and exchange rate difference is reflected in the Errors and Omissions account of Financial Account. Positive sign in the Asset side of BB means increases. Negative sign indicates decrease of Liability. Overall Balance of BOP emerges deducting Asset from Liabilities of BB allowing BPM-6.

Monetary, external, fiscal and real sector development and their interaction can be quantified in tabular form (Table-4). This is how we can establish the sectoral relationship of the economy.

Table: 4 Bangladesh: National Accounts Indicator

	Actual		Provisional	Estimated	Projection
	2008-09	2009-10	2010-11	2011-12	2012-13
A. Real Sector(%)					
National income and prices (percent change)					
Nominal GDP growth (% change)	12.6	12.9	13.4	15.9	14.1
Real GDP	5.7	6.1	6.7	7.0	7.2
CPI Inflation (average)	6.7	7.3	8.8	9.5	7.5
Total Domestic Investment as percent of GDP	24.4	24.4	24.7	25.9	26.6
Domestic saving	20.1	20.1	19.6	20.2	19.9
National saving	29.6	30.0	28.4	26.3	26.8
B. Fiscal Sector (%)					
Total revenue	10.4	10.9	11.8	12.6	13.4
Tax	8.6	9.0	10.1	10.6	11.2
No-ntax	1.8	1.9	1.7	2.0	2.2
Total expenditure	14.3	14.6	16.2	17.7	18.5
Revenue expenditure	11.2	11.0	12.0	13.2	13.2
Annual Development Program	3.2	3.7	4.2	4.5	5.2
Budget overall balance (Excluding grant)	-3.9	-3.7	-4.4	-5.1	-5.0
Financing (net) in percent					
Domestic financing	3.1	2.3	3.8	3.8	3.3
Banking source	2.2	-0.3	3.2	3.2	2.4
non-bank	0.9	2.6	0.6	0.6	0.9
Foreign financing	0.8	1.3	0.6	1.3	1.8
C. Monetary Sector					
Money and credit (percent change)					
Net domestic assets	17.8	18.8	25.0	21.9	15.8
Private sector	15.9	17.6	28.4	19.1	18.0
Broad money (M2)	19.2	22.4	21.4	17.0	16.0
C. External Sector					
Balance of payments (percent change)					
Exports, f.o.b.	10.1	4.2	41.7	14.5	14.5
Import, c.i.f.	4.2	5.4	41.8	15.0	15.0
Remittances(US$ billion)	9.7	11.0	11.7	12.9	14.5
Current account balance (%of GDP)	2.7	3.7	0.9	0.4	0.2
Gross official reserves (US$ billion)	7.5	10.7	10.9	9.7	10.7
Gross official reserves (months of import)	3.8	5.1	3.6	2.9	2.7

Source: Medium-Term Macroeconomic Outlook : FY11-FY17 Finance Division, Ministry of Financre GOB Bangladesh Economic Review, 2012

Section-V

Conclusion

Less mechanical calculation of money supply with low lags and maintaining maximum degree of freedom is the essence of publicly presenting asset and liability side prudent monetary program numbers in Bangladesh. Liability side currency deposit ratio and reserve deposit ratio is needed to observe money multiplier trends. Assets side NFA of RM and M2 are deterministic variables. Increase in FDI and MLT loans can generate more surpluses in the overall balance of BOP improving NFA of BB. In order to improve the ability of payment and asset quality mix in RM foreign exchange reserves more than three months of import payment is vital following credit rating of the country. Private sector credit of M2 is random variable. Micro prudential policy such as housing loan, auto loan, crop loan, credit card to the common people like developed country encouraging financial inclusion as well as monetization in Bangladesh. Currency data of different period shows it's positively related to transaction demand with respect to GDP and inflation and inversely related to interest rate of banks and national savings certificates (NSC). Precautionary demand for money represented by broadly demand deposit (checking account) of real money balance (M1) is positively related to income. While, speculative demand for money in Bangladesh is less following aggregate demand equation.

Credit to government from the DMBs is complementary (necessary) element. At the same time, claim on government from BB is substitute owing to opportunity cost of funds with seigniorage and inflation effect. Eventually the holders of currency need to bear the cost of government seigniorage gain. On the other hand, government deposits all its cash balances with BB free of interest. The opportunity cost of money in Bangladesh is virtually limited to housing, land and crops. Unplanned investment channelizing private and government sector will inflate the real asset and commodity prices creating income inequalities in the country. Claims on DMBs in RM depend on liquidity need and refinancing to export and small and medium enterprise (SME) sector for employment generation. Other item (net) component of RM and M2 is quadratic nature bearing two different sign positive and negative. Liability side component currency growth is stochastic variable. Excess reserves reported in the RM liability side demonstrate the marginal efficiency of DMBs. Excess reserves depend on BBs policy factor for instance CRR, SLR, bank rate and OMO. Government sector credit is crucial, which is treated as come forward ad hoc basis encouraging the economic activities of the country. Government can borrow money through overdraft from BB as government has taxing ability. This amount increases the NDA of BB with high powered money generating volatility in money multiplier and rates of the economy. Amortization and gradual securitization of government debt taken through overdraft from BB may improve the balance sheet of central bank enhancing market dynamics.

In the global frontier the book value relating to interest rate encouraging financial intermediation is not authenticated to some extent. It is influenced by asymmetric information and moral hazard, which is covered by insurance company addressing inflated book value (asset bubble) arising from subprime lending in the housing sector. EU countries among others are concern with austerity issue and recapitalization of banks. These countries are experiencing more government expenditure comparing income. At the same time, due to near term uncertainty the demand is not strong enough in the developed countries encouraging economic growth. This global frontier outcome is largely impacting the NFA of M2 in Bangladesh. Export, foreign remittance and FDI can boost the NFA with Taka sterilization policy by the BB to contain inflation. In M2, RM and BOP proper debt structure of the government will optimize the domestic and foreign financing providing desired room for private sector credit to enhance GDP growth. Accuracy in M2, RM and BOP program numbers will minimize actual and potential gap of inflation and output. Macro prudential policy along with micro prudential policy of BB using direct and indirect instrument (OMO) with

flexibility will play role to maintain stability in the actual and projected paths deviation of M2, RM and BOP for achieving monetary policy objectives.

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Paper No. 27

'Inflation Targeting' in the Indian Context: Issues and Challenges

Amaresh Samantaraya*

I. Introduction:

Current practices on conduct of monetary policy in a cross-country perspective have evolved over time reflecting the advancements in theoretical underpinnings and changing empirical realities. Moving away from the conventional monetary policy frameworks such as 'monetary targeting', 'interest rate targeting' and 'exchange rate targeting', leading central banks across the industrial and emerging countries switched over to 'inflation targeting' beginning with the Reserve Bank of New Zealand (RBNZ) in 1990. The 'inflation targeting' approach has been widely regarded as the state of the art monetary policy framework becoming very popular in every passing day. This is guided by the theoretical and empirical research on mainly three accounts. These are related to (i) empirical evidences undermining the relevance of activist policy, (ii) increasing concerns on adverse consequences of inflation, and (iii) the need to search for an alternate 'nominal anchor' due to failure of the existing monetary policy framework to deliver low and stable inflation in some countries.

India has been a low inflation country in a developing country standard. The average inflation in India over last six and half decades or so is around 6.5 per cent, and there are only four years in the entire period when inflation was above 15.0 per cent. This partly reflects the effectiveness and success of responsible monetary management despite several challenges arising from supply side shocks, fiscal dominance and external sector developments. Particularly, the post-reform period in India beginning since early 1990s stood out as a period of price stability along with impressive economic growth for a period extending close to a quarter century. The average economic growth during 1992-2014 stood at 6.8 per cent, while average inflation stood at 6.5 per cent. This magnificent macroeconomic performance was associated with a significant turnaround in the overall economic policy paradigm. India adopted market oriented economic policy regimes in the broad areas of industrial sector, financial sector and external sector with greater outward orientation since early 1990s as a response to the economic crisis of 1991. Details of such reforms are discussed by Joshi and Little (1996), Rangarajan (1998) and Reddy (2000). With changing policy paradigm and macroeconomic developments, conduct of monetary policy in India also witnessed significant transformations during the post-reform period. Samantaraya (2014) presents a detailed account of the same. In terms of monetary policy framework, there were many turns and twists. India switched from 'monetary targeting' framework to 'multiple indicators approach' in late 1990s, and recently, guided by the recommendations of Patel Committee Report (RBI, 2014), made overtures for adoption of 'inflation targeting'

In this backdrop, the present paper reviews the issues and challenges related to adoption of 'inflation targeting' in India. This has also important implications for adoption of similar framework by a developing economy like Nepal which has very close economic-political-cultural ties with India.

The rest of the paper is organised as below. In Section II, a brief discussion on the salient features of 'inflation targeting' is undertaken. In order to assess its relevance in the Indian context, the macroeconomic background prior to adoption of 'inflation targeting' by a variety of economies is

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undertaken in Section III. Existing debate on the issue as available in the literature is briefly reviewed in Section IV. Finally, Section V concludes the paper with our view of suitability of 'inflation targeting' in the Indian context.

II. Salient Features of Inflation Targeting

Given that monetary policy has a long and distributed lag, and the length and strength of lag effects on the final objectives are not certain, monetary authorities across the world has been relying on various nominal anchors. In the past, these nominal anchors took the form of 'monetary aggregates' or 'foreign exchange rate' which were used as intermediate targets. With the evolving economic situation in several countries and failures of the above nominal anchors to deliver low and stable inflation, several leading central banks began to use forecasts about the future inflation by the monetary authority and setting the inflation target for the medium term as the new nominal anchor under the 'inflation targeting'. This tradition started with adoption of 'inflation targeting' first by the Reserve Bank of New Zealand in 1990. The history of conducting monetary policy from the cross-country experience reveals that when the existing monetary policy framework fails to deliver its stated objectives, there have been moves to switch over to a new framework under the changing circumstances. This was also true for adoption of 'inflation targeting' by many central banks. Particularly, during the initial phase, 'inflation targeting' was opted as a possible alternative by those central banks, where the prevailing frameworks such as 'monetary targeting' or 'exchange rate targeting' failed to deliver price stability. For example, in New Zealand, average inflation was about 10.0 per cent for a decade prior to mid-1980s. In Brazil, Chile and Turkey high level of inflation prior to adoption of inflation targeting adversely affected central bank credibility to fight inflation. The framework of 'monetary targeting' lost the favour gradually with uncertainties in velocity of money and emerging signs of instability in money demand function. Speculative attack on domestic currency in several countries pursuing 'exchange rate targeting' forced them to look for other alternatives. Furthermore, in the later stage adoption of 'inflation targeting' became more of a move towards modernity with its growing popularity.

It is interesting to note that although the first adoption of 'inflation targeting' by a central bank is not even completed a quarter century, but the origin of the idea to use inflation or price level as a nominal anchor is not that recent. On December 29, 1967, Professor Milton Friedman, in his much celebrated Presidential address delivered at the Eightieth Annual Meeting of the American Economic Association, had indicated that amongst the alternative candidates to be considered as nominal anchors, the price level is the best option. However, he also cited several reasons[1] why use of price level as a guide to monetary policy was impractical. To quote[2], "attempting to control directly the price level is therefore likely to make monetary policy itself a source of economic disturbance because of false stops and starts." Professor Friedman also noted that as the understanding of monetary policy advances, the situation may change. Adoption of 'inflation targeting' by a number of central banks in last two and half decades is a testimony to the fact that there has been significant strides in improving our understanding on monetary transmission mechanism and dynamics of inflation.

Today, the central banks in a large number of advanced economies and several emerging economies are following 'inflation targeting'. Under this framework, price stability subordinates all other objectives of monetary policy[3]. The policy objective is explicitly stated in terms of a numerical

[1] These factors included indirect link between the policy actions and the price level; long and variable time lag between policy action and realisation of its effects on prices, etc.
[2] Friedman, Milton (1968): "The Role of Monetary Policy", *American Economic Review*, Vol. 58, March, PP. 1 – 17.
[3] Except extreme and rare situations, where there is an imperative need to temporarily change long term inflation target to counter real sector development.

target for inflation. This numerical target is expressed either as a band (for example, 2.0 to 4.0 per cent) or as a point target (3.0 per cent) with tolerable limits. Acknowledging lag effects of monetary policy decision and with a forward looking perspective, 'inflation targeting' entails projections of various macroeconomic indicators and obtains an inflation forecast. If inflation forecasts deviate from the targets, suitable policy decisions in terms of variation in policy rates are undertaken so as to align future inflation outcomes with inflation targets. Generally, inflation targets are defined over medium term period, and not necessarily to be maintained at all time points continuously. The reasons for any such deviations at any given point, however, need to be explained to the legislators and general public.

The monetary transmission mechanism under 'inflation targeting' can be summarised as in Exhibit 1. Under this framework, overnight policy rate of the central bank is used as the main policy instrument. Variation in policy rate imparts policy driven changes in the interest rates in the economy. Variation in various interest rates and bank lending rates, in turn, influences consumption and investment decisions of households and firms, ultimately influencing economic activity and prices in the economy. Variation in interest rates also influence foreign exchange rate through its influence on international capital inflows. More importantly, under 'inflation targeting', credibility of the central banks also influences inflation outcome through inflation expectation, which is considered to be very powerful. Unconditional commitment by the central bank to pursue the preannounced inflation target, and subordination of all other objectives to price stability reinforces central bank credibility under 'inflation targeting' and facilitates anchoring of inflation expectations by various stakeholders.

Central banks which adopted 'inflation targeting' formally are obviously not a homogeneous group. It includes a set of industrially advanced counties, a set of emerging countries as also a third set of transition economies. There are variations across these central banks in terms of institutional arrangements and operational features in the conduct of monetary policy. Notwithstanding variations in details of actual implementation across these central banks, there has been some commonality in central elements enlisted by Mishkin (2004), as given below.

- Public announcement of medium-term numerical targets for inflation
- An institutional commitment to price stability as the primary, long-run goal of monetary policy and a commitment to achieve the inflation goal
- An information-inclusive strategy in which many variables and not just monetary aggregates are used in making decisions about monetary policy
- Increased transparency of the monetary policy strategy through communication with the public and markets about the plans and objectives of monetary authority
- Increased accountability of the central bank for attaining its inflation objectives

The above characteristics of 'inflation targeting' framework can be broadly divided into two components, namely (i) the policy framework of inflation targeting, and (ii) a strategy of communication and transparency (Bernanke, 2003).

Policy framework of 'Inflation Targeting'

As a policy framework, 'inflation targeting' involves pursuing the primary objective of price stability. Under this framework, the single objective of price stability was characterised by 'strict' inflation targeting in the initial days of its inception. Recently, many inflation targeting central banks pursue a flexible form, which allows for countercyclical monetary policy in the exceptional circumstances of severe and prolonged economic recession and unemployment situation, but within the long-term commitment to price stability.

Salient features of the policy framework as followed by the leading 'inflation targeting' central banks are summarised in Table 1, below.

Table 1: Summary Characteristics of Inflation Targeters

Country	Price Index used as Target	Range/Point Target	Institution setting the Target
Australia	Headline CPI	2.0-3.0 %	CB endorsed by Government
Brazil	Core CPI	4.5±2.0 %	--
Canada	Headline CPI	2.0±1.0 %	Jointly by the CB & Government
Chile	Headline CPI	3.0±1.0 %	Central Bank
Columbia	Headline CPI	3.0±1.0 %	Central Bank Board
Ghana	Headline CPI	Below 10.0 %	Government
Hungary	Headline CPI	3.0 %	Central Bank
Iceland	Headline CPI	2.5%	Jointly by the CB & Government
Indonesia	Headline CPI	4.5±1.0 %	Government
Israel	Headline CPI	1.0-3.0%	Govt in consultation with CB
New Zealand	Headline CPI	2.0±1.0 %	Policy Target Agreement by CB & Govt.
Norway	Headline CPI	2.5 %	Government
Peru	Headline CPI	2.0±1.0 %	Central Bank
Philippines	Headline CPI	4.0±1.0 %	Government
Poland	Headline CPI	2.5±1.0 %	Central Bank
Romania	Headline CPI	2.5±1.0 %	Central Bank
South Africa	Headline CPI	3.0-6.0%	Central Bank
South Korea	Headline CPI	2.5-3.5%	CB in Consultation with Govt.
Sweden	Headline CPI	2.0%	Central Bank
Switzerland	Headline CPI	Less than	Central Bank
Thailand	Core CPI	0.5-3.0%	CB in conjunction with Finance Minister
Turkey	Headline CPI	5.0%	Jointly by the CB & Government
United	Headline CPI	2.0%	Government

Sources: Official websites of respective central banks.

Notes: (1)CB stands for Central Bank, and CPI for Consumer Price Index

(2) In some countries as in Iceland, Turkey and the United Kingdom the central bank governor has to write an open letter to the Government if the inflation exceeds a tolerable band of ±1.0 %, as part of accountability procedure

Invariably, all central banks pre-announce the targets for inflation to be achieved in a year o two. In initial phase of 'inflation targeting', several central banks specified the inflation target in terms of a band of say, 2.0 to 4.0 per cent. With accumulated evidence and improvement in the

performance, many of them moved to announcing a single target say, 3.0 per cent of inflation with a tolerance band of, generally, +/- one percentage point.

This framework involves specification of inflation target by the government or the central bank or jointly by the government and the central bank. However, full operational autonomy is given to the central bank to achieve the target. In case the inflation outcome breaches the target for a specified time period, the governor of the central bank has to explain to the Parliament or the appropriate legislative body of the country by writing a open letter. In several inflation targeters, there is a provision to dismiss the governor for fixing the accountability.

In certain instances where inflation outcome breached the pre-announced targets, the monetary authority did not change the inflation target rather preferred to explain to the Parliament or legislative body and general public about the causes for deviation and what are the measures initiated to bring back inflation consistent with the target. For instance, in an event of one-off adjustment in indirect taxes in Turkey, it was expected that the inflation outlook will deviate from the inflation target in the short run. But on this occasion, the Central Bank of Turkey did not revise inflation targets. It believed that the impact of the shock will disappear in the one-year ahead forecasts. As a result, a change in medium-term target would not be required, and instead the short term forecasts would be adjusted, accordingly. Of course, the central bank has to inform the government as well as the public through open letters explaining the reasons for deviation in short-term inflation outcomes.

Strategy of communication and transparency

It has been observed that adoption of 'inflation targeting' has been associated with substantial improvement in communication strategy of the central bank, both in terms of clarity and transparency. There has been regular communications with the government, and reporting to the appropriate legislative body. More importantly, the central banks have been communicating frequently to the financial market and the general public on monetary policy decisions and their rationale. These communications play a critical role for formulating inflation expectations. Reddy (2009) noted that in the past, central banking was shrouded in secrecy with some 'mystique' surrounding it. In the recent years, *inter alia*, with adoption of 'inflation targeting', there has been greater visibility, transparency and communication. Better communication has enhanced effectiveness of monetary policy, mainly due to improvement in efficiency, time-consistency, optimality of communications, and institutional-cum-decision making processes.

Needless to mention, success of 'inflation targeting' rests on the fundamental channel of inflation expectation by various economic agents. The inflation targeters publish 'Monetary Policy Report' or 'Inflation Report' which generally covers policy objectives, policy framework and economic forecasts. These documents specify 'inflation target' as a band for inflation or as a point target. It also explains the broad policy framework, in terms of working of the economy, how policy decisions through interest rate change influences the economy and inflation; and how the global environment and domestic macroeconomic developments influence various macroeconomic indicators. Using sophisticated econometric models and survey results, these Reports also provide forecasts for various macroeconomic indicators in the short-term as also in the medium-term. It is very important to inform the public about any new information/shock which is likely to change the economic forecasts. Accordingly, these forecasts are adjusted.

The communication, with clarity and transparency should be conducive to enhance central bank credibility in terms of its commitment to price stability in the medium term. If there is any deviation in the short-term inflation target due to unforeseen shocks subsequent to the preparation of the Report, the public should be convinced about the reason for deviation and public confidence has to be maintained with effective communication.

Furthermore, generally, inflation targeting central banks take policy decisions in a group, popularly known as 'monetary policy committee (MPC)'. The MPC generally consists of both internal (within the central bank) and external members. Part of the transparency in central bank communication also involves publication of voting pattern of MPC members and minutes of the meetings, with a reasonable time lag. This also informs the public about the decision making process in the central bank and makes policy decision more predictable, as compared to the mysterious central bank of the past, where the financial market and the general public keep guessing about policy moves.

III. Empirical Background leading to Adoption of Inflation Targeting: A Review

In addition to the above discussion on the rational for adoption of 'inflation targeting', it will be very useful to understand the empirical realities that led to adoption of 'inflation targeting' in several countries to gain useful insights. The empirical realities will be discussed in terms of macroeconomic performance and institutional arrangements between the government and the central bank. As space will not be adequate to include all 'inflation targeters', we will include select country experiences so as to represent a variety of cases. This will include initial inflation targeters and recent ones, industrially advanced and emerging economies, countries adopting 'inflation targeting' within the process of initiatives to get rid of a crisis situation, and those opted to qualify for being admitted to Euro area, etc. The discussion in this section is based on information obtained from official documents of the respective central banks including speeches of their senior executives, research studies, and also from the official websites.

New Zealand

We shall begin with the first adherent of 'inflation targeting' *i.e.,* the Reserve Bank of New Zealand (RBNZ). A succinct account of this background was provided by Dr. Donald T. Brash former Governor of the RBNZ in a speech[4] delivered in Mumbai on June 17, 1999, as summarised below:

- Prior to mid-1980s, New Zealand witnessed one of the worst inflation records amongst OECD countries. Annual inflation was above 10 per cent for more than a decade.
- There was a political recognition that such high inflation hindered faster growth of the economy. New Zealand's growth rate was the lowest in the OECD.
- In 1984, New Zealand witnessed a severe foreign exchange crisis, wherein the previously pegged exchange rate came under huge pressure and eventually gave way.
- In March 1985, New Zealand switched over to a floated regime of exchange rate with the explicit objective of enabling monetary policy to focus on a single objective of reducing inflation. This was beginning of the transition from 'foreign exchange rate' as the nominal anchor to 'inflation'.
- There was a clear instruction from the Finance Minister that the RBNZ should achieve the single objective of price stability with complete operational autonomy. This was *de facto* independence, within a regime, when RBNZ was formally only adviser to the Finance Minister.
- Subsequently, the Finance Minister advised RBNZ to suggest ways to put in place a legislative framework to save monetary policy from short-term political manipulation. In-depth research of central banking literature and cross-country analysis of central bank-government relationship led to enactment of RBNZ Act 1989, which laid the formal foundation for adoption of 'inflation targeting' in New Zealand.

[4] "Inflation Targeting: Is New Zealand's Experience relevant to Developing Countries?", Sixth L.K. Jha Memorial Lecture organized by the Reserve Bank of India in Mumbai.

Canada

The Bank of Canada (BoC) was the second central bank to adopt 'inflation targeting'. Similar to the central banks elsewhere, the BoC had been pursuing the goal of maintaining price stability. Until 1982, it had been following 'monetary targeting' approach wherein narrow monetary aggregate (M1) was used as an intermediate target to guide monetary policy. Over time, it was realised that financial innovations have resulted in significant weakening of the linkage between M1 and aggregate demand, and hence M1 was dropped as a target in 1982. This also initiated the process of serious empirical studies in search of an alternative target. During this transit period, the BoC used both monetary and credit aggregates as information variables to draw policy perspective. This process of pursuing price stability as the long term goal sans any intermediate target or any pre-specified time path continued until 1991.

In the backdrop of Kuwait war and consequent sharp rise in international oil prices, it was realised that there is some risk to price stability. Secondly, replacement of existing federal sales tax at the producer level by the goods and services tax (GST) in early 1991 was expected to add to inflationary pressure in the short run. At this point, it was realised that the central bank should adopt an approach in which a future path for the inflation can be specified to guide inflation expectation of the firms and individuals. This was expected to work by managing the wage-price spiral. Moreover, it was realised that there should be strong government support for the central bank's inflation objective. Any doubt in public mind about the willingness of the government to support price objective will hinder the achievements. This was more so in case of Canada, as in the past, long term inflation projections in the budget were not in alignment with the central banks goals of price stability.

In this backdrop, Canada adopted 'inflation targeting' on February 26, 1991 with the BoC and the government jointly[5] announcing inflation-reduction targets. A target of CPI inflation of 3.0 per cent was set to be achieved by end-1992. The target for mid-1994 and end-1995 were also specified to be 2.5 and 2.0 per cent, respectively. Achievement of such targets was envisaged to facilitate assessing the central bank performance on price stability and improve its accountability.

Israel

Israel is the first emerging market economy to embrace 'inflation targeting'. In Israel, the rate of inflation rose persistently since early 1980s and even touched triple digit figure during mid-1980s. It continued to remain high at around 18.0 per cent in the late 1980s. The difficulty for the central bank was not only to reduce inflation, but also educate a part of the policy making community and the general public about the need for low inflation. Aligning domestic inflation with prevailing inflation in advanced countries was essential to benefit from the process of globalisation. In this backdrop, Israel introduced a crawling exchange rate band in late 1991. Under this framework, rate of crawl was specified in a forward looking manner taking into consideration domestic inflation target and the foreign inflation (Bufman, Leiderman and Sokoler, 1995). The government was setting the exchange rate target and inflation target in consultation with the Bank of Israel (BoI). Thus, interestingly, in Israel, inflation targets were began to set not as an end-product of monetary policy, but as an input to set exchange rate target. Thus, 'inflation targeting' in Israel started through a 'back door' entry, as an input to set the crawling exchange rate peg.

However, since 1992, the BoI began to place 'inflation target' as the objective of monetary policy. The headline CPI was chosen to specify the central bank's inflation target. During the initial years,

[5] The government's announcement was part of its annual budget and the Bank of Canada issued a press note detailing the operation of such targets.

the inflation targets were set at higher levels within a range of 7.0 to 10.0 per cent. The targets were substantially lowered since 1999, when it was set at 4.0 per cent.

For quite some time, the inflation targets and crawling exchange rate band coexisted. Over the time, it became clear that under free capital mobility, coexistence of an exchange rate band and inflation targets posed serious challenges to the conduct of monetary policy. Subsequently, the monetary authority placed greater emphasis on 'inflation targeting', accompanied by increasing exchange rate flexibility.

Brazil

Brazil had a history of high inflation. The stabilisation process initiated during mid-1994, however, was successful to reduce inflation by 1997. This stabilisation process involved privatisation of state-owned companies in various industries, liberalisation of foreign trade by reducing tariff and non-tariff barriers, and restructuring of the financial system. But, the much needed reforms in the fiscal sector were postponed due to lack of political will. It remained as an area of discomfort. The related vulnerability became evident in the aftermath of the Russian crisis of 1998. There was large capital flight from Brazil putting unprecedented pressure on exchange rate. The Central Bank of Brazil (CBB) had to abandon the crawling peg for the exchange rate. As a fallout, there was deterioration of inflationary conditions.

The policy efforts to manage the crisis suggested a newly floating exchange regime and a new nominal anchor for monetary policy in the form of 'inflation targeting'. The CBB formally adopted 'inflation targeting' on July 1, 1999. However, during this time, very few within CBB had comprehensive understanding about 'inflation targeting'. The new research department in CBB was set up in March 1999. The technical capabilities to produce inflation forecast were not adequate. This is a critical task under 'inflation targeting'. The researchers in the inflation targeting group had to put considerable efforts to assimilate the literature in this area. Seminars on 'inflation targeting' were arranged jointly with the International Monetary Fund (IMF) to provide required training.

As a numerical target, CPI based headline inflation was selected as the appropriate target. The initial target was set at 8.0 per cent for 1999 with a tolerance band of ∓2.0 percent. In a forward looking manner, the targets were set at 6.0 per cent and 4.0 per cent, for 2000 and 2001, respectively.

South Korea and Thailand

South Korea and Thailand adopted 'inflation targeting' in the aftermath of the Asian crisis, which began with the financial crisis in Thailand in July 1997, and spread to its neighbours such as Indonesia, Malaysia, the Philippines and South Korea through the contagion effect. Before the crisis, South Korea had a long history of following 'monetary targeting'. The structural reforms package introduced in the aftermath of the crisis included amendment to the Bank of Korea Act in 1998 providing political and institutional independence to the monetary authority. Under the revised regime, the Bank of Korea adopted 'inflation targeting'. The target for inflation was set in consultation with the government, and short-term interest rates were used as the main policy instrument. Subsequently, the Bank of Korea (BoK) switched to 'pure inflation targeting' in 2001. This also witnessed using broad money targets as the operating target. The following period witnessed a series of tinkering in the monetary policy operating procedure, and in March 2008, the BoK emphasised on using interbank 'call money rate' as the main 'operating target' and the BoK Base Rate as the policy rate.

Before the Asian crisis of 1997, Thailand pursued 'exchange rate targeting'. In response to the crisis, as a part of IMF support programme, Thailand adopted a floating exchange rate regime,

along with 'monetary targeting' as the monetary policy framework. Slowly there were evidences of breaking down of the stable relationship between money and output, and targeting money supply deemed to be inappropriate. This led to looking for an alternate nominal anchor. With its growing popularity, 'inflation targeting' became the obvious choice. Thailand adopted 'inflation targeting' since May 2000. Subsequently, with amendment of Bank of Thailand Act in March 2008 independence in conduct of monetary was achieved. This amended Act also clarified the objectives and responsibilities of the central bank. It provided for setting of inflation target by the monetary policy committee of the Bank of Thailand in conjunction with the Minister of Finance.

Slovakia

In 2004, Slovakia acceded to the European Union. As part of the commitment for membership of the European Union, Slovakia was supposed to join the European monetary union and adopt Euro as domestic currency. As per the requirements for adoption of Euro, there was a need for prior fulfilment of the Maastricht convergence criteria on inflation, interest rates, government debt, etc. In order to fulfil inflation convergence, it was believed that 'inflation targeting' will be most suitable to deliver low inflation. Hence, the National Bank of Slovakia formally adopted 'inflation targeting' in early 2005. The inflation target was set to be below 2.0 per cent. However, with adoption of Euro, Slovakia automatically abandoned 'inflation targeting'.

IV. Debate on Relevance on Inflation Targeting for India

Notwithstanding growing popularity of 'inflation targeting', several leading central banks like the Federal Reserve in the United States, the European Central Bank, the People's Bank of China continue to pursue multiple objectives, wherein price stability is one of the major objectives. Until recently, the Reserve Bank of India (RBI) was also a member of this club. These central banks emphasize on achieving higher employment or supporting economic growth as an objective of monetary policy along with price stability. In this section, we will review the debate on formal 'inflation targeting' in the Indian context. On this issue, it is good to start with quoting Dr. Donald T Brash from his 6th L.K. Jha Memorial Lecture delivered at Mumbai on June 17, 1999 as below:

"New Zealand's experience with inflation targeting has, I believe, been positive one ...Every country has *circumstances and traditions which are a little different and, while I believe that inflation targeting is an approach to monetary policy formulation which deserves serious consideration, the ultimate decision about how best to run monetary policy must obviously be made by each country in the light of their circumstances and traditions... While optimal approach to monetary policy will clearly depend to some degree on the traditions and constitutional structure of individual countries, I believe that explicit inflation targeting is an approach which is worthy of serious consideration"*

It is apparent from above remarks that despite his persuasion in support of 'inflation targeting', Dr. Brash recognized country specific circumstances, traditions and institutional arrangements as critical determinants for its adoption by any particular country. This also applies to India.

On the one hand, the lack of support for 'inflation targeting' in the Indian context came from the fact that the existing monetary policy framework has been successful in delivering low and stable inflation, barring a handful episode of supply shocks. The argument goes as, if it is not broken, no need to fix it. Some countries which adopted 'inflation targeting', witnessed inflationary episodes beyond the control of their existing monetary policy framework. The examples are New Zealand, Brazil, Chile, Turkey, etc. Some countries experienced difficulties with existing monetary policy framework or nominal anchors per se due to external factors. For example, the UK and Poland conceived abandoning 'exchange rate targeting' to avoid speculative attacks which engendered volatility in foreign exchange rate. Countries like Indonesia and Thailand found it difficult to control

money supply given that dominant component of monetary base was currency outside the banks. Romania and Slovakia adopted inflation targeting to meet the Maastricht inflation criterion and euro adoption.

Jalan (2002) summarized the main arguments against adoption of 'inflation targeting' in the Indian context. At general level, he questioned the survival of the view of 'one target, one instrument' with passing of time, despite its sound theoretical underpinnings. Particularly, in the context of a developing country like India, he was sceptical about adoption of 'inflation targeting' due to three main reasons. The first one is related to the issue of trade off between price stability and economic growth. Jalan (2002) argues that conflicting situations arise when one has to choose between preventing inflation from going up in future (say, after 18 months) versus sharp slowdown in industry at present. With uncertainties in transmission lag, he disfavored reliance on any mechanistic rule. Particularly, during periods of domestic and external uncertainties, these issues become more relevant.

The second issue is related to the definitional aspect of inflation target. Many countries adopting 'inflation target' set their targets in terms of 'core inflation' which exclude certain items like food and fuel, which are prone to supply shocks. It is argued that if such items having significant weight are excluded from CPI in India, the inflation in residual items may not be meaningful.

Thirdly, large international capital flows in the Indian context strongly influences day-to-day foreign exchange rate movements. According to Jalan (2002) large volatility in exchange market can have significant real effect and implicitly stressed on the need for central bank intervention in the foreign exchange market. This is not entirely consistent with exclusive focus on inflation targeting. It may be noted that with continuing relaxation of capital account controls, there has to be increasing synchronization between monetary policy and exchange rate policy. This brings the issue of 'impossible trinity'. As indicated in the *Report of the Committee on Fuller Capital Account Convertibility*, "all poles of the trinity cannot be simultaneously attained, but the approach of the Indian authorities, quite rightly, has been to work towards optimizing intermediate solutions."

In a recent study, Azad and Das (2013) have raised doubts on the relevance of 'inflation targeting' for India and other four developing countries in the region, *viz.,* Bangladesh, Nepal, Pakistan and Sri Lanka. Based on the theoretical argument on the shape of the Phillips curve, they estimated the sensitivity of inflation in three different regimes such as weak, balanced and overheated. Their results supported the likelihood of the Phillips curve being horizontal and not upward sloping. Thus, they suspected the effectiveness of 'inflation targeting' for a developing country like India, and expressed concerns on hardships on the working people of the country by adopting it.

On the contrary, some others have explicitly or implicitly expressed their support to switch over to 'inflation targeting' as a credible monetary policy strategy for India. Such arguments mainly come from various official reports. *Report of the Committee on Fuller Capital Account Convertibility* (Chairman: Shri S.S. Tarapore) recommended that given the lagged impact of monetary policy on the economy, monetary policy objectives should be formulated with a medium term perspective. It suggested that the Government and the RBI, should jointly set out the objectives of monetary policy for a specified period and this should be placed in the public domain. The RBI should have unfettered instrument independence to attain the stated objectives. Although this Report did not explicitly advocate for single objective of price stability, the apparent stress on such a view becomes evident from the observation that "in the context of a progressively liberalized capital account, inflation rates in India need to converge towards internationally accepted levels. Furthermore, interest rates in India would broadly need to realign and reflect inflation differentials. There is a strong social objective in an unswerving policy on inflation control as inflation hurts the weakest segments the most."

The Report of the Raghuram Rajan Committee (Planning Commission of India, 2008) observed that India's monetary policy framework has continuously evolved in response to the changing economic, institutional and political imperatives. It expressed serious reservations on the existing monetary policy framework as a credible anchor for stabilizing inflation expectations. Contrary to the uncertainty created by the mix of inflation and exchange rate objectives, Raghuram Rajan Committee emphasized that a framework with a single well defined objective will serve as a firm and predictable anchor for inflation expectations. Thus, the Committee asserted that "monetary policy should be reoriented towards focusing on a single objective and there are good reasons why this objective should be price stability (defined as low and stable inflation)." The recommendation for single objective of inflation targeting was based on the successful delivery of good monetary and macro outcomes by such central banks which focused on price stability as the single objective. It believed that making price stability as the primary objective and credibly acting to pursue the stated target will be helpful in anchoring inflationary expectations and promoting macroeconomic stability. As regards, choosing the appropriate price index to target, Raghuram Rajan Committee suggested that such details can be best examined after establishing the principles. Debates on such details should not shift the focus from the broad issues.

Report of the Mishtry Committee[6] also believed that an institutional commitment to predictable and low inflation is critical to build global confidence. In this context, it considered an explicit and legally mandated *de jure* inflation-targeting framework as the superior monetary policy regime for India. On the appropriate price index to target, it asserted that using 'core inflation' excluding commodities like food and oil may be theoretically appropriate. But it considers headline CPI as a better option to use for 'inflation targeting' from the perspective of public perception and central bank credibility. This will also save the authorities from the suspicion of fudging of the figures. Moreover, the public is more familiar with headline CPI and wages and dearness allowances are linked to it.

Finally, very recently, RBI's Expert Committee to Revise and Strengthen the Monetary Policy Framework (Chairman: Dr. Urjit R. Patel) has also recommended in favour of inflation to be used as the nominal anchor in the revised monetary policy framework. It was asserted that stabilizing and anchoring inflation is critical for ensuring price stability on an enduring basis. Through this the central bank re-establishes credibility in a transparent manner that deviation from the target level of inflation on a permanent basis will not be tolerated. In the process, the central bank anchors the inflation expectations of various stakeholders, which in turn influences their behaviour, and aggregate demand for the economy. Subject to establishment and achievement of this nominal anchor, the Committee advised to conduct monetary policy consistent with a sustainable growth trajectory and financial stability. The headline CPI (combined) was identified as the indicator for setting the nominal anchor. The target was set at 4 per cent with a band of +/-2 per cent around it. However, it suggested the transition path to the target zone to be suitably graduated. Along with the above, the Committee has suggested several important reforms/modifications covering the issues related to institutional requirements, organisational structures for monetary policy decision making, monetary policy operating framework, etc., which are required to be undertaken for facilitating transition to 'inflation targeting'.

As a follow up to the Patel Committee recommendations, on January 28,2014, the RBI had taken recourse to the 'glide path' for reducing inflation, by setting a target of 8.0 per cent by January 2015, and 6.0 per cent by January 2016. The target was expressed in terms of headline CPI. This was the beginning towards adoption of a 'flexible inflation targeting' framework. It was also decided to undertaken monetary policy reviews in a bi-monthly cycle.

[6] High Powered Expert Committee on Making Mumbai an International Financial Centre set up by the Ministry of Finance, Government of India, which submitted its Report in February 2007.

Section V: Conclusions

The paper concludes with presenting our views on the appropriateness on 'inflation targeting' in the Indian context, as below.

Review of conduct of the monetary policy in India in the past reveals that the policy framework has witnessed several transformations guided by evolving economic conditions and changing institutional arrangements. In the backdrop of emerging risks to the monetary system due to growing fiscal dominance and excessive 'social control' of bank credit and interest rates, India adopted 'monetary targeting' in the mid-1980s. This framework witnessed subsequent refinements in the process of 'learning by doing' and was successful in delivering a largely stable inflation outcome for more than a decade. This was in the backdrop of high inflationary episodes of 1970s and considerable volatility in prices during the 1950s and 1960s. Given the transformations in the financial sector and structure of the economy, by late 1990s, it was realized that exclusive reliance on monetary aggregates may not be adequate to assess the economic conditions for formulating monetary policy. The RBI viewed that in addition to monetary aggregates, there is a need to monitor a host of macroeconomic indicators such as interest rates, foreign exchange rates, banking aggregates, inflation, etc. to draw appropriate policy perspective. Consequently, it adopted 'multiple indicators approach' since 1998-99. Thus, given the past record of open-mindedness to new options under evolving situations, one has to begin with an open mind on the option of adopting 'inflation targeting'.

Going by the central elements of 'inflation targeting' noted by Mishkin (2004), the RBI has been providing indicative medium term numerical targets for inflation. There has been a *de facto* institutional commitment to price stability as the primary long run goal of monetary policy. This becomes evident from the RBI's series of policy rate hikes to control inflation, in the recent periods, despite apprehensions from industry and a section of economists that such policy moves will stifle the growth process. The repo rate, which is the single policy rate under the revised operating procedure, was raised gradually from 7.25 per cent in May 2013 to 8.00 per cent in January 2014 to fight inflation, despite the economic slowdown during the last couple of years. The economic growth was at sub-5.0 per cent level during 2012-13 and 2013-14. During January 2006-October 2008, the RBI under Governor Dr. Y. V. Reddy had raised the repo rate by 300 basis points in 10 successive steps. This was despite some reservations in government quarters about the need for such hikes, which viewed the RBI concerns on overheating as more imaginary rather than real. During March 2010-July 2011, the RBI again under Governor Dr. D. Subbarao had also raised repo rate by 325 basis points in 11 successive steps.

Since adoption of 'multiple indicators approach' in 1998-99, the RBI has moved away from exclusive reliance on monetary aggregates for decision making to an all information-inclusive approach using various macroeconomic indicators. Moreover, there have been significant improvements in the RBI communication strategy in terms of clarity and transparency although a lot more to be achieved in this regards including releasing minutes of the meeting of Technical Advisory Council on Monetary Policy and technical details of RBI projections of growth and inflation.

Thus, on the accounts of announcement of formal inflation targets, information-inclusive strategy and transparency in communication, the current monetary policy strategy has features of standard 'inflation targeting' approach. But accountability of the Governor on failure to achieve such targets is not part of the present monetary policy framework in India.

In principle, we believe that price stability should be fundamental objective of monetary policy in India. Consistent with the Friedmanite view, we also stress upon the fact the central bank should be aware of what it can do and cannot do. The empirical evidences worldwide revealed limitations of the activist monetary policy, and there has been a growing consensus that monetary policy is not a suitable instrument to achieve employment or output gain in the medium term. Using

monetary policy for short-term output gain will eventually end up with inflationary outcome for the future. We also strongly believe that inflation inhibits the growth process because of misallocation of resources and causes several other social and economic costs as detailed earlier.

However, given the institutional arrangements, ownership structure of the banking system, there are several challenges for 'inflation targeting'. We will discuss the key issues, as below.

Firstly, does India meet various pre-requisites for switching to 'inflation targeting'? Generally, it is believed that for successful implementation of 'inflation targeting', a set of pre-conditions need to be met. This includes lack of fiscal dominance, central bank instrument independence, presence of a broad-based financial sector, reasonably stable financial system, clarity in monetary transmission mechanism and adequate technical capability in forecasting inflation. However, cross-country experiences reveal that for implementation of 'inflation targeting', the long list of pre-conditions need not be met at the outset. From survey of select countries, Freedman and Otker-Robe (2009) observed that the following preconditions were in place when 'inflation targeting' was introduced:

- Price stability as primary goal of monetary policy
- Central bank instrument independence
- Lack of fiscal dominance
- Reasonable control over short term interest rates
- Reasonable financial system stability
- Reasonably well-developed financial markets

They also noted that the following set of preconditions was missing when 'inflation targeting' was introduced in general:

- Adequate modelling/forecasting capacity
- Good understanding and well functioning of monetary transmission mechanism
- Lack of dual anchors
- Goal/legal independence
- Fully developed economic databases

Making an assessment based on the above, it is apparent that the set of missing preconditions are also true for India. On economic database, employment and labour data in India are largely sparse. Former RBI Governor, Dr. D. Subbarao had once expressed his dissatisfaction about the quality of data on industrial production. Despite improvement in model building capabilities, there is some scope for improvement for making reasonably good forecasts. Track record of various agencies, both public and private, making economic forecasts need to improve in terms of precision. The understanding of transmission mechanism is inadequate. The RBI also does not enjoy legal independence.

Amongst the preconditions, as set out by Freedman and Otker-Robe (2009), four out of six are fully satisfied in Indian context. Price stability has been accepted as the prime objective of monetary policy. Indian financial market is reasonably board-based and well developed and the central bank has significant influence on short term interest rates. The financial system has been largely stable.

However, the conditions of lack of fiscal dominance and instrument independence are not fully met. As regards fiscal dominance, it is true that automatic monetization by issue *ad hoc* treasury bills was phased out by 1997, and the RBI participation in the primary issue of government securities was discontinued since 2006. This has *de jure* reduced fiscal dominance on monetary policy. Nevertheless, since 2008, heavy fiscal stimulus package to manage domestic consequences

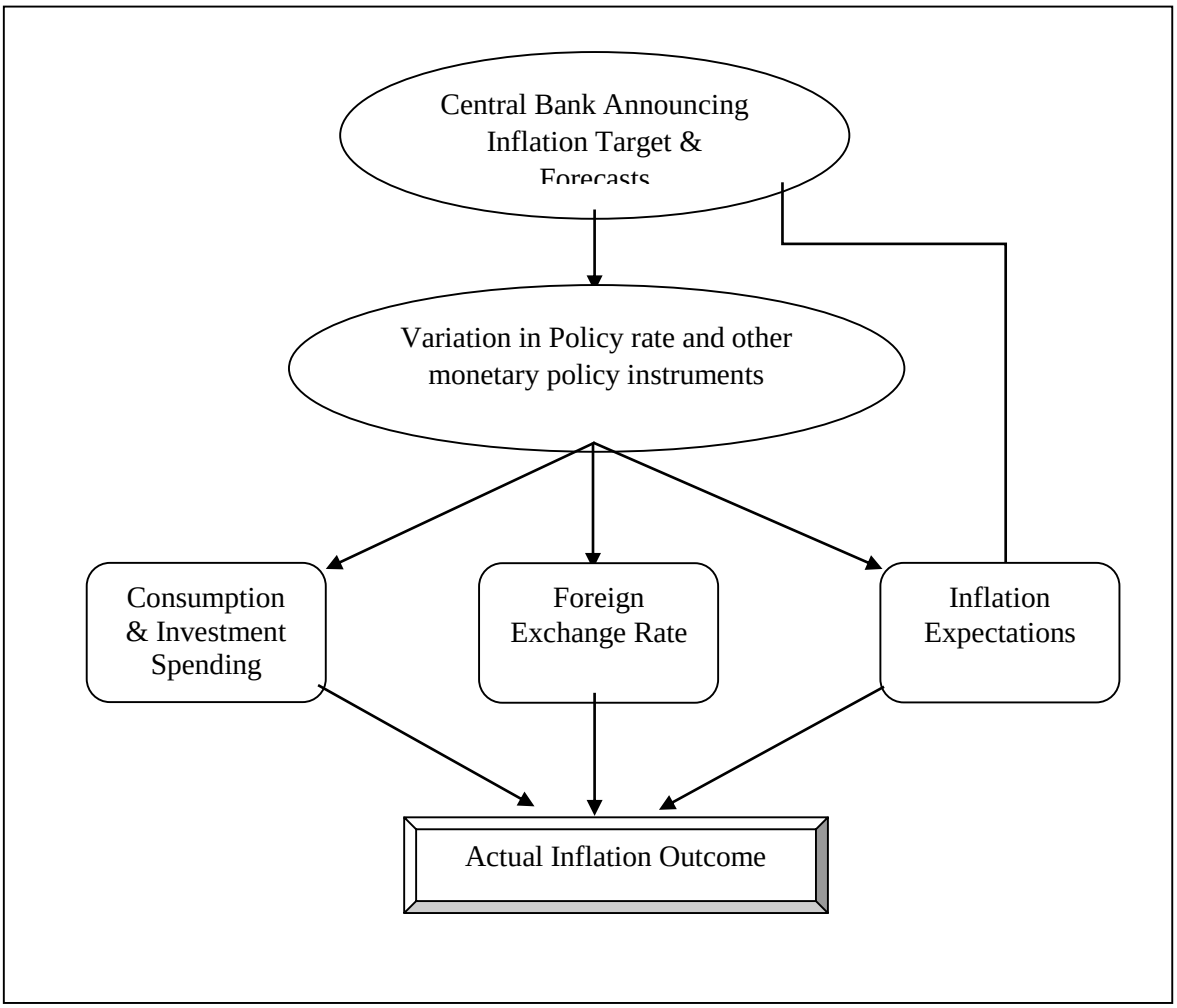
of the global financial crisis resulted in burgeoning government borrowing requirements. This exerted unwarranted pressure on market interest rates constraining monetary policy operations.

On instrument independence, it may be noted that the RBI may be enjoying complete freedom for decisions on policy rates like repo/reverse repo rate under LAF. It is believed that before taking policy decisions, the RBI consults the Minister of Finance informally. Given the dominance of public sector banks in the banking system, any disagreement with the Finance Minister, may make decisions on policy rates, *de facto* ineffective. For example, consider a situation when the RBI wants to raise policy rate to arrest inflation. The intended result of policy action depends on the banks' decision to raise lending rates following above monetary tightening. However, if the Minister of Finance is not convinced about the need for rate hike, he may informally indicate the banks not to raise the lending rates, even at the cost of falling profitability. The public sector banks are obviously more loyal to the government, their owner than to the RBI. In all likelihood, they will respond to the Finance Minister rather than the policy signal emanating from the central bank. However, under these circumstances, blunt policy instruments like cash reserve ratio (CRR), regulatory measures such as variation of risk weights for certain lending and provisioning requirements are very useful from the central bank point of view.

To sum up, pending fulfilment of various preconditions for adopting formal 'inflation targeting' we suggest that the RBI should opt for 'soft inflation targeting', in the sense price stability must become the most dominant objective of monetary policy. We will also not suggest adopting 'hard inflation targeting' for India, which frequently faces serious supply shocks. These supply shocks normally come from agriculture, but sometimes the supply shock can come as a result of international commodity prices such as crude oil. In those situations, achieving a certain fixed target may become very difficult. The reality is monetary policy alone cannot control supply shock driven inflation. Appropriate supply management initiatives on part of the government have to supplement monetary policy in such situations.

Necessary action may be initiated at the earliest so as to confirm to various preconditions as discussed above within a reasonable timeframe. This may include a legislative mandate to achieve price stability or formal commitment of the government to the targets. Adoption of 'soft inflation targeting' will certainly influence expectations which have a strong impact on inflation outcome. Moreover, the RBI's commitment to maintain the nominal anchor will manage wage-cost-price spiral and ensure stable prices. Such a framework will be conducive for the RBI's medium term objective of aligning domestic inflation to the advanced country standard so as to maximize the benefits from the globalization process.

Exhibit 2: Inflation Targeting - Transmission Mechanism



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Paper No. 28

Optimal Rate of Inflation for Nepal: An Empirical Investigation

Siddha Raj Bhatta*

Abstract

This paper attempts to empirically examine the optimal rate of inflation for Nepalese Economy on the basis of annual data over the period 1975 to 2014. It employs the non-linear specification by Sarel (1996) and Conditional Least Squares Specification by Khan and Senhadji (2001) to estimate the optimal rate of inflation. The results from the study suggest that the threshold rate of inflation is 6 percent for the Nepalese case. When inflation is below this threshold, it does not have any significant effect on growth or it may have a slightly positive effect, whereas inflation has significant retarding effects on growth beyond the threshold. It is, thus, desirable to contain inflation to less than 6 percent to ensure that economic growth is unharmed by the pernicious effects of high inflation.

JEL Classification: [E31, O40]

Key Words: Inflation, Growth, Optimal Inflation

1. Introduction

One of the fundamental macroeconomic objectives for most countries is economic stability characterized by high and sustained output growth with low inflation. Hence, the question of the existence and nature of the link between inflation and growth has been the subject of considerable interest and debate (Khan and Senhadji, 2001). There is a general consensus among policy makers and economists that high rate of inflation is detrimental to economic growth as it disrupts the smooth functioning of a market economy and impedes efficient resource allocation by obscuring the signaling role of relative price changes, the most important guide to efficient economic decision making (Fischer, 1993). Thus, some of the economies have moved towards the explicit inflation targeting in their monetary policy framework in order to preclude the adverse effect of inflation on growth.

The economic scenario before the 1970s, however, was dominated by the belief that inflation has either none or positive relationship with economic growth. It is the stagflation of the 1970's which brought a stark change in the argument. The hyperinflation followed by the dismal performance of the economies in a vast majority of countries stimulated a large number of theoretical and empirical studies to bring ahead the idea that inflation adversely affects growth.

In the recent years, works by Fischer (1993), Sarel (1996), and Khan and Senhadji (2001) have added the third dimension to the debate introducing the idea of non-linearity in the relationship between inflation and economic growth. Non-linearity in the relationship implies that at lower rate of inflation, the relationship is positive or nonexistent, but at higher rates, it switches to a negative

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one. In such a nonlinear relationship, the inflexion point, threshold, or the optimal rate of inflation at which the sign of the relationship between the two variables would switch, can be estimated.

The main purpose of this paper is: (i) to check whether non-linearity in the relationship between inflation and economic growth exists in the Nepalese Case, and (ii) to find the optimal rate of inflation beyond which inflation has pernicious effects on economic growth, in case the non-linear relationship exists.

Rest of the study is organized as follows: Section Two reviews some of the empirical studies carried out at national and international level, Section Three presents the data issues and methodology followed in the study, Section Four discusses the estimation results and the final section presents some concluding remarks.

2. Review of Literature

The debate whether inflation is supportive or detrimental to economic growth has attracted a vast pool of theoretical discussions and empirical studies, especially after the 1970s. Some earlier empirical studies, such as Bruno and Easterly (1995) put forward the argument that inflation affects economic growth negatively at least at double-digit level. Nevertheless, later studies like Sarel (1996), and Khan and Senhadji (2001) found that the effect of inflation on economic growth is indeed non-linear: up to a certain threshold rate of inflation, inflation does have insignificant or positive effects on economic growth whereas beyond that level, it is detrimental to economic growth.

Fischer (1993) examined that high inflation reduces growth by reducing investment and productivity growth. Taking the dataset of 93 countries and employing spline regression with breaks at 15 and 40 percent, he found that there exists non-linearity in the inflation growth relationship and the strength of the relationship weakens for inflation rates higher than 40 percent.

Barro (1995) found a negative relationship between inflation and economic growth on the basis of the dataset of 100 countries covering the period 1960-1990. The regression results of the study indicate that the growth rate of real per capita GDP reduces by 0.2-0.3 percentage points per year for every 10 percentage point increase in inflation. This adverse impact, though seems small, proves to be substantial in the long run e.g. if inflation increases by 10 percentage points each year for 30 years, the level of real GDP will be reduced by 4-7 percent.

Sarel (1995) observed that inflation does not have any influence on growth or at least there may be a slight positive effect when inflation is below a certain optimal rate. He used a panel data set of 248 observations from 87 countries spanning the period 1970 to 1990 and found the structural break at 8 per cent level of inflation. Above the 8 percent level, he observed that the estimated effect of inflation of economic growth is negative, strong, significant and robust.

Bruno and Easterly (1998) observed that a negative, shorter to medium term relationship between inflation and growth is only present with high frequency data and extreme inflation observations (when the inflation is above the threshold rate of 40 percent). They found no evidence of any relationship between inflation and growth at annual inflation rates of less than 40 per cent.

Ghosh and Phillips (1998) used a data set of 145 IMF member countries for the period 1960-1996 to show that there is a negative relationship between high inflation and growth. They found that, at very low rates of inflation (2-3 per cent a year or lower), inflation and growth are positively correlated. Otherwise, inflation and growth are negatively correlated.

Khan and Senhadji (2001) examined an unbalanced panel data set of 140 countries covering the period 1960 to 1998 employing Nonlinear Least Squares (NLSS) regression model and found that the threshold rate of inflation is lower for industrialized countries (1-3 per cent) than it is for developing countries (7-11 per cent). The study reveals that inflation levels below the threshold have no effect on growth, while inflation rates above the threshold have a significant negative effect.

Mubarik (2005) examined the threshold point of inflation for Pakistan employing the methodology put forward by Khan and Senhadji (2001) and found that the inflation rate beyond 9 percent is detrimental to economic growth. His study is based on the annual dataset from 1973 to 2000. Hussain and Malik (2011) confirmed the 9 percent threshold rate of inflation of Pakistan using the dataset of 1960 to 2006. They suggest that Pakistan must contain inflation to single digit for optimal economic growth.

Singh (2010) observed that the optimal rate of inflation is 6 percent for Indian economy, employing Khan and Senhadji (2001) methodology with the annual dataset for 1971 to 2009 and quarterly dataset for 1996:Q1 to 2009:Q3. Mohanty et.al. (2011) examined the threshold rate for India employing Sarel (1996), Khan and Senhadji (2001) and Espinoza et al. (2010) methodologies and found that there are significant retarding effects of inflation when it is above the threshold rate of 4 to 5.5 percent, while there is significant positive relationship between inflation and economic growth when inflation is below its threshold range. Furthermore, Chakarvarty Committee (1985) considered the acceptable inflation of 4 percent while Rangarajan (1998), Vasudevan et al. (1998), Samantaraya and Prasad (2001) observed the optimal rate of inflation lying in the range of 6–7 percent.

Leshoro (2012) estimated the threshold rate of inflation for South Africa at 4 percent using the quarterly dataset for the period 1980:Q2 to 2010:Q3. He found that inflation has positive and insignificant relationship with economic growth up to 4 percent level of inflation whereas it has significant negative relationship with growth beyond the threshold rate. The policy makers should strive to keep inflation preferably below 5 percent to avoid its pronounced adverse effects on growth.

Younus (2012) observed that the optimal growth for Bangladesh lies between 7 to 8 percent. He has employed annual data from 1976 to 2012 in his quadratic regression model. He suggests that targeting too low an inflation rate (relative to the threshold) would be hurtful for growth in terms of potential cost of forgone output and, at the same time, too high rate of inflation would also impede economic growth.

In case of Nepal, **Bhusal and Silpakar (2011)** estimated the threshold rate of inflation to be 6 percent using the annual dataset for the period 1975 to 2010. However, their study has a poorer overall fit as evidenced by the inclusion of inflation as a single independent variable in the growth equation with a resultant low R2 value of less than 2 percent. Furthermore, it fails to examine whether the existence of the threshold rate is significant or not.

3. Data Issues and Methodology

3.1 Data Issues

The study has used annual time series data of Real Gross Domestic Product, Inflation, Population Growth, Export Income and Total Investment for the Nepalese Economy spanning the period 1975 to 2014. Real Gross Domestic Product (at 2001 price), export and total investment figures have been taken from Economic Survey 2011 and 2014 Issues published by Ministry of Finance, Nepal. Total investment includes private investment as well as public investment. Export and total

investment figures have been deflated by using consumer price index. CPI, instead of GDP deflator has been used to deflate the time series to remove the negative correlation between inflation and growth rate, which is not caused by the effects of inflation. Consumer Price Index (CPI) series (2006=100) has been taken from Quarterly Economic Bulletin (July 2014 Issue) published by Nepal Rastra Bank. The population figures have been extracted from the World Bank database maintained at data.worldbank.org for the period 1980 to 2014 and for the population data for 1975 to 1979, estimates made by United Nations Department of Economic and Social Affairs in 'World Population Prospectus: 2010 Revision' have been used.

3.2 Methodology

Following the conventional economic theory and empirical literature (Barro 1991, Sala–i–Martin 1997 and Romer 1993), the following growth equation has been used in this study.

$$/\Delta Y = \alpha + \beta_1 \pi + \Theta X + e \quad \text{.....(1)}$$

Where,

ΔY = Growth Rate

π = Rate of Inflation

X = A vector of other control variables that includes growth rate of population, growth rate of exports and growth rate of total investment, and

e = iid$(0, \sigma^2)$

Introducing the concept of extra inflation in equation (1);

$$\Delta Y = \alpha + \beta_1 \pi + \beta_2 * D(\pi - \pi^*) + \Theta X + e \quad \text{.....(2)}$$

Where $\pi - \pi^* is$ the difference between actual inflation and the threshold inflation defined as extra inflation.

D is a dummy such that:

D=0 when $\pi \leq \pi^*, and$

D=1 when $\pi > \pi^*$

Relation (2) shows that below the threshold rate of inflation (π^*), the impact of inflation on growth is shown by the value of β_1 whereas beyond the threshold rate, the impact of inflation on growth is shown by the sum of β_1 and β_2. The value of β_2, thus, shows the difference of the impact between the two sides of the threshold.

In more convenient terms, relation (2) can be expressed as:

$$G\_RGDP = \alpha + \beta_1 INF + \beta_2 * D(INF - \pi^*) + \beta_3 G\_POP + \beta_4 G\_RX + \beta_5 G\_RTI + e \quad \text{.....(3)}$$

The coefficients $\beta_3, \beta_4, \beta_5$ are expected to bear a positive sign with them and β_2 is expected to have a negative sign showing the negative relationship between inflation and growth beyond the threshold level.

Table 3.1

Data Definitions

G_RGDP	Growth Rate of Real Gross Domestic Product at 2001 Price defined as $\Delta \ln(\text{Re}al\ \text{GDP})$
INF	Inflation Rate defined as the Growth Rate of CPI (2006=100) and (INF= $\Delta \ln(CPI)$
π^*	Threshold Rate of Inflation
G_POP	Growth Rate of Population defined as $\Delta \ln(Population)$
G_RX	Growth Rate of Export (deflated by CPI) defined as $\Delta \ln(Deflated\ \text{Export Income})$
G_RTI	Growth Rate of Total Investment (deflated by CPI) defined as $\Delta \ln(Deflated\ \text{Total Investment})$

One important issue here is whether the variables should be used in the model in log form. Sarel (1996), Khan and Senhadji (2001), among few others, have used the variables in the growth equation in log form as it provided more symmetrical distribution of inflation in their case. In case of Nepal, the distribution of Real GDP growth and INF are near symmetrical as shown by the histograms provided in Appendix A. Thus, the variables are used without taking the log form.

3.2.1 Sarel Methodology

Sarel (1996) methodology consists of iterating the regression model presented in relation (3) with different π* values using the OLS estimation. The threshold rate of inflation occurs at that value of π* which produces the maximum value of R-squared or minimum Root Mean Square Error (RMSE). The coefficient of extra inflation indicates the difference in the inflation effect on growth between the two sides of the structural break and its t-statistic value tests whether or not the structural break is significant.

3.2.2 Khan and Senhadji Methodology

Khan and Senhadji (2001) methodology estimates the regression equation presented in (3) using conditional least squares. They argue that conventional gradient search techniques to implement Non Linear Least Squares (NLSS) are inappropriate as π* enters the model in a non-linear and non-differential manner. In this case, Conditional Least Squares can be used in which for any π* the model is estimated by OLS, yielding the sum of squared errors as a function of π*. The least squares estimate of π* is found by searching over π and selecting the value that yields the lowest sum of squared errors. Formally, if S1(π) denotes the residual sum of squares with different assumed threshold rate of inflation, the threshold rate π* is chosen so as to minimize S1(π),: that is,

$$\pi^* = \arg\min_{\pi}\{S_1(\pi),\ \pi_1, \ldots\ldots\pi_r\}$$

Where, π_1 to π_r are the assumed threshold values of inflation during the iteration process.

For this value of π* the slope parameters are estimated by OLS. Chan and Tsay (1998) have shown that these NLLS estimates are consistent and asymptotically normal.

To test whether threshold rate of inflation is significant, Khan and Senhadji (2001) employed the Hansen (1999) Likelihood Ratio, as the classical tests such as t-test have nonstandard distribution due to non-identification of π*. Hansen (1999) showed how to bootstrap to simulate the asymptotic distribution of LR0 statistic.

Under the null hypothesis of no threshold effect (H_0: $\beta_1 = \beta_2$), the LR_0 ratio is defined by

$$LR_0 = \frac{S_0 - S_1}{\hat{\sigma}^2};$$

This hypothesis is tested against the alternative hypothesis H_1: $\beta_1 \neq \beta_2$

Where,

S_0=Residual sum of squares under H_0 or no threshold effect.

S_1=Residual sum of squares under H_1or threshold effect and

$\hat{\sigma}^2$ =residual variance under H_1.

4. Results and Discussion

4.1. Historical Facts about Inflation and Growth

Nepal has achieved 4.18 percent average growth rate of real GDP on average over the period 1975 to 2014. Growth rate has fluctuated between 0.16 percent to 8.55 percent: somewhat higher in the late 1980s and 1990s followed by the structural reform program recommended by IMF and World Bank, lower in the early 2000s due to heightened domestic political insurgency and improving thereafter (Table 4.1 and Chart 4.1)

Table 4.1

Summary Statistics

Variable	Average	Std.	Maximum Value	Minimum Value
G_RGDP	4.18	1.99	8.55	0.16
INF	7.96	3.89	19.05	-1.13
G_POP	2.04	0.55	2.64	0.95
G_RX	5.04	18.23	65.81	-41.89
G_RTI	6.65	10.27	28.57	-17.33

Inflation, on the other hand, has always been greater than the growth rate except few years averaging 7.96 percent over the sample period (Chart 4.1). Inflation was higher in the 1980s and early 90s due to an increase in electricity tariff and fertilizer prices, impact of Gulf War, low agricultural production, devaluation of Nepalese Rupee against US dollar and other convertible

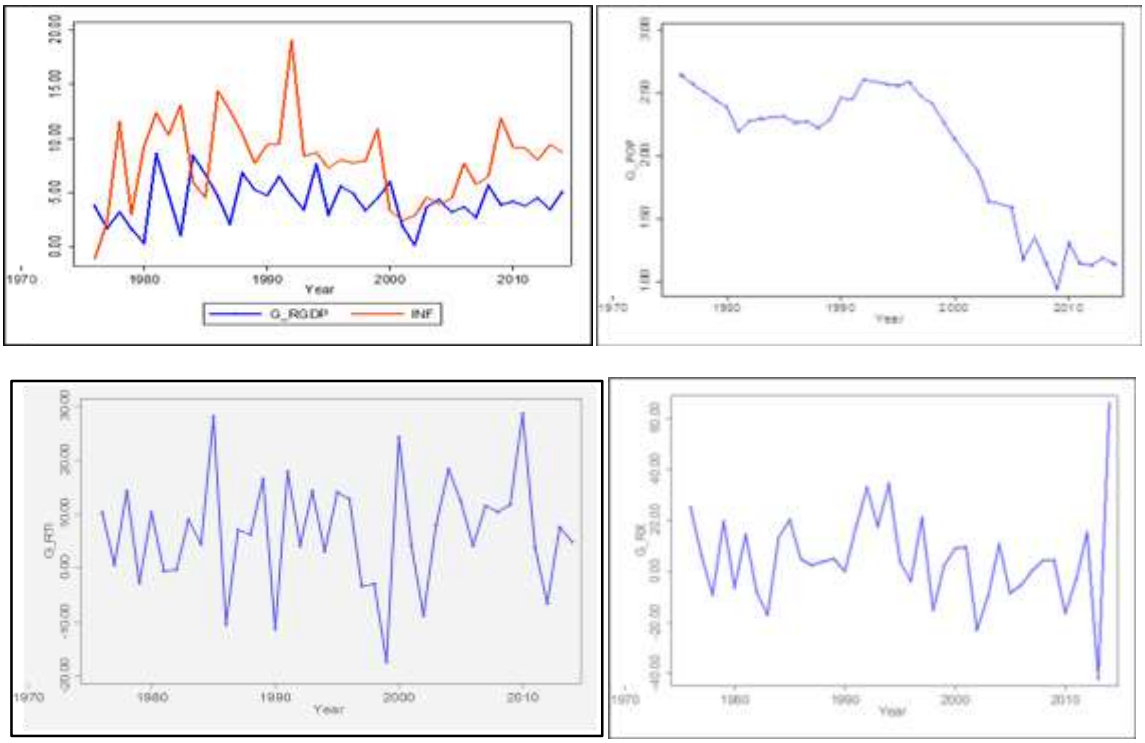
currencies by 20.9 percent in 1991, and an upsurge of prices in India. Rise in the Food and Beverage index in 1992 was 24.49 percent leading to the highest ever-recorded rate of Inflation in Nepal (NRB, 2007).

4.2 Time Series Properties of the Variables

Chart 4.1 shows the time series plot of the variables used in the study. All the variables seem to be stationary in nature except the growth rate of population which has a downward trend.

Chart 4.1

Time Series Plot of the G_RGDP, INF, G_POP, G_RX and G_RTI



To confirm the exact order of integration of the variables, Augmented Dickey Fuller Test (ADF) and Phillips-Perron Test (PP) were employed. The results in table 4.2 demonstrate that the null hypothesis of unit root in the time series can be easily rejected for the variables G_RGDP, INF, G_RX and G_RTI at level making them stationary at level [I(0)] whereas the null for G_POP can be rejected only at its first difference making it stationary at first difference [I(1)].

Table 4.2

Unit Root Test Results

Variable	Constant				Constant and Trend				Order of Integration
	ADF Value	p-value#	PP Value	p-value#	ADF Value	p-value#	PP Value	p-value#	
G_RGDP	-6.25*	0.00	-6.25*	0.00	-6.17*	0.00	-6.17*	0.00	I(0)
INF	-4.88*	0.0	-4.87*	0.00	-4.90*	0.00	-4.93*	0.00	I(0)

Variable	Constant				Constant and Trend				Order of Integration
	ADF Value	p-value#	PP Value	p-value#	ADF Value	p-value#	PP Value	p-value#	
G_POP	-0.25	0.93	-0.31	0.92	-1.29	0.88	-1.38	0.86	I(1)
D(G_POP)	-7.30*	0.00	-7.18*	0.00	-7.32*	0.00	-7.19*	0.00	
G_X	-6.94*	0.00	-6.98*	0.00	-6.88*	0.00	-6.93*	0.00	I(0)
G_RTI	-7.85*	0.00	-8.13*	0.00	-7.82*	0.00	-8.18*	0.00	I(0)

4.3 Optimal Rate of Inflation for Nepal

Table 4.3 and Chart 4.2 present average growth rate of real GDP for different ranges of inflation, inflation being arranged in the ascending order. For the five years when inflation ranged up to 3 percent only, average growth rate was rather low. In the higher inflation range of 3 to 5 percent, growth rate is higher than the previous inflation range. Average growth rate is highest when inflation lies in the range of 5 to 7 percent. Average growth rates for the inflation ranges greater than seven percent are lower than the inflation range of 5 to 7 percent. This bi-variate relationship between inflation and real GDP growth sheds light on the existence of some sort of non-linearity in the relationship between inflation and GDP growth with a structural break or inflexion point after which such a relationship switches from positive to a negative one.

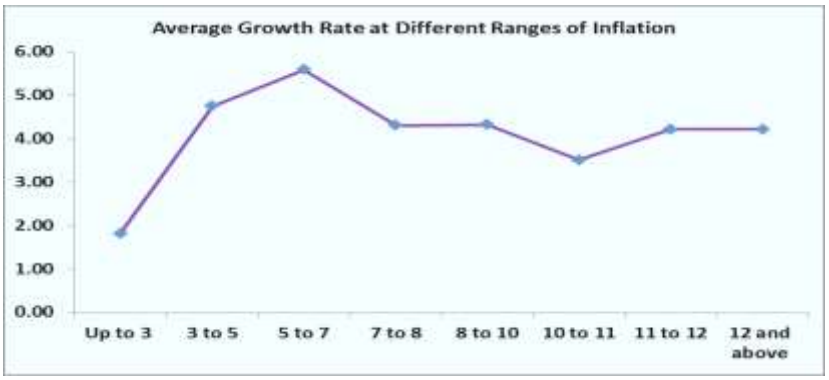
Table 4.3

Average Growth Rates at Different Ranges of Inflation

Inflation Range (in %)	Sample Years	Average Growth Rate
Up to 3	5	1.82
3 to 5	5	4.75
5 to 7	3	5.59
7 to 8	7	4.31
8 to 10	9	4.33
10 to 11	3	3.51
11 to 12	2	4.22
12 and above	5	4.22

Chart 4.2

Average Growth Rates at Different Ranges of Inflation



4.3.1 Estimation Results from Sarel (1996) Methodology

Following the Sarel (1996) methodology, relation (3) has been iterated taking the value of threshold rate of inflation from 1 to 11 percent. For π*=6 percent, the Residual Sum of Squares has reached a minimum and equivalently, the value of R-squared has reached a maximum value as depicted in chart 4.3. Also, the coefficient of extra inflation is statistically significant at 5 percent level of significance implying the significance of the structural break. The estimation results for all values of π* considered in this study have been provided in Appendix B along with the diagnostic test statistics. Here, estimation result for π*=6 only has been reported (Table 4.4).

Table 4.4

Estimation Results for Sarel (1996) Methodology

Variable	Coefficient	Std. Err.	t-ratio	Prob>t
_Cons	0.42	1.70	0.25	0.81
INF	0.55*	0.22	2.53	0.02
D(INF-6)	-0.64*	0.29	-2.14	0.04
G_POP	0.34	0.55	0.62	0.54
G_RX	0.05*	0.02	3.11	0.01
G_RTI	0.25	0.03	0.86	0.39
Source	Sum of Squares	df	Mean Square	
Model	49.12	5	9.82	F(5,33) = 3.22
Residual	100.63	33	3.04	Prob>F = 0.02
Total	149.75	38	3.94	R-squared = 0.33
No. of Observations = 39		Root MSE = 1.75		Adj. R-squared = 0.23
Shapiro Swilk W-Test Stat. = -0.79(0.78)		BP Heteroskedasticity Test Stat. = 1.44 (0.23)		Mean VIF = 4.30
RESET Test Stat. = 1.38 (0.27)		LM Autocorrelation Test Stat. = 2.79(0.09)		

*shows that the coefficients are significant at 5 percent level.

Numbers in the parenthesis show the probability associated with the statistic.

The estimated threshold rate of inflation (of 6 percent) is consistent with the studies by Bhusal and Silpakar (2011) for Nepal, and Singh (2010), Rangarajan (1998), Vasudevan et.al.(1998), and Samantaraya and Prasad (2001) for India.

The positive and significant value of the coefficient of INF shows that inflation is conducive to growth below the threshold rate of inflation (6 percent). The sum of the coefficients of the INF and Dummy is negative (0.55-0.64=-0.09) implying that if inflation rate increases by one percentage point above the threshold, real GDP will be reduced by 0.09 percentage on the average, other factors affecting the growth rate of GDP remaining as they are. Though, the negative impact seems small, it can have serious repercussionary effects on the economy in the long run. The coefficients of other variables are positive as expected. However, the coefficients of population growth and growth of real total investment are not significant. In Nepalese case, population growth may not be a good proxy for the labor force growth due to open broader with India, and increasing trend of Nepalese workers going abroad for work, which might have caused a mismatch between population growth and labor force growth.

All the diagnostic tests show satisfactory results for the estimated model. The regression line is significant as shown by the probability of F-statistic. The Shapiro Wilk W test statistic shows that we cannot reject the null hypothesis of error terms being normally distributed. It is also evident from the Kernel Density Plot of the residuals in Chart 4.4. Furthermore, Heteroskedasticity Test statistic shows that we cannot reject the null of the constant error variance due to high probability value associated with it. The average Variance Inflation Factor (VIF) being less than ten suggests that the model variables are not suffering from the problem of multicollinearity. The high probability value associated with the RESET test statistics implies that we cannot reject the null hypothesis of no omitted variables in the regression model. Finally, the LM test for Autocorrelation shows no presence of Autocorrelation in the error term of the estimated regression model.

Chart 4.3

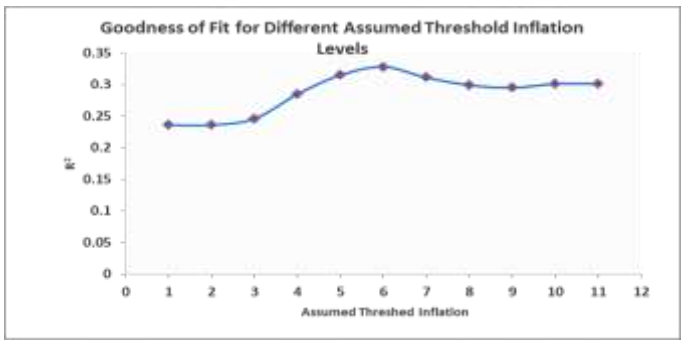
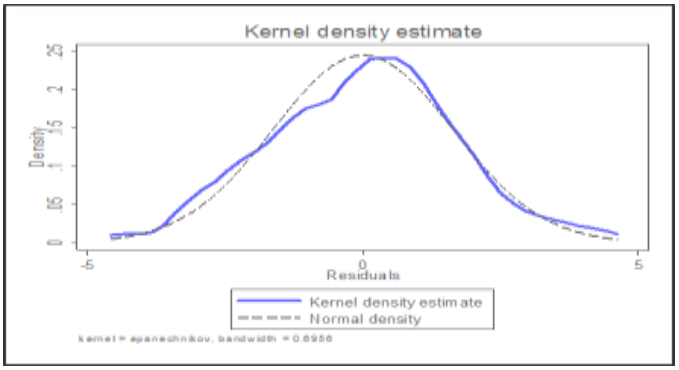


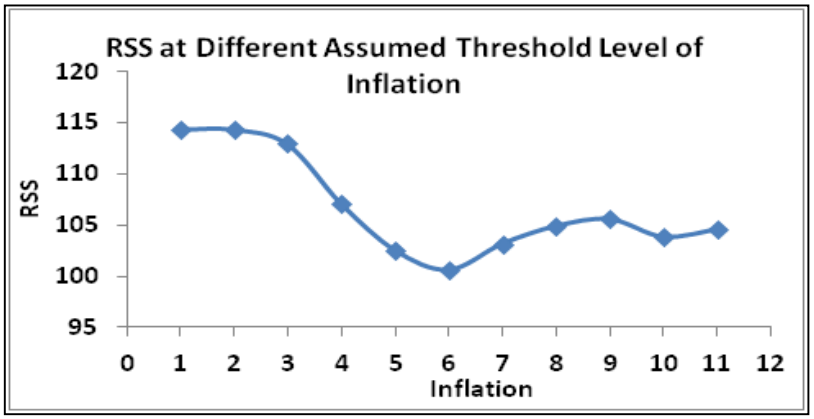
Chart 4.4



4.3.2 Estimation Results from Khan and Senhadji (2001) Methodology

The iteration procedure for Khan and Senhadji (2001) methodology is same as Sarel (1996). Iterating relation (3) assuming the threshold inflation from 1 to 11 percent, the Residual Sum of Squares reached a minimum for π*=6 percent (depicted in chart 4.5).

Chart 4.5



The threshold rate of inflation (π*=6) is statistically significant as shown by the LR0 statistic.

Table 4.5

Hansen Likelihood Ratio Test Result

Test Statistic	LR-Statistic	Critical Value (5 percent)
LR_0	5.28*	5.23

*shows that the coefficient is significant at 5 percent level.

4.4 Model Excluding the Growth Rate of Population

It is desirable to see whether population growth rate (I(1) variable) in the model has spuriously affected the relationship between inflation and growth rate of real GDP. The results show that even after excluding the growth rate of population, the threshold rate of inflation comes out to be 6 percent reinforcing the finding from the earlier model (Table 4.6 and Chart 4.6).

Chart 4.6

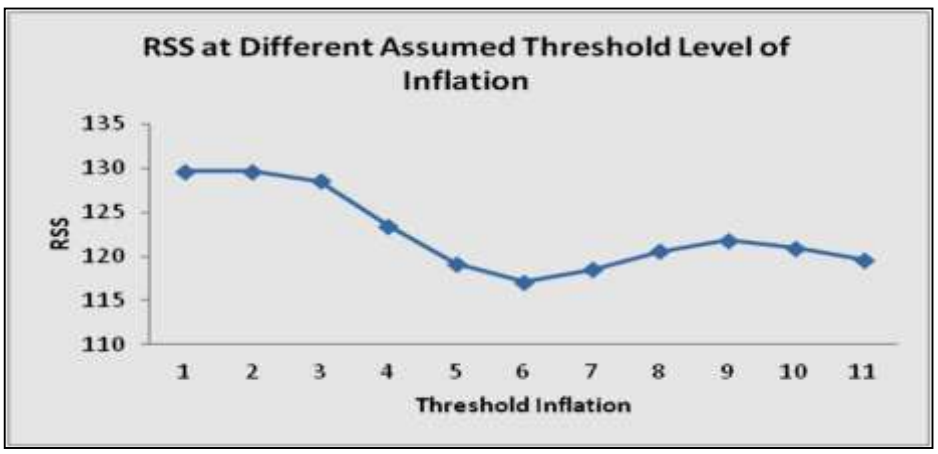


Table 4.6

Estimation Results without Population Growth

Variable	Coefficient	Std. Err.	t-ratio	Prob>t
_Cons	1.40	0.11	1.26	0.21
INF	0.45*	0.22	2.04	0.04
D(INF-6)	-0.56**	0.29	-1.92	0.06
G_RX	0.04*	0.01	2.92	0.01
G_RTI	0.03	0.03	0.89	0.38
Source	Sum of Squares	df	Mean Square	
Model	46.29	4	11.57	F(4,34) = 3.36
Residual	117.10	34	3.44	Prob>F = 0.02
Total	163.39	38	4.29	R-squared = 0.28
No. of Observations = 39		Root MSE = 1.73		Adj. R-squared = 0.19
Shapiro Swilk W-Test Stat. = -1.59(0.93)		BP Heteroskedasticity Test Stat. = 2.78 (0.09)		Mean VIF = 5.56
RESET Test Stat. = 2.00 (0.13)		LM Autocorrelation Test Stat. = 2.14(0.14)		

*shows that the coefficients are significant at 5 percent level.

**shows that the coefficients are significant at 10 percent level.

Numbers in the parenthesis show the probability associated with the statistic.

The coefficients of the model excluding population growth rate are consistent with the earlier model. And all the diagnostic statistics show that the regression model is free from the problems of autocorrelation, multicollinearity, heteroskedasticity, non-normality of residuals and model misspecification.

4.5 Impact of Ignoring the Non-linearity

If the inflation-growth relationship is modeled in a linear fashion ignoring the role of the threshold rate of inflation, a bias is introduced in the relationship between inflation and growth in the Nepalese case too. Table 4.7 shows that the average relationship between inflation and growth becomes positive and insignificant when the point of inflection is ignored.

Table 4.7

Impact of Ignoring the Non-linearity

Variable	Coefficient	Std. Err.	t-ratio	Prob>t
_Cons	2.80	1.38	2.03	0.05
INF	0.05	0.08	0.66	0.51
G_RX	0.03*	0.01	2.51	0.02
G_RTI	0.03	0.03	1.15	0.25
Source	Sum of Squares	df	Mean Square	
Model	33.74	4	8.44	F(4,34) = 2.21
Residual	129.64	34	3.81	Prob>F = 0.08
Total	163.39	38	4.29	R-squared = 0.20
No. of Observations = 39		Root MSE = 1.95		Adj. R-squared = 0.11

5. Concluding Remarks

The main purpose of this paper was to check for any non-linearity in the relationship between inflation and economic growth in the Nepalese case. The results show that there is a point of inflection at 6 percent rate of inflation in the relationship between inflation and growth making the relationship between them a non-linear one. Moreover, the results clearly indicate that inflation does have positive and/or insignificant relationship with growth below 6 percent whereas it has a significant negative relationship with growth beyond the threshold. This fact highlights the need that policy makers should strive to contain inflation below 6 percent in order to achieve optimal economic growth. Thus, a macroeconomic policy aiming at the inflation rate below 6 percent is one of the best recommendations that can be made from the results of the study.

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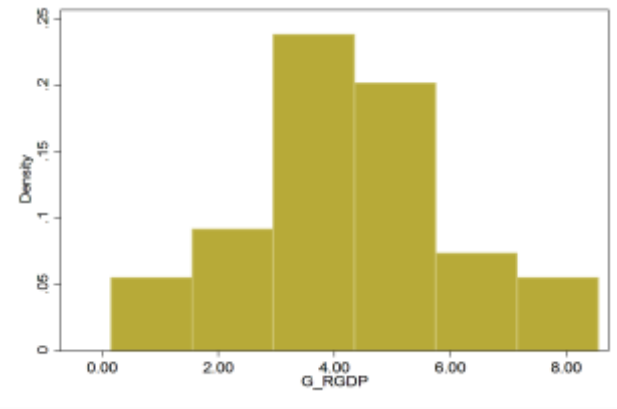
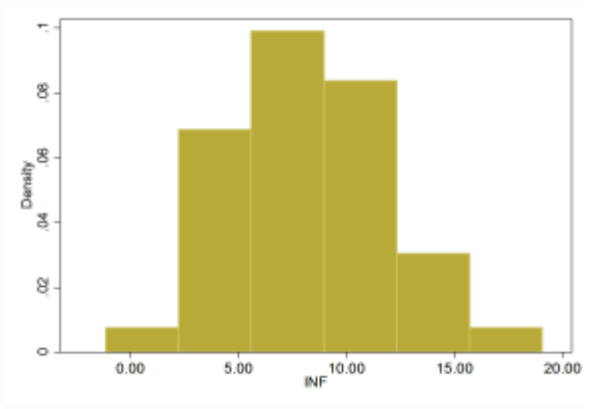
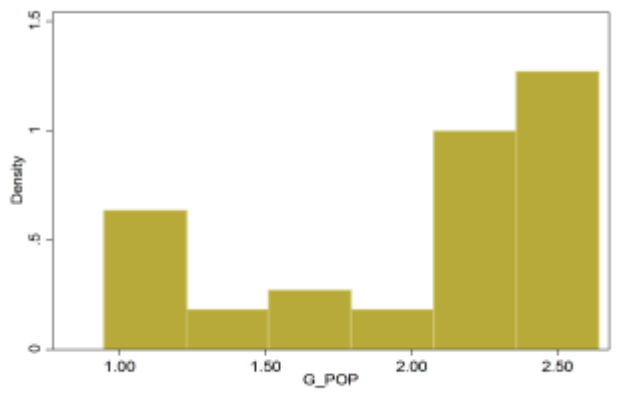
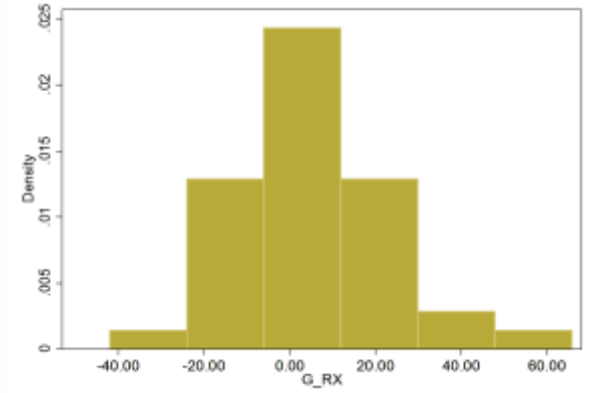
Appendix A

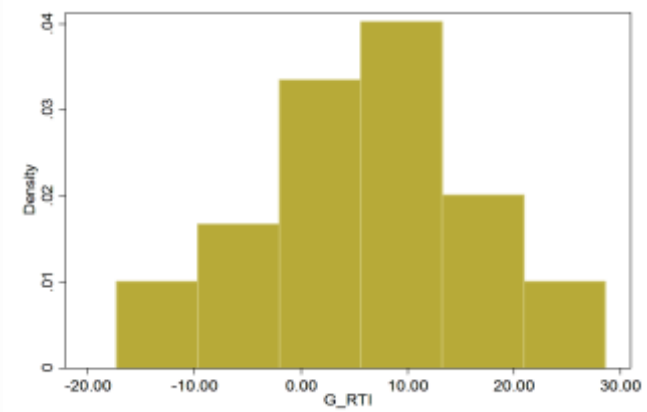
Histograms of G_RGDP, INF, G_RX, G_POP and G_RTI











Appendix B

Regression Results for Different Assumed Threshold Rates of Inflation

Coefficient	$\pi^* = 1$	$\pi^* = 2$	$\pi^* = 3$	$\pi^* = 4$	$\pi^* = 5$	$\pi^* = 6$	$\pi^* = 7$	$\pi^* = 8$	$\pi^* = 9$	$\pi^* = 10$	$\pi^* = 11$
Constant	2.60 (0.12)	2.51 (0.19)	1.84 (0.36)	0.69 (0.72)	0.30 (0.87)	0.42 (0.81)	0.97 (0.55)	1.35 (0.39)	1.52 (0.33)	1.54 (0.30)	1.70 (0.25)
INF	0.36 (0.70)	0.28 (0.67)	0.44 (0.37)	0.67 (0.08)	0.66 (0.03)	0.55 (0.02)	0.41 (0.02)	0.31 (0.03)	0.27 (0.03)	0.26 (0.02)	0.23 (0.03)
$D(INF - \pi^*)$	-0.26 (0.79)	-0.17 (0.79)	-0.36 (0.49)	-0.66 (0.14)	-0.70 (0.06)	-0.63 (0.04)	-0.50 (0.06)	-0.41 (0.09)	-0.40 (0.10)	-0.47 (0.07)	-0.50 (0.08)
G_POP	0.03 (0.95)	0.03 (0.96)	0.09 (0.87)	0.25 (0.66)	0.33 (0.55)	0.34 (0.54)	0.27 (0.63)	0.22 (0.69)	0.22 (0.69)	0.20 (0.71)	0.18 (0.75)
G_RX	0.04 (0.01)	0.04 (0.01)	0.05 (0.01)	0.05 (0.01)	0.05 (0.01)	0.05 (0.01)	0.05 (0.01)	0.05 (0.01)	0.05 (0.01)	0.05 (0.01)	0.05 (0.01)
G_RTI	0.03 (0.30)	0.03 (0.30)	0.03 (0.36)	0.02 (0.41)	0.02 (0.44)	0.02 (0.39)	0.03 (0.36)	0.03 (0.32)	0.03 (0.32)	0.03 (0.30)	0.03 (0.28)
R-Square	**0.236**	**0.236**	**0.246**	**0.285**	**0.315**	**0.328**	**0.311**	**0.299**	**0.295**	**0.301**	**0.301**
R-bar Square	**0.121**	**0.121**	**0.131**	**0.176**	**0.211**	**0.226**	**0.210**	**0.193**	**0.188**	**0.201**	**0.195**
F-Value	2.04 (0.09)	2.04 (0.09)	2.15 (0.08)	2.63 (0.04)	3.04 (0.02)	3.22 (0.02)	2.98 (0.02)	2.82 (0.03)	2.76 (0.03)	2.91 (0.02)	2.85 (0.03)
Shapiro Swilk W-Test	-0.34 (0.63)	-0.34 (0.63)	-0.09 (0.54)	-0.75 (0.77)	-1.33 (0.90)	-0.79 (0.78)	-0.32 (0.62)	-0.20 (0.57)	-0.36 (0.64)	-0.13 (0.55)	-0.03 (0.51)
BP Test for Heteroskedasticity	0.91 (0.34)	0.91 (0.34)	0.90 (0.34)	0.57 (0.45)	0.75 (0.39)	1.44 (0.23)	1.78 (0.18)	1.75 (0.18)	2.12 (0.14)	2.36 (0.12)	2.28 (0.13)
Mean VIF	62.36	28.47	16.93	10.78	6.84	4.30	2.88	2.08	1.73	1.55	1.42
RESET Test	1.92 (0.15)	1.92 (0.15)	1.59 (0.21)	1.38 (0.26)	1.36 (0.27)	1.38 (0.27)	1.22 (0.32)	1.24 (0.31)	1.36 (0.27)	1.58 (0.21)	1.66 (0.19)
LM Test for Autocorrelation	1.08 (0.29)	1.08 (0.29)	1.23 (0.27)	1.96 (0.16)	2.64 (0.10)	2.79 (0.09)	2.58 (0.10)	2.29 (0.13)	2.03 (0.15)	2.21 (0.13)	2.23 (0.13)
$\beta_1 + \beta_2$	**0.10**	**0.11**	**0.08**	**0.02**	**-0.04**	**-0.08**	**-0.09**	**-0.10**	**-0.13**	**-0.21**	**-0.27**

Paper No. 29

Dividend policy, performance, and the stock price in Nepal

Nabaraj Adhikari, PhD

Abstract

Several studies have been documented in the extant literature on the relevance and irrelevance of dividend policy or dividend policy and enterprise performance in developed and emerging capital markets as well as a few studies on dividends and stock prices in pre-emerging capital markets like that of Nepal. There is lack of empirical studies on dividend policy, performance, and the stock price in the extant literature. This paper, therefore, aims at investigating the dividend policy, performance, and the stock price in Nepal employing descriptive cum analytical research. A priori hypothesis between relationship of the variables indicating dividend policy, performance and stock price are set based on theoretical framework and previous studies, and tested on the data from 22 listed enterprises covering a 5-year period, 2009 to 2013. Purposive sampling technique is used while selecting enterprises listed on Nepal Stock Exchange Ltd. All regular dividend paying enterprises are selected and data obtained are analysed using cross-section regression approach. The findings reveal that higher the dividend payout, better the enterprise performance and that a dividend is a major factor affecting the stock price and current year dividend per share affects negatively while dividend paid in the past year and return on equity influence positively the stock price. The implication of the findings is that devoting adequate time in designing and disseminating a dividend policy are the required initiatives in improving the performance of listed companies and enhance the stock price in the pre-emerging capital markets. As the paper addresses the gap in the extant literature, the findings could be useful for research scholars, investors and financial analysts in understanding the capital market as well as market operator and Government regulator in strengthening the capital market of Nepal.

Keywords: Capital market; dividend policy; performance; pre-emerging; stock price

JEL classifications: C 31; C 87; G32; G 35

1. Introduction

There is considerable debate on whether dividend payouts affect value of the stock. Some studies state that dividends increase shareholder wealth (Gordon (1963), Walter (1963)), other studies state that dividends are irrelevant (Miller and Modigliani (1961), Black and Scholes (1974), Miller and Scholes (1978)), and still other studies argue that dividends decrease shareholders' wealth (Litzenberger and Ramaswamy (1979), and Naranjo et al. (1998)). Despite the numerous studies, dividend policy remains an unresolved issue in corporate finance.

Amidu (2007) reveals that dividend policy affects enterprise performance as measured by its profitability. The results show a positive and significant relationship between return on assets, return on equity, growth in sales and dividend policy. Banz (1981) reveals that average returns on large stocks are lower while average returns on small stocks are higher. Bolster and Janjigian (1991) indicate that the value of the enterprise is greater for stocks with higher dividend yields as compared to stocks with lower dividend yields. In line of these studies, the present paper aims to find the relationship between dividend policy and performance of the enterprise in Nepal.

Solomon (1963) contends that dividends may offer tangible evidence of the enterprise's ability to generate cash, and as a result, the dividend policy affects the value of the enterprise. Brennan

(1970) proves that if effective capital gains tax rates are lower than effective rates on dividend income, then investors will demand a higher rate of return on securities with higher dividend payout. In the Nepalese context, Pradhan (2003) argues that the share value is affected by dividend payments. It is thus an important issue to be addressed in this paper is whether there is any influence of dividend policy on stock price using more recent data. Further this paper aims to assess the effect of dividend policy and performance on stock price.

The remainder of the paper is organised as follows. Section 2 provides the review of literature. Research methodology is presented in Section 3. Analysis of data is made in Section 4. Section 5 presents the findings and discussion. Lastly, Section 6 offers the policy implications.

2. Literature review

Miller and Modigliani (1961), designated as MM hereafter present a comprehensive argument for dividend irrelevance by holding the enterprise's investment policy constant in their analysis of dividend policy and showing with perfect capital markets in which there is an absence of taxes, rationality, and perfect information that dividends can be replaced at no cost; thus dividend policy is irrelevant to the valuation of share. MM views dividend policy as the following trade-off: retaining earnings versus paying cash dividends and issuing new shares of stock. According to them an enterprise can offset any dividends it pays by issuing new shares of stock. Since any dividend policy can easily be offset, they argue that dividend policy does not influence the value of share.

Friend and Puckett (1964) use cross-section data to test the effect of dividend on stock price. Prior to this work, most studies had related stock prices to current dividends and retained earnings, and reported that higher dividend payout was associated with higher price earnings ratios. The study uses dividends, retained earnings and lagged earnings price ratio as independent variables. Symbolically,

$$P_t = a+bDiv_t+cRE_t+d\ (E/P)_{t-1} \quad (1)$$

The study suggests that there is little basis for the customary view that in the stock market generally, except for unusual growth stocks, a rupee of dividends has several times the impact on price of a rupee of retained earnings.

Khan and Khan (2012) studies the dividend policy and stock prices by taking a sample of 131 companies listed in the Karachi Stock Exchange for a period of 10 years from 2001 to 2010. They use panel data approach to explain the relationship between stock dividend along with cash dividend and stock prices after controlling the profit after tax, earnings per share and return on equity. The findings, in overall, indicate that dividend policy has significant positive effect on stock prices.

Masum (2014) shows the relationship between dividend declaration practice and its impacts on shares market price of 30 commercial banks listed in Dhaka Stock Exchange (DSE) for the period of five years from 2007- 2011. The model employed is:

$$MP_{it} = ß_0 + ß_1\ (DY_{it}) + ß_2\ (RR_{it}) + ß_3\ (PAT_{it}) + ß_4\ (EPS_{it}) + ß_5\ (ROE_{it}) + \eta_t + \lambda_t + Ɛ_{it} \quad (2)$$

Where, DY is dividend yield, RR is retention ratio, PAT is profit after tax, earnings per share, ROE is return on equity, η_t is the specific characteristics measure of each bank called unobservable heterogeneity, and λ_t is a parameter for time dummy variables which is equal for all banks in each year but changes over time and Ɛ is the error term. The empirical estimation of the model reveals that return on equity and earnings per share have statistically significant positive impact on stock prices of the commercial banks of Bangladesh.

The assumption of perfect market, no taxation, no transaction cost, possibility of arbitrage etc., are over simplified and it does not apply in the real world (Dhanani (2005)). For example, in Nepal, the capital market contains all sort of imperfections. Moreover, there is absence of empirical studies on dividend policy, performance, and the stock price in the extant literature.

A brief review of capital market trend during mid-July 2008 to mid-July 2011 reveals that on 31 August, 2008 NEPSE index was reached to 1175.38 as the record points and on 15 June 2011, NEPSE index was decreased to 292.31 as the lowest points and within a year also there is a wide deviation between the highest and lowest points of the NEPSE index. In the year 2009, the highest point was 1175.38 and the lowest point was 609.46 leading to have 565.92 point deviation. These fluctuations in the index were occurred without having any definite economic and other reasons. Such a fluctuation in market index can be considered quite high and undesirable in the sense of credibility of capital market in the country.

In view of the gap in the extant literature as well as in the context of speculative market scenario of the country as aforementioned, it is interesting to investigate dividend policy, performance, and stock price of the enterprises in Nepal.

3. Research methodology

This section deals with a description of the research methodology employed in addressing the issues of this study.

3.1 Target population, data source, and sampling procedure

The population for this study consists of the enterprises listed on the Nepal Stock Exchange Ltd. (NEPSE). In mid-July 2013, there were 230 enterprises listed on NEPSE. The enterprises are selected based on the availability of information. The criteria by which the enterprises are included in the sample are: (i) The enterprises must have available data for all years, that is 2009-2013. (ii) The enterprises must have been listed on NEPSE before the aforementioned period of time. A review of data sources: individual annual reports of listed enterprises and annual trading reports of NEPSE reveal that till mid-July 2013, there were 22 listed enterprises paying dividends regularly for the study period mid-July 2009 to mid-July 2013 with the required data for the purpose of the study. The reason for selection for 5 years' time span is to have a large number of enterprises having uninterrupted dividend payouts in the sample and that one business cycle is completed in 5-7 years (Rafique (2012)). Thus, cross-sectional data of 22 listed enterprises (first 17 are financial sector enterprises and last five are non-financial sector enterprises) for the period of 2009 to 2013 (inclusive) with a total of 110 observations are used in the study as presented in Appendix 1.

3.2 Basic regression model and variables with hypothesized signs

To examine the relationship between dividend policy and stock price of the enterprise, the following model developed based on empirical findings is employed with the aid of Statistical Package for Social Science (SPSS) 20:

$$P_{it} = a_0 + a_1\, EPS_{it} + a_2\, ROE_{it} + a_3\, BETA_{it} + a_4\, DPS_{it} + a_5\, LAGDPS_{it} + a_6\, REPS_{it} + \mu_{it} \quad (3)$$

Where, the variables and hypothesized signs are as follows:

'P_{it}' is per share market price of enterprise 'i' in period't'; it is year-end closing price of the share that indicates the value of the enterprise. It is dependent variable in the model.

'EPS_{it}' is earnings per share of enterprise 'i' in period't', that is, the amount of earnings per each outstanding share of an enterprise's stock. Based on Khan and Khan (2012), and Masum (2014), it is hypothesised that per share market price is positively related to the earnings per share.

'ROE_{it}' is return on equity of enterprise 'i' in period't' which is net income after tax divided by shareholders equity. Shareholders' equity is share capital plus reserves and surpluses. Based on Khan and Khan (2012), and Masum (2014), it is hypothesised that per share market price is positively related to the return on equity.

'$BETA_{it}$' is systematic risk of the share of enterprise 'i' in period't' and is obtained from the following formula: β = COV (return on per share and return on market)/ market variance. BETA is considered proxy for enterprise risk in various empirical studies and is referred to as a measure of the sensitivity of the asset's return to variation in the market return, its systemic risk (Rozeff (1982), Alli et al. (1993), and Holder et al. (1998)). Based on Friend and Puckett (1964), Ardestani et al. (2013), and Ranti (2013)), it is hypothesised that per share market price is inversely associated with the risk of the enterprise.

'DPS_{it}' is dividend per share of enterprise 'i' in period't', and it is proxy for the dividend policy of the enterprise in this paper as in Gul et al. (2012), S.A. and S.O. (2013), and Yegon et al. (2014). Based on Graham and Dodd (1951), Bolster and Janjigian (1991), Pradhan (2003), Khan and Khan (2012), and Adhikari (2014), it is hypothesised that per share market price will increase with the dividend per share distributed by the enterprise.

'$LAGDPS_{it}$' is dividend per share of enterprise 'i' in period't-1' that is past year dividend. Based on Baker and Powell (2000), and Adhikari (2014)), it is hypothesised that per share market price will increase with the lagged dividend per share of the enterprise.

'$REPS_{it}$' is retained earnings per share of enterprise 'i' in period't' and it is earnings retained by the enterprise after the payments of preferred dividends and cash dividends to equity shareholders. Based on Pradhan (2003), and Khan and Khan (2012), it is hypothesized that per share market price will fall with the increase in retained earnings per share.

'μ_{it}' is random error term.

4. Analysis of data

Examination of the relationship between dividend policy, performance, and stock price is undertaken using the pooled cross-sectional data for various classifications of sample enterprises. As such, the study is attempted at two levels using overall sample, viz., (a) analysis of properties of portfolio formed on dividends and (b) regression analysis. The study is also attempted using group-specific samples by regression analysis. The following sub-sections present the analysis and findings of data.

4.1 Overall analysis

The overall analysis of the dividend policy, performance and valuation of stock price of the enterprise comprises analysis of properties of portfolio formed on dividends and regressions.

a) Properties of portfolios formed on dividends

The portfolios are formed on dividends of low and high dividend paying enterprises, and all sampled securities are sorted out into three portfolios based on dividends. The smallest to largest enterprises are contained in portfolios 1, 2, and 3 respectively. The low to high ratios of enterprise performance indicators are provided in portfolios 1 to 3. For each security, various measures of

earnings per share, return on equity, risk-beta, dividend per share, lagged dividend per share, and retained earnings per share are computed. They are then classified according to the portfolios formed above, and average values are computed. The results are presented in Table 1.

The results, among others, indicated that stocks with higher dividends have higher market price. The market prices per share have increased from Rs.511.06 for the smallest portfolio to Rs.2107.19 for the largest portfolio. Market prices of stocks paying higher dividends are also more variable as compared to stocks paying lower dividends as revealed by standard deviations of market price per share. Similarly, stocks with larger dividends have larger earnings. The earnings per share have increased from Rs.27.24 for the smallest portfolio to Rs.152.17 for the largest portfolio.

The mean return on equity has increased from Rs.15.47 for the smallest portfolio to Rs.17.54 for the intermediate portfolio to Rs.34.56 for the largest portfolio of stocks paying larger dividends. The return on equity is also more variable for the stocks paying higher dividends as compared to stocks paying lower dividends as revealed by standard deviation of the return on equity. The stocks with larger dividends have lower risk as shown in Table 1 from the lowest portfolio to the intermediate portfolio and the risk is slightly increased from the intermediate portfolio to the largest portfolio.

Table 1: Summary statistics for portfolios formed on dividends of selected enterprises

This table provides descriptive statistics for variables used in the study over the period 2009 to 2013 at the portfolio level. The three portfolios are formed based on dividend per share paid, i.e. < Rs.10 as the smallest portfolio or portfolio 1, dividend per share paid >Rs.10 to **<**Rs.**21** as intermediate portfolio or portfolio 2, and dividend per share paid > Rs.21 portfolio 3 or the largest portfolio. P is the per share closing price of enterprise, EPS is earnings per share, ROE is return on equity, BETA is risk, DPS is dividend per share, LAGDPS is lagged dividend per share, and REPS is retained earnings per share.

Portfolios		**1 Smallest < Rs.10**	**2 Intermediat >Rs. 10 to < Rs.21**	**3 Largest > Rs.21**
Number of observations		36	37	37
Panel A: P	**Means** (Rs.)	511.06	655.57	2107.19
EPS	(Rs.)	27.24	40.78	152.17
ROE	(%)	15.47	17.54	34.56
BETA	(Coefficient)	0.61	0.67	0.88
DPS	(Rs.)	4.32	13.67	115.12
LAGDPS	(Rs.)	7.81	13.18	96.98
REPS	(Rs.)	19.12	26.33	45.54
Panel B: Standard deviations				

Portfolios		1 Smallest < Rs.10	2 Intermediat >Rs. 10 to < Rs.21	3 Largest > Rs.21
P	(Rs)	443.99	645.15	2066.80
EPS	(Rs.)	16.91	39.46	223.70
ROE	(%)	5.84	7.85	18.97
BETA	(Coefficient)	.39	0.38	0.43
DPS	(Rs.)	2.74	3.08	201.96
LAGDPS	(Rs.)	10.20	7.92	177.12
REPS	(Rs.)	12.70	39.16	50.69

Source: Annual reports of the listed enterprises and annual trading reports of NEPSE for the fiscal year 2009 to 2013.

b) Regression analysis

The results of regression analysis of closing price per share on earnings per share, return on equity, beta- risk, dividend per share, lagged dividend per share, and retained earnings per share for total sample are shown in Table 2.

The results reveal that coefficients of return on equity and lagged dividend per share have positive signs in all equations, which are as per priori expectation and the coefficients are significant at 1 percent level of significance in all equations, which indicate that return on equity and lagged dividend per share are major determinants of stock price of the enterprise. Current year dividend per share is also appeared to be an important determinant of stock price as its coefficient is significant at 1 percent level of significance in all equations. Irrespective of priori expectation, the coefficient of current year dividend per share has negative sign. Hence current year dividend per share affects negatively the stock price in Nepal.

Table 2: Regression results for total sample enterprises

This table shows regression results for the model as defined by equation: $P_{it} = a_0 + a_1 EPS_{it} + a_2 ROE_{it} + a_3 BETA_{it} + a_4 DPS_{it} + a_5 LAGDPS_{it} + a_6 REPS_{it} + \mu_{it}$. The regression analysis is based on 22 enterprises over 5 years of data for a total of 110 observations. P is the per share closing price of enterprise, which is dependent variable. The independent variables are defined as: EPS is earnings per share, ROE is return on equity, BETA is risk, DPS is dividend per share, LAGDPS is lagged dividend per share, and REPS is retained earnings per share.

Equations	Constant	EPS	ROE	BETA	DPS	LAGDPS	REPS	R^2	F-statistics
(1)	88.04 (0.40)	5.21 (0.86)	22.29 (3.01)*	177 (0.88)	-16.39 (-2.44)**	22.05 (3.83)* ((.02))	-4.86 (-.73) ((.09))	0.69	38.87*

		((0.01))	((0.52))	((0.91))	((0.01))				
(2)	45.90 (0.21)	-	23.84 (3.33)* ((0.55))	222.37 (1.14) ((0.98))	-12.59 (-2.49)* ((0.02))	22.86 (4.03)* ((0.02))	0.30 (0.11) ((0.52))	0.69	46.61*
(3)	193.76 (1.12)	-	24.67 (3.46)* ((0.56))	-	-12.93 (-2.56)* ((0.02))	23.31 (4.11)* ((0.2))	0.03 (0.01) ((0.53))	0.69	57.77*
(4)	194.34 (1.21)	-	24.67 (3.47)* ((0.56))	-	-12.93 (-2.58)* ((0.02))	23.31 (4.14)* ((0.02))	-	0.69	77.75*
(5)	68.57 (0.30)	6.10 (0.97) ((0.01))	24.05 (3.15)* ((0.52))	237.63 (1.14) ((0.91))	-18.08 (-2.60)* ((0.01))	22.37 (3.76)* ((0.02))	-5.92 (-0.86) ((0.99))	0.66	33.42*
(6)	19.27 (0.09)	-	25.86 (3.49)* ((0.55))	290.71 (1.45) ((0.98))	-13.63 (-2.61)* ((0.02))	23.32 (3.98)* ((0.02))	0.12 (0.04) ((0.52))	0.66	39.93*
(7)	207.60 (1.24)	-	26.95 (3.66)* ((0.56))	-	-14.11 (-2.71) ((0.02))	23.86 (4.09)* ((0.02))	-	0.65	65.80*

T-statistics are shown in single parentheses under estimated values of the regression coefficients, and tolerances are shown in double parentheses under estimated t-statistics.

* & ** denote the significance of coefficients at 1 percent and 5 percent level of significance respectively.

To gauge robustness and sensitivity-to-specification error of the regression, each independent variable having insignificant coefficient is removed from the complete model and the regressions are re-estimated. These results are shown in Table 2, Equations 2-4. The coefficients of the variables did not change in sign or size (regression coefficients are not sensitive to these alterations in terms of sign and significance). In the additional three equations, the explanatory power of the regression model as reflected by R^2 did not increase at all. The closer tolerance (TOL) is to zero of the variable, the greater the degree of collinearity of that variable with the other regressors (Gujarati and Porter (2009)). The TOL of dividend per share, lagged dividend per share, and earnings per share is close to zero indicating some degree of multicollinearity between these variables. To avoid multicollinearity problem the variable earnings per share is removed from the Equation (2), Equation (3) and Equation (4), the results remain the same in terms of sign and significance of coefficients of the variables, hence, indicating that muticollinearity is not a significant problem. Further, to gauge robustness and sensitivity-to-stock price trend and fluctuation error of the regression, the average market price that is average of high, low and closing market price of stock is considered instead of closing price of stock as a dependent variable in the model and the regressions are re-estimated. These results are shown in Table 2, Equations 5-7. The coefficients of the variables did not change in sign or size. In these additional three equations, the explanatory power (R^2) of the regression model did not change remarkably. The R^2, which has explained about 66 percent of cross-sectional variability in stock price with the independent variables used in the models, is considered as good. Similarly, F-value in all equations show that it is significant at 1 percent level of significance reflecting that regression equations provide statistically significant results.

4.2 Group specific analysis

Based on nature of group of the enterprises involved and also number of selected listed enterprises, the overall sample is classified into two groups: (a) financial sector, and (b) non- financial sector. The results of regression analysis for financial sector sample are shown in Table 3.

The results reveal that coefficients of earnings per share and lagged dividend per share have positive signs in all equations, which are as per priori expectation and the coefficients are significant at 1 percent level of significance in all equations, which indicate that earnings per share and lagged dividend per share are major determinants of stock price of financial sector enterprises in Nepal. Retained earnings per share is also appeared to be an important determinant of stock price as its coefficient is significant at 5 percent level of significance in majority of equations. Irrespective of priori expectation, the coefficient of retained earnings per share has negative sign. Hence, retained earnings per share affect negatively to the stock price of financial sector enterprises in Nepal.

Table 3: Regression results for financial sector enterprises

This table shows regression results for the model as defined by equation: $P_{it} = a_0 + a_1\ EPS_{it} + a_2\ ROE_{it} + a_3\ BETA_{it} + a_4\ DPS_{it} + a_5\ LAGDPS_{it} + a_6\ REPS_{it} + \mu_{it}$. The regression analysis is based on 17 enterprises over 5 years of data for a total of 85 observations. P is the per share closing price of enterprise, which is dependent variable. The independent variables are defined as: EPS is earnings per share, ROE is return on equity, BETA is risk, DPS is dividend per share, LAGDPS is lagged dividend per share, and REPS is retained earnings per share.

Equations	Constant	EPS	ROE	BETA	DPS	LAGDPS	REPS	R^2	F-statistics
(1)	11.26 (0.06)	43.58 (3.66)* ((0.04))	-2.32 (-0.32) ((0.59))	-194.99 (-1.10) ((0.74))	-17.73 (-1.30) ((0.12))	17.88 (2.38)* ((0.42))	-35.70 (-2.19)** ((0.09))	0.65	23.66*
(2)	-17.94 (-0.12)	43.52 (3.68)* ((0.04))	-	-180.80 (-1.06) ((0.79))	-18.94 (-1.46) ((0.13))	18.36 (3.01)* ((0.45))	-36.49 (-2.28)** ((0.09))	0.65	28.76*
(3)	-102.24 (-0.77)	43.65 (3.69)* ((0.04))	-	-	-21 (-1.64) ((0.13))	18.60 (3.05)* ((0.45))	-38.17 (2.40)** ((0.09))	0.64	35.55*
(4)	-181.46 (-1.46)	26.83 (4.53)* ((0.18))	-	-	-	17.77 (2.89)* ((0.45))	-16.78 (-1.83) ((0.28))	0.63	45.56*
(5)	20.86 (0.10)	42.91 (3.23)* ((0.04))	-2.64 (-0.33) ((0.59))	-170.36 (-0.86) ((0.74))	-14.72 (0.97) ((0.12))	19.51 (2.76)* ((0.42))	-35.82 (-1.97)* ((0.09))	0.62	20.95*
(6)	-12.38 (0.07)	42.84	-	-154.20	-16.10 (-1.11)	20.05 (2.94)*	-36.72	0.62	25.41*

		(3.24)* ((0.04))		(-0.81) ((0.79))	((0.13))	((0.45))	(-2.06)** ((0.09))		
(7)	-151.65 (-1.10)	28.65 (4.37)* ((0.18))	-	-	-	19.55 (2.88)* ((0.45))	-19.95 (-1.97)* ((0.28))	0.61	41.51*

T-statistics are shown in single parentheses under estimated values of the regression coefficients, and tolerances are shown in double parentheses under estimated t-statistics.

* & ** denote the significance of coefficients at 1 percent and 5 percent level of significance respectively.

To gauge robustness and sensitivity-to-specification error of the regression, each independent variable having insignificant coefficient is removed from the complete model and the regressions are re-estimated. These results including R^2 and F-value are shown in Table 3, Equations 2-4 as well as further robustness test results by considering average market price as dependent variable in the model along with R^2 and F-value as shown in Table 3, Equations 5-7 have confirmed the results of Equation (1) in Table 3.

The results of regression analysis for non-financial sector sample are shown in Table 4.

Table 4: Regression results for non-financial sector enterprises

This table shows regression results for the model as defined by equation: $P_{it} = a_0 + a_1 EPS_{it} + a_2 ROE_{it} + a_3 BETA_{it} + a_4 DPS_{it} + a_5 LAGDPS_{it} + a_6 REPS_{it} + \mu_{it}$. The regression analysis is based on 5 enterprises over 5 years of data for a total of 25 observations. P is the per share closing price of enterprise, which is dependent variable. The independent variables are defined as: EPS is earnings per share, ROE is return on equity, BETA is risk, DPS is dividend per share, LAGDPS is lagged dividend per share, and REPS is retained earnings per share.

Equations	**Constant**	**EPS**	**ROE**	**BETA**	**DPS**	**LAGDPS**	**REPS**	**R^2**	**F-statistics**
(1)	1005.35 (1.47)	-4.67 (-0.56) ((0.01))	16.81 (0.89) ((0.21))	-650.51 (-0.65) ((0.51))	-0.98 (-0.08) ((0.01))	16.01 (1.57) ((0.01))	-1.06 (-0.11) ((0.08))	0.87	19.47*

(2)	1141.02 (1.81)	-	14.88 (0.81) ((0.22))	-825.24 (-0.88) ((0.56))	-4.69 (-0.49) ((0.01))	15.78 (1.58) ((0.01))	-5.96 (-1.43) ((0.44))	0.86	24.28*
(3)	1436.39 (2.82)*	-	-	-881.16 (-0.95) ((0.57))	-0.57 (-0.07) ((0.01))	12.62 (1.38) ((0.01))	-6.88 (-1.74) ((0.47))	0.86	30.58*
(4)	1018.06 (4.04)*	-	-	-	-1.0 (-0.13) ((0.01))	12.14 (1.34) ((0.01))	-5.23 (-1.47) ((0.58))	0.85	40.68*
(5)	950.50 (1.63)	-4 (-0.56) ((0.01))	20.68 (1.28) ((0.21))	-668.51 (-0.78) ((0.51))	-2.55 (-0.26) ((0.01))	16.22 (1.87) ((0.01))	-1.58 (-0.19) ((0.08))	0.89	24.26*
(6)	1066.74 (1.99)	-	19.03 (1.22) ((0.22))	-818 (-1.02) ((0.56))	-5.73 (0.71) ((0.01))	16.03 (1.89) ((0.01))	-5.77 (-1.63) ((0.44))	0.89	30.13*
(7)	1022.14 (4.63)*	-	-	-	-0.90 (-0.13) ((0.01))	-	-5.29 (-1.70) ((0.58))	0.87	47.63*

T-statistics are shown in single parentheses under estimated values of the regression coefficients, and are shown tolerances in double parentheses under estimated t-statistics.

* & ** denote the significance of coefficients at 1 percent and 5 percent level of significance respectively.

The results reveal that coefficients of all considered variables are not statistically significant at 1 or 5 percent level of significance in all equations, which indicate that stock price is not influenced by the variables used in the model. The result of Equation (1) in Table 4 is confirmed by the robustness tests in Equations (2) to (4) and further robustness test by considering average market price as dependent variable in Equations (5) to (7). The result is also confirmed by the goodness of fit of the model reflected by the R^2 and F-value in all equations in Table 4.

5. Findings and discussion

The overall results for the analysis of dividend policy and performance of the enterprises reveal that stocks with higher dividends have better performance of the enterprises in terms of earnings per share, return on equity, and risk. The current year dividend per share affects negatively and lagged dividend per share affects positively to the stock price in overall sector. Considering the immediate influence of dividends, the present finding is inconsistent with the standard view of the role of dividend policy found in the literature of finance that low-payout enterprises, in general, will sell at a discount (Graham and Dodd (1951), Harkavy (1953), Gordon and Shapiro (1956), Durand (1959), Clendenin (1958), Fisher (1961), Gordon (1962), Hunt and Donaldson (1971), and many others).

Results of the tests of the effect of dividend policy on the value of stock price also contradict with MM hypotheses that given the earnings, dividend is mere detail. When considered the influence of past dividends, the findings corroborate with the empirical evidence of Chawla and Srinivasan (1987) in India, Khan and Khan (2012) in Pakistan, and empirical evidence of Pradhan (2003) in Nepal.

The overall results imply that stock price in Nepal had no immediate response to the fundamental performance factors of the enterprises rather stock prices were formed as desired by the few speculative investors of the market during the study period and it was more prevalent in non-financial sector enterprises as financial sector is also regulated by Nepal Rastra Bank as robust regulator.

6. Policy implications

The current year dividend and lagged dividend are the major determinants of stock price as revealed in the paper. It is thus dividend policy is relevant and that corporate managers should devote adequate time in designing and disseminating a dividend policy.

The highly fluctuating characteristic of the market as revealed in the paper is detrimental to the interest of current stockholders as well as credible development of the capital market in the country. Because of this, some concrete actions should be taken for enhancing intensity to protect the investors, perfecting securities laws, improving supervision, and taking tougher enforcement. Similarly, current and potential investors should be educated on the fundamental performance factors of the enterprises, industry and economy. Securities Board of Nepal (SEBON) as a market regulator and NEPSE as a market operator should be responsible to address these issues.

As the paper addresses the gap in the extant literature, it extends new ways to study the stock market regarding the dividend policy, performance, and the valuation of stock thereby helping to enhance the understanding and raise the level of pre-emerging capital market of Nepal. Hopefully, future researchers will add some value to this direction by increasing sample size and study period.

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Appendix 1:

List of the selected listed enterprises for the paper including years of dividend payments and number of observations

S.N.	Name of the enterprises	Years	Observations
1	Nabil Bank Limited (Nabil)	2009,10,11, 12, 13	5
2	Nepal Investment Bank Limited (NIBL)	2009,10,11,12,13	5
3	Standard Chartered Bank Nepal Limited (SCBNL)	2009,10,11,12, 13	5
4	Himalayan Bank Limited (HBL)	2009,10,11,12, 13	5
5	Nepal SBI Bank Limited (NSBL)	2009, 10,11,12,13	5
6	Bank of Kathmandu Limited (BKL)	2009,10,11,12,13	5
7	Everest Bank Limited (EBL)	2009,10,11,12, 13	5
8	Citizen Bank International Nepal Ltd.(CBINL)	2009, 10, 11, 12,13	5
9	Nirdhan Utthan Bank Ltd. (NUBL)	2009,10,11,12, 13	5
10	Swabalamwan Laghubitta Bikash Bank Ltd.(SLBBL)	2009,10,11,12,13	5
11	Chhimek Laghubitta Bikash Bank Ltd.(CLBBL)	2009,10,11, 12, 13	5
12	Mahalaxmi Finance Limited (MFL)	2009, 10,11,12,13	5
13	Pashchimanchal Finance Co. Limited (PFCL)	2009,10,11,12,13	5
14	Siddhartha Finance Limited (SFL)	2009,10,11,12,13	5
15	International Leasing and Finance Company Limited (ILFCL)	2009, 10,11, 12, 13	5
16	United Finance Company Limited (UFCL)	2009,10,11,12,13	5
17	Shree Investment Finance Company Limited (SIFCL)	2009, 10,11,12,13	5
18	Soaltee Hotel Limited (SHL)	2009, 10, 11, 12, 13	5
19	Bottlers Nepal Terai Limited (BNTL)	2009,10,11, 12, 13	5
20	Salt Trading Company Limited (STCL)	2009, 10,11, 12, 13	5
21	Butwal Power Company Ltd. (BPCL)	2009,10,11,12,13	5

S.N.	Name of the enterprises	Years	Observations
22	Unilever Nepal Limited (UNL)	2009,10,11,12,13	5
Total observations			110

Note: S.N. indicates serial number for the enterprises selected.

Source: Annual reports of the listed enterprises for the fiscal year mid-July 2008 to mid-July 2013 and annual trading report of Nepal Stock Exchange Ltd.

Paper No. 30

Institutional Investors and the Stock Market Behavior - Evidence From India

S S S Kumar*

Abstract

In this paper we analyze the impact of institutional participation in the Indian stock market. The institutional investors are classified as domestic institutional investors (DIIs) and foreign institutional investors (FIIs). We first document the trends in the changes and growth of institutional stock ownership in Indian companies. We then examine the determinants of stock market performance considering net institutional investments, fundamental factors and sentiment indicators. The fundamental factors considered in this study are Price Earnings ratios, Price to Book value ratios, realized volatility and the rupee exchange rate. Under the sentiment indicators we considered Put call ratio and advance decline ratios. We have also considered external factors like S&P 500 index and CBOE volatility index (VXO). We find that, firstly, there is a positive relationship between foreign investments and Nifty index. This indicates that foreign investments flow in when the market is raising and they recede when the market is declining. Second, Nifty index is driven by three important factors – foreign investments, dollar-rupee exchange rate and the VXO. The market is not related to any of the fundamental factors like Price-earnings ratio which is a cause for concern. More importantly, the market is not influenced by domestic institutional investment activity as DIIs do not seem to be playing a significant role. Analysis of the drivers of foreign investments show that Nifty, dollar-rupee exchange rate, PCR and VXO performance are the chief determinants. A similar analysis of the determinants of the domestic institutional investments show that it is fundamentals that matter but not the sentimental indicators. The findings of the study have implications for Policymakers and economies that are going to open up their markets to foreigners. The evidence shows that once the markets are opened, domestic investors will be dwarfed and the influence they wield in the markets will be minimal. More importantly, the markets that will be dominated by foreign institutions who are less guided by fundamental factors and are more driven by external factors that are beyond the purview of the host economy. The evidence from India shows that foreign investments will be significantly associated with the exchange rate. As exchange rate is an important macroeconomic variable we premise that the actions of foreign investors have implications for the whole economy through the exchange rate channel.

Key words: Institutional investors, fundamental factors, sentiment indicators

JEL Classification: F32, G15, G23

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Introduction

The New Economic Policy (NEP) of structural adjustments and stabilization programme was given a big thrust in India in June-July 1991. As a part of this policy, the financial sector reforms have received special attention because of the perceived inter-dependent relationship between the real and financial sectors of the modern economy. The need for financial reforms has arisen because the financial institutions and markets were in a bad shape. The reforms had become imperative on account of the facts that despite its impressive quantitative growth and achievements, the financial health, integrity, autonomy, flexibility and vibrancy in the financial sector had deteriorated over the past many years. The objective of financial reforms has been to correct and eliminate the disorders that are mauling the financial sector and to transform a financially repressed system into a free system.

In the wake of reform process, investments from Foreign Institutional Investors (FIIs) as well as Domestic Institutional Investors (DIIs) was encouraged. Domestic institutional investors are predominantly mutual funds while foreign institutional investors are those institutions established or incorporated outside India which proposes to make investment in securities in India. For a country that embraced free market model after having remained closed to the outside world for long, foreign capital whether it was portfolio money like that of FII or investment flows like FDI was essential to rebuild the country. The genesis of FIIs can be traced to the reforms in 1993 when Foreign Institutional Investors (FIIs) were allowed to access Indian capital market on registration with SEBI. Foreign Portfolio investment carries a sense of notoriety of its own because at the first sign of trouble these flows reverse direction. The notoriety emanates from the very nature of FII investment – portfolio managers tend to restructure and rebalance their portfolios dynamically across the countries, their primary concern being their portfolio. Owing to their magnitude of flows, the direction of FII investment flows tends to make or break the fortunes of a market.

Brief Literature review: In the Indian context there were studies examining the influence of foreign institutional investors' activity in Indian stock market focusing on the relationships between stock returns and the changes in FII investments. Chakrabarti (2001) examined the nature and causes of FII flows to India and observed that FII flows are highly correlated with BSE National index returns and the index returns explain considerable variation in FII flows. The study concludes that the FII flows are "more of an effect of market returns than their cause". Kumar (2001) investigated the effects of FII inflows on the Indian stock market over the period 1993-1997 and reports bi-direction causality from FII flows to Sensex and vice versa. Gordon and Gupta (2003) analyzed the factors effecting portfolio flows to Indian equity market over the period 1992-2001. Their study finds rather intriguingly a negative relationship between portfolio inflows and stock markets returns leading to the conclusion that FIIs are "not positive feedback traders but rather are bargain hunters". Using daily data over the period 2000-2009 Thiripalraju and Acharya (2011) shows that FIIs investments are positively related to past market returns and bi- directional causality is reported between FIIs investments and market returns. Based on post-crisis data Bose (2012) finds evidence of bi-directional causality between FII investments and Sensex returns. From the literature study it may be noted that there is no study examining the DIIs' impact on Indian market as well as comparing the investment approaches of FIIs and DII. This study fills in this important research gap.

Nature of FII Investments: Foreign institutional investors were allowed to invest in the stock markets from September 14, 1992. FIIs registered with SEBI and RBI had been allowed to invest in all securities viz., shares, debentures, and warrants, and in schemes launched by domestic mutual funds. With a modest inflow of INR 13 Cr in 1992-93, FII investments in equity markets peaked during 2012-13 with around INR 140,000 Cr. It can be noted that FII investments are steadily increasing during the last two decades. The average net inflows until the turn of

millennium is INR 4955 Cr per year while in the next five years (2000-01 to 2005-06) the average annual inflows are INR 20,330 Cr. In the next five year period (2006-07 to 2011-12) the average annual inflows are INR 48,492 Cr. Barring the two years following the Asian crisis and global financial crisis (1998-99 and 2008-09) India was a net recipient of FII inflows.

Table 1: Trends in Net FII Investments in Indian markets in INR (Crore#)

Financial Year	Equity	Debt	Total	Financial Year	Equity	Debt	Total
1992-93	13	0	13	2003-04	39,960	5,805	45,765
1993-94	5,127	0	5,127	2004-05	44,123	1,759	45,881
1994-95	4,796	0	4,796	2005-06	48,801	-7,334	41,467
1995-96	6,942	0	6,942	2006-07	25,236	5,605	30,840
1996-97	8,546	29	8,575	2007-08	53,404	12,775	66,179
1997-98	5,267	691	5,958	2008-09	-47,706	1,895	-45,811
1998-99	-717	-867	-1,584	2009-10	1,10,221	32,438	1,42,658
1999-00	9,670	453	10,122	2010-11	1,10,121	36,317	1,46,438
2000-01	10,207	-273	9,933	2011-12	43,738	49,988	93,726
2001-02	8,072	690	8,763	2012-13	1,40,033	28,334	1,68,367
2002-03	2,527	162	2,689	2013-14**	57,513	-63,591	-6,078

*Source: SEBI Website; ** As on December 31, 2013; # one Crore = 10 millions*

Table 2 below presents summary statistics for twenty-one emerging markets on net Portfolio inflows over the period 1992 to 2012. It may be observed that India is the third largest recipient of Portfolio inflows but at the same time the inflows are only moderately volatile as can be noted from the Coefficient of Variation (CV). In terms of the quality and quantity of inflows to India only China and Brazil have larger inflows that are also relatively stable.

Table 2: net Portfolio inflows to emerging equity markets (in millions USD)

	in millions of dollars			Ranking	
Country Name	Average inflows	Cumulative inflows	CV	Average inflows	CV
Argentina	177.38	3724.92	17.41	18	21
Brazil	7759.22	162943.61	1.49	2	6
Chile	984.51	20674.63	1.51	10	7

	in millions of dollars			Ranking	
Country Name	Average inflows	Cumulative inflows	CV	Average inflows	CV
China**	10559.69	221753.44	1.23	1	2
Colombia@	439.36	9226.52	2.10	14	11
Czech Republic$	214.71	4508.82	3.35	16	16
Hungary$	83.88	1761.44	15.31	21	19
India	7338.75	154113.75	1.59	3	8
Indonesia$	488.16	10251.26	4.20	13	18
Israel	1347.13	28289.80	1.15	9	1
Korea, Rep.	3807.95	79967.00	3.76	4	17
Mexico	1773.49	37243.20	2.26	6	14
Peru$	99.62	2091.98	2.23	20	12
Philippines#	556.00	11676.00	2.00	12	10
Poland&	926.33	19453.00	2.24	11	13
Romania**	109.54	2300.25	1.69	19	9
Russian Federation	394.21	8278.41	15.78	15	20
South Africa	3628.19	76191.93	1.37	5	4
Thailand	1624.38	34111.88	1.29	7	3
Turkey	1427.81	29984.00	1.45	8	5
Venezuela, RB	191.00	4011.00	2.37	17	15

** Source: World Bank (prepared from the World Development Indicators (WDI).*

$ data available from 1993; @ data available from 1994; & data available from 1995; #data available from 1996; **data available from 1997; http://data.worldbank.org/indicator/BX.PEF.TOTL.CD.WD/countries/1W-IN?display=default

Figure 1 depicts the movement of Nifty index and the monthly net FII flows. In the aftermath of the global financial crisis FIIs withdrew significant amounts of money worldwide and India also experienced similar outflows but a turnaround in the outflows can be noticed in the subsequent years. During the period Jan 2008 to Feb 2009 FIIs withdrew INR 47,948 Crores while in the calendar year 2008 the net outflows are to the tune of INR 53,051.70 Crores. In the subsequent months the inflows resumed fuelled by the stimulus policy pursued in developed countries through

a benevolent interest rate regime. In the month of May 2009 alone India received INR 20,606.90 Crores as a consequence of the formation of a stable Central Government.

Figure 1: Nifty index and the monthly net FII flows Feb 2000 – Jan 2014

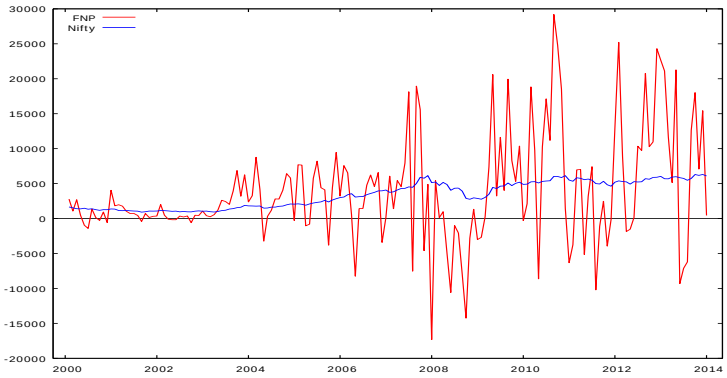

Figure 2 presents the average net FII inflows and a seasonal pattern is found during the period 2000-2014. FII inflows are significantly higher during the last four months of the calendar year compared with the other periods of any year. A regression analysis (Table 3) with monthly dummies indicates that inflows in the months of February and March have significantly higher inflows generally associated with the pre and post budget rallies. The inflows are significant during the month of July probably due to the resolution of the uncertainty regarding monsoon. Again, the inflows are significant in September to December period which could be due to the anticipated market movements associated with half yearly results and the festivity periods. In India pronounced seasonality effect (month of year effect) was reported by Chakrabarti and Sen (2007) and Parikh (2009) hence the stock market rallies are observed during these periods.

Figure 2: Average monthly net flows (INR Crores) during Feb 2000 – Jan 2014

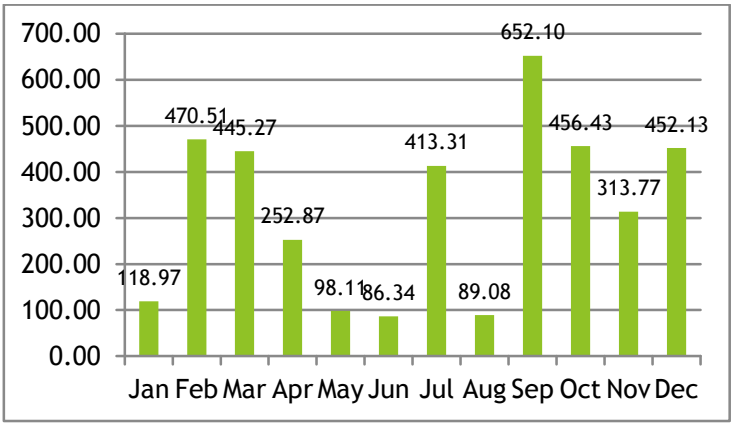

Table3: Dummy variable regression to examine seasonality (dependent variable: net FII inflows)

Variable	Coefficient	t-ratio	Variable	Coefficient	t-ratio
dm1	1427.7	0.6986	dm7	4959.67	2.427**
dm2	5646.16	2.7629***	dm8	1068.97	0.5231
dm3	5343.19	2.6147***	dm9	7825.24	3.8293***

dm4	3034.4	1.4849	dm10	5477.2	2.6803***
dm5	1177.28	0.5761	dm11	3765.22	1.8425*
dm6	1036.06	0.507	dm12	5425.52	2.655***

*10% level of significance; **5% level of significance; 1% level of significance;

dmi dummy variable for the month I = 1 (Jan) to 12 (Dec)

FIIs played an important role in Indian markets as liquidity providers and the average turnover of the FIIs in the equity market constitutes around 16.0 percent of the total turnover on the BSE and the NSE during 2006-07 to 2012–13. Apart from the Indian Promoters and the individual investors, FIIs emerged as a significant share holding category of investors in Indian companies (listed on NSE). Table 4 indicates that Banking and FMCG sectors attracted considerable interest from the FIIs. However, bulk of the FII investments are going in to large companies and small companies are not getting the benefit of FII money (Report of the Working Group on Foreign Investments).

Table 4: Shareholding Pattern at the end of March 2013 for companies listed at NSE

Sectors	Indian Promoters	Foreign Institutional Investors	Individuals
Banks	45.8%	16.9%	15.1%
Engineering	48.7%	4.6%	21.1%
Finance	48.6%	8.8%	21.6%
FMCG	46.7%	9.2%	19.9%
Information Technology	34.0%	7.2%	29.6%
Infrastructure	54.4%	6.3%	15.7%
Manufacturing	48.9%	4.6%	22.2%
Media & Entertainment	49.2%	6.1%	20.7%
Petrochemicals	43.7%	5.1%	18.8%
Pharmaceuticals	44.0%	6.8%	23.0%
Services	44.6%	5.2%	15.8%
Telecommunication	45.9%	5.6%	16.6%
Miscellaneous	52.2%	5.8%	21.3%

Source: NSE Fact Book 2013

Data Description

The study was conducted using the monthly data during the period November 2001 to December 2012. The Foreign Institutional Investments and Domestic Institutional Investments behavior was examined considering different types of factors like fundamental factors, sentiment indicators external and domestic market indicators. Under the fundamental factors we included Price Earnings Ratio (PER) and Price to Book Value ratio (PBR). Put-call ratio (PCR) and Advances to Decline Ratio (ADR) are categorized as sentiment indicators. While Nifty index returns and volatility of Nifty index is considered as domestic stock market indicators. S & P 500 index returns and CBOE Volatility index (VXO) are considered as external market indicators. We also included INR-USD exchange rate (USD) also in our analysis. A brief definition of the factors is given below:

Foreign Institutional Investments (FNP): Following Sellin (1996), the difference in the monthly cash market purchases of FIIs (PC) and cash market sales of FIIs (Sc) is defined as net FIIs' investment in the cash market. It is normalized by dividing it with the total FII turnover, i.e., FNP = $\frac{P_c - S_c}{P_c + S_c}$

Domestic Institutional Investments (DNP): the difference in the monthly cash market purchases of domestic institutional investors and their cash market sales is defined as net DIIs' investment in the cash market. It is normalized by dividing it with the total DII turnover, i.e., DNP = $\frac{P_c - S_c}{P_c + S_c}$

Nifty Index returns (Nifty): Nifty index is the benchmark index of the National Stock Exchange (NSE) India. The index returns are computed as the natural log differences, i.e., Nifty = Ln (It/It-1), where, It is the level of the Nifty index on day 't'.

Nifty index volatility (VOL): Volatility is calculated as the standard deviation of the natural log of Nifty returns for the respective period.

S & P 500 index returns (SP): S & P 500 index is considered as a proxy for the foreign market activity. The index returns are computed as the natural log differences, i.e., SP= Ln (It/It-1), where, It is the level of the Nifty index on day 't'.

Price Earnings Ratio (PER): The price-to-earnings ratio is an equity valuation multiple defined as market price per share divided by annual earnings per share. In an efficient market, the share price should reflect a firm's future value creation potential, greater value creation can indicate greater future dividends from the company.

Price to Book value ratio (PBR): Computed by dividing current stock price by common stockholder equity per share (book value), adjusted for stock splits. The price/book ratio measures what the market is paying for the net assets (also known as shareholder equity) of a given company.

Put-Call ratio (PCR): The Put-Call Ratio is the number of put options traded divided by the number of call options traded in a given period. The average value for the put-call ratio is not 1.00 due to the fact that equity options traders and investors almost always buy more calls than puts. Hence, the average ratio is often far less than 1.00 (usually around 0.70) for stock options. When the ratio is close to 1.00 or greater, it indicates a bearish sentiment. The higher than average number indicates more puts being bought relative to calls. This means that more traders are betting against the underlying and hence the general outlook is bearish. Conversely, when the ratio is near 0.50 or lesser, it implies a bullish sentiment.

Advances to Declines ratio (ADR): The Advance to Decline ratio shows the ratio of advancing issues to declining issues. It is calculated by dividing the number of advancing issues by the number of declining issues. ADR gives an indication of the direction of the market. When drawn on a chart, the steepness of A-D line shows if a strong bull or bear market is under way.

Exchange Rate returns (USD): Indian Rupee exchange rate against US Dollar is an important factor for foreigners making investments in India because a weak rupee favours FIIs while entering the market and a strong rupee is desirable by foreigners during exits. The exchange rate changes are computed as the natural log differences, i.e., USD = Ln (Et/Et-1), where, Et is the exchange rate (INR/USD) on day 't'.

The data used in this study comes from different sources – DIIs and FIIs' activity on the cash market is obtained from SEBI's website. NIFTY index data, S & P 500 index data and VXO data were obtained from NSE and CBOE exchanges' website. USD, PER, PBR and ADR data were obtained from the Handbook of Statistics (2012).

As is conventional in any time series analysis first we test for the presence of unit root in each of the variables. The unit root test results indicate that the variables are integrated of the same order i.e., I(0), hence we proceed with deploying the ordinary least squares method of regression. We estimate the following model to examine the impact on the Indian stock market:

$$Nifty_t = \alpha + \beta_1 FNP_t + \beta_2 DNP_t + \beta_3 SP_t + \beta_4 VOL_t + \beta_5 VXO_t + \beta_6 ADR_t + \beta_7 PER_t + \beta_8 PBR_t + \beta_9 PCR_t + \beta_{10} USD_t + \varepsilon$$

We also estimate the following equations to examine the behavior of institutional investors' behavior in Indian market:

$$FNP_t = \alpha + \beta_1 Nifty_t + \beta_2 DNP_t + \beta_3 SP_t + \beta_4 VOL_t + \beta_5 VXO_t + \beta_6 ADR_t + \beta_7 PER_t + \beta_8 PBR_t + \beta_9 PCR_t + \beta_{10} USD_t + \varepsilon$$

$$DNP_t = \alpha + \beta_1 Nifty_t + \beta_2 FNP_t + \beta_3 SP_t + \beta_4 VOL_t + \beta_5 VXO_t + \beta_6 ADR_t + \beta_7 PER_t + \beta_8 PBR_t + \beta_9 PCR_t + \beta_{10} USD_t + \varepsilon$$

Results and Discussions:

The regression results indicate that the Nifty index is influenced by FNP, USD and VXO as these variables are statistically significant at less than 1% level. To some extent also by the domestic volatility but none of the fundamental factors like Price-Earnings ratio, Price to Book value ratio have any influence on Nifty movements. The relationship between Nifty index and FNP is positive indicating that Nifty index and FNP move in the same direction i.e., if FII investments increase Nifty index gains and vice versa. Also, the relationship between USD and Nifty index is negative whereby it may be inferred that as the exchange rate depreciates Nifty index will gain and as the exchange rate appreciates Nifty index will lose. The results also indicate that the Nifty index and VXO are inversely related and VXO is statistically significant factor in explaining the changes in Nifty returns. The inverse relationship is expected because volatility index and stock index will be oppositely related.

Table 5: OLS regression results (Dependent Variable: NIFTY)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.02048	0.02879	-0.71141	0.4782
FNP	**0.282877**	**0.065835**	**4.296755**	**0**
DNP	0.025706	0.060535	0.424649	0.6718
VOL	-0.01211	0.006953	-1.74191	0.084
ADR	-0.00235	0.003644	-0.64555	0.5198
PCR	0.030776	0.026169	1.176027	0.2419
PER	-0.00137	0.002007	-0.68207	0.4965
PBR	0.008673	0.007084	1.224269	0.2232
USD	**-0.71883**	**0.244866**	**-2.93562**	**0.004**
SP	0.259042	0.16568	1.563513	0.1205
VXO	**-0.10355**	**0.037112**	**-2.79015**	**0.0061**
Adjusted R-squared	0.542142	F-statistic	16.7483	Prob(F-statistic) = 0

Analysis of FIIs activity on Indian market indicate that FNP is significantly influenced by Nifty index and the relationship is positive. Apart from Nifty index, FII activity is also influenced by DNP, VOL, PCR, USD and VXO. From the sign of the relationship between FNP and DNP it can be argued that FIIs and DIIs actions are opposite i.e., when FIIs are net sellers DII turn net buyers and vice versa. FNP and VOL are negatively related indicating that as riskiness of the domestic market goes up FIIs turn net sellers and vice versa. The relationship between the sentiment indicator PCR and FNP is negative and is statistically significant. Similarly the relationship between USD and FNP is negative and is statistically significant, thereby leading to the conclusion that FIIs activity is increases when the rupee depreciates. Further, VXO is positively related to FII activity in India this means that when the US markets become more risky they turn towards other emerging markets like India.

Table: 6 OLS regression results (Dependent variable: FNP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.12781	0.034995	3.652293	0.0004
NIFTY	**0.461364**	**0.107375**	**4.296755**	**0**
DNP	**-0.17184**	**0.075799**	**-2.2671**	**0.0251**
VOL	**-0.02222**	**0.008762**	**-2.53546**	**0.0125**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ADR	0.005746	0.004632	1.240465	0.2172
PCR	**-0.06751**	**0.033052**	**-2.04253**	**0.0432**
PER	0.000721	0.002567	0.28088	0.7793
PBR	0.000339	0.009102	0.037246	0.9703
USD	**-0.84133**	**0.314466**	**-2.67543**	**0.0085**
SP	0.309175	0.211855	1.459375	0.147
VXO	**0.111572**	**0.047825**	**2.332901**	**0.0213**
Adjusted R-squared	0.464732	F-statistic	12.54735	Prob(F-statistic) = 0

Finally we examine the factors that explain DIIs investment behavior. From the results it may be noticed that FNP, VOL, PER, and PBR are statistically significant. As observed earlier, there is a negative relationship between DIIs and FIIs. Domestic volatility and DIIs activity are positively related and this finding is a little intriguing. More importantly, DIIs activity is driven more by the fundamental factors like Price earnings ratio and Price to book value ratios rather any sentiment indicators like ADR or PCR.

Table: 7 OLS regression results (Dependent variable: DNP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.01869	0.043682	-0.42777	0.6696
NIFTY	0.038733	0.122132	0.317139	0.7517
FNP	-0.19085	0.104132	-1.83281	0.0692
VOL	0.017257	0.01036	1.665729	0.0983
ADR	-0.00299	0.005565	-0.53651	0.5926
PCR	0.031241	0.039976	0.78149	0.436
PER	-0.01069	0.002861	-3.73649	0.0003
PBR	0.045918	0.010032	4.577308	0
USD	0.353506	0.377633	0.936111	0.351
Adjusted R-squared	0.25501	F-statistic	6.690732	Prob(F-statistic) = 0

To gauge the determinants of the exchange rate a regression was conducted with FNP, DNP, Nifty, SP, and Vol as the independent variables. The results indicate that Nifty, SP and FNP are the statistically significant determinants and there is an opposite relationship between the USD and independent variables.

Table: 8 OLS regression results (Dependent variable: USD)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.013214	0.004068	3.24813	0.0015
NIFTY	-0.09304	0.02918	-3.18835	0.0018
SP	-0.10038	0.043344	-2.31588	0.0222
DNP	0.017189	0.018639	0.922224	0.3581
FNP	-0.0702	0.023016	-3.0499	0.0028
VOL	-0.0045	0.002323	-1.93524	0.0552
Adjusted R-squared	0.366916	F-statistic	16.41655	Prob(F-statistic) = 0

From the regression results it can be inferred that there is a feedback between FIIs' investments and Nifty index movements. Simultaneously there is no statistically significant relationship between DIIs activity and Nifty movements. It appears that Indian market is influenced by FIIs' activity and DIIs' are not a significant driver of stock returns in India. But there is an opposite and significant relationship between FIIs and DIIs. These relationships mean that Nifty is driven by FIIs activity however when FIIs leave the market the situation is not too precarious because DIIs step in as there is an opposite relationship between FII and DII activity. Another important finding of this study is that FIIs are mostly driven by external factors and not really the fundamental factors of the stock market. This is because the study finds no relationship between FII activity and fundamental actors like PER and PBR but rather VXO and USD-INR exchange rate and sentiment indicator like PCR. In other words when the currency depreciation and risk levels in US lead to more investments by FIIs rather fundamentals of the economy. This speculative aspect of FIIs activity leads to the notoriety of the FII flows. However DIIs are more driven by fundamental factors like PER and PBR and are not influenced by Nifty index or by sentimental indicators like ADR or PCR. This again is a virtue of the DII money indicative of the stability of the flows as well as the investment nature of the DII money.

Conclusions

In this paper we analyze the impact of institutional participation in the Indian stock market. The time period of the study spans from November 2001 to December 2012. The study examines the determinants of stock market performance considering net institutional investments, fundamental factors and sentiment indicators. The fundamental actors considered in this study are Price Earnings ratios, Price to Book value ratios, realized volatility and the rupee exchange rate. Under the sentiment indicators we considered Put call ratio and advance decline ratios. External factors like S&P 500 index and VXO are also included as independent factors. The results indicate that, there is a there is a positive relationship between foreign investments and Nifty index. This indicates that foreign investments flow in when the market is raising and they leave the markets when the market is slowing down. Second, Nifty index is driven by three important factors – foreign

investments, dollar-rupee exchange rate and the CBOE volatility index. The market is not related to any of the fundamental factors like Price-earnings ratio which is a cause for concern. More importantly, the market is not influenced by domestic institutional investment activity as DII is not statistically significant. Analysis of the drivers of foreign investments show that the Nifty index, dollar-rupee exchange rate, PCR and VXO performance are the chief determinants. A similar analysis of the determinants of the domestic institutional investments show that it is fundamentals like PER and PBR that matter but neither the sentimental indicators nor the FIIs activity. The findings of the study have implications for Policymakers and economies that are going to open up their markets to foreigners. The evidence shows that when the markets are opened to foreigners, domestic institutional investors will be dwarfed and the influence they wield in the domestic markets may be insignificant and the markets will be dominated by foreign institutions who are less guided by fundamental factors and are more driven by external factors that are beyond the purview of the host economy. The evidence from India shows that foreign investments will be significantly associated with the exchange rate in fact there is a feedback between USD and FNP. Since the exchange rate is an important macroeconomic variable we premise that the actions of foreign investors have implications for the whole economy through the exchange rate channel.

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Paper No. 31

Counter-cyclicality or Pro-cyclicality in the Fiscal Policy of Nepal

T.P. Koirala (Ph.D)

Abstract

This study examines discretionary fiscal policy response to business cycle of Nepal. Analysis based on various fiscal balances and time series of GDP for the period 1975 to 2013, government has been found pursuing counter-cyclical fiscal policy in the post liberalization period and pro-cyclical in the pre-liberalization period. In line with the recent empirical finding that only counter-cyclical fiscal policy is capable in performing stabilization function rather than the pro-cyclical policy, this study found that the fiscal stimulus of the government of Nepal has also been adding aggregate demand during downturns (bad time) and withdrawing demand during upturns (good time) as envisaged by counter-cyclical discretionary fiscal policy. The counter-cyclicality as such is stronger during 2000s in contrast to a mild pro-cyclicality for the period 2011-13. Among the various measures of fiscal balances, use is made of Cyclically Adjusted Balance (CAB) of overall budget balance as a measure of discretionary fiscal actions in this study. Factors like stronger institutions and sound macroeconomic policies might overcome recent pro-cyclicality of Nepal and allows room for counter-cyclicality fiscal policy in the future. Similarly, the phenomenon of high fluctuation in the fiscal impulse over time indicates uncertain and inconsistent fiscal stance of the government. It demands for focus more on automatic stabilizers rather than more discretionary fiscal actions by broadening tax bases and social safety nets.

Key Words: cyclically adjusted balance, output gap, counter-cyclical, fiscal stance, fiscal impulse.

JEL Classification: E3,E32,E62

1. Introduction

Sound and sustainable government finance is necessary for promoting macroeconomic stability and economic growth. It is an ingredient not only for sustainable growth but also poverty reduction (IMF,2006). Fiscal adjustment is the key to achieve sound and sustainable fiscal position. It may involve either tightening or loosening the fiscal stance, depending on individual country circumstances. Loose fiscal policy can lead to inflation, crowding out, uncertainty and volatility, all of which hamper growth (Gupta, et al., 2004) whereas tight fiscal policy lead to deflation and even hampering growth. Therefore, good quality fiscal adjustment can also mobilize domestic savings, increase the efficiency of resource allocation, and help meet development goals (IMF 2006). Therefore, fiscal policy is used as a tool of demand management of the economy.

One way to analyze the interaction between fiscal policy and demand conditions is to understand, how do demand conditions affect fiscal position? (how do fiscal balances react to the business cycle?). This question is sharp contrast with, how does fiscal policy affect demand conditions? (does it support growth, and how?). Classical endogeneity problem, i.e. whether fiscal policy affect output or fiscal policy respond to output cycle gives rise to the choice of the approaches for empirical analysis. The empirical analysis based on former approach dominates under the ground that every assessment of the impact of a policy change must take into account the economic circumstances when the policy was implemented. The response of fiscal policy to macroeconomic conditions (referring to former question) relates to interaction between fiscal policy and business cycles. It can also be used for accessing the "underlying" fiscal stance of the economy (Fedelino,

Anna and Horton 2009). Fiscal policy is indicated as counter-cyclical if it expands (expansionary) when the economy slows down (bad time). Counter-cyclical fiscal policy adds aggregate demand during downturns (bad time) and withdrawing demand during upturns (good time). Fiscal policy is indicated as pro-cyclical if it is expanded (expansionary) when the economy expands (good time). Fiscal policy is indicated as a-cyclical (neutral) if its stance does not change over business cycles. Table 1 presents the summary view of interaction between fiscal policy stances and economic situations.

Table 1: Fiscal Policy Stances and Economic Situations

Policy stance	Good time	Bad time
Expansionary	Pro-cyclical	Counter-cyclical
Contractionary	Counter-cyclical	Pro-cyclical

Governments have responded by aiming to boost economic activity through two channels: automatic stabilizers and discretionary measures, i.e. fiscal stimulus (Horton M. and Ganainy A., 2006). If fiscal variables (e.g. budget balance) move in response to automatic effects induced by changes in the macroeconomic environment (e.g. while economic activity slows down, revenue decrease and expenditure increase, react to cycle), government policy is said to follow automatic stabilizer. Automatic stabilizers operate in relation to the business cycle. These cyclical changes make fiscal policy automatically expansionary during downturns and contractionary during upturns. Such automaticity is absent in discretionary fiscal policies as such policies are influenced by the discretion of the policymakers. If fiscal variables (e.g. budget balance) move in response discretionary policy actions (e.g. tax cut, expenditure increase), the policy is said to be discretionary fiscal policy (IMF, 2006). Therefore, the effect of business cycle is filtered to net out the effect of discretionary fiscal policy from that of automatic stabilizer. For instance, the impression of expansionary/ contractionary discretionary policy action may be misleading if policy stances have the combined effect of automatic stabilizers and discretionary policy actions. Therefore, the demarcations of the policy responses whether that corresponds to discretionary policy action or that is through automatic effects of macroeconomic environment have different policy implication.

Globally, the response of fiscal policy to macroeconomic conditions has become more countercyclical in the past 10 years; it implies that discretionary policies have been effective in dampening the business cycle (IMF, 2013). The policymakers took several fiscal measures to cushion the downturn in the aftermath of global financial crisis (2008-09). In the last decade, most Asian economies have pursued more countercyclical fiscal policies than in the 1980s and 1990s. India and Vietnam, having become more pro-cyclical in the past decade, stand out as exceptions within emerging Asia (IMF, 2013). In Nepal, every year discretionary policy options have been implemented to achieve the macroeconomic goals particularly obtaining high economic growth with due consideration on economic stability. As counter-cyclical fiscal policy is capable in performing economic stability, the study on the role the fiscal policy in performing stabilization function in case of developing countries like Nepal is an emerging policy debate. In this context, this study aims to investigate whether fiscal policy in Nepal is counter-cycle or pro-cyclical. The study will thus be useful for macroeconomic policy making in the area of fiscal adjustment for macroeconomic stabilization in the present Nepalese context. The study found that the counter-cyclicality of Nepal's fiscal policy corresponds to counter-cyclical fiscal stance of global and Asian economies during the last ten years (IMF, 2013).

2. Conceptual Framework

There is considerable theoretical debate on the endogeneity problem between the fiscal policy and economic activity. They depend on each other at the same time, and so it is not immediately clear what determines what just by looking at simple correlations (IMF, 2008). So far as the effect of fiscal stimulus on the economy (causality running from fiscal policy to economic growth), academic debates starting from Keynesian to New Keynesian proposition focused on the response of output to changes in fiscal policy rather than other way round (i.e. response of economic growth to changes in fiscal policy). According to Keynesian economists the effectiveness of fiscal policy has much less in an open economy depending on the degree of capital mobility and the exchange rate regime. Neoclassical theorists emphasize the role of expectations about future income and taxes, arguing that forward-looking households will figure out that temporary fiscal stimulus matters little to their lifetime income as they prefer consumption smoothing. Barrow (1974) under the well-known Ricardian equivalence critique argues that households and firms understand that deficits accompanied by future tax leave them no better off in net present value terms, and therefore they save rather than spend temporary (lump-sum) tax cuts. Neoclassical models often exhibit negative wealth effects following increases in government spending that are strong enough to reduce private consumption and investment. By contrast, recent work using so-called New Keynesian models argues that an increase in government consumption still can have positive consumption and real wage effects, if there are nominal and real rigidities and liquidity constraints (Galí, 2006).

In recent years, the extent of market rigidities, fiscal policy accommodated by monetary policy, globalization and openness and financial innovation are relevant for effective discretionary fiscal policy. Monetary policy is generally a more effective countercyclical policy instrument than fiscal policy because interest rate changes can be made in days and quickly reversed. However, monetary policy adjustments may take longer period than fiscal policy adjustments to affect aggregate demand. Moreover, fiscal policy contributes to broader-based stabilization through the impact of taxes and government spending on income-sensitive (in addition to interest-sensitive) components of aggregate demand. When monetary policy is constrained in responding to output variations, fiscal policy should take a more central role. This may be the case if the mandate of the central bank focuses on securing low inflation, rather than stabilizing output. Also, if nominal interest rates are close to zero, monetary policy options are limited as interest rates cannot be lowered further. The relative effectiveness of fiscal and monetary policies will also depend on the exchange rate regime, with fiscal policy being relatively less effective under a flexible regime and more effective under a fixed exchange rate regime.

The other way round of the simultaneity between the fiscal policy and economic activity is the effect of economic activities on the fiscal stimulus (response of fiscal policy to changes in economic activities). During economic downturn (bad time), revenue responds shrinking, that is, pro-cyclical, while expenditure increases, counter-cyclical. In good times higher revenues may trigger higher discretionary expenditure, i.e. induce pro-cyclicality. Inflation has effects on government budget. Inflation leads to increase in commodity prices and cost of subsidies, leads to increase in government expenditure. Higher inflation rate could lead to higher nominal interest rates and higher interest spending of the government. Inflation also leads to appreciation of currency in real terms and loss of competitiveness. High inflation can lead to uncertainty, decline in investment, and thus GDP and revenues to decline. Interest rate has also effect on budget. Lower interest rates mean lower interest payments of the government. It spurs investment and higher GDP growth, decline in corporate costs leading to higher corporate profits and tax collections (revenue of the government). Low foreign interest rates motivates search for yield could lead to capital inflows. High capital inflows could lead to more liquidity supporting higher growth as well as lower interest rates and high revenue. If real effective Exchange Rate (REER) appreciates, there is loss of competitiveness (exports decline and cheaper imports hurt domestic industry) that lead to lowering GDP and hence decline in revenue. In case of high external debt, an exchange rate

depreciation or global interest rates rise, liabilities will increase as do interest payments (increase in expenditure).

The business cycles of macroeconomic variables as explained above determine the choice of fiscal policy stances. Expansionary fiscal policy is chosen when the economy shows downturn, that is counter-cyclical fiscal policy. As fiscal policy responds by aiming to boost economic activity through automatic stabilizers and discretionary measures, automatic stabilizers have counter-cyclical impact on the business cycle without need for policy intervention. Automatic stabilizers allow implementing counter-cyclical fiscal policies in dampening business having quick effect on the cycles with self-reversing characteristics. Therefore, automatic stabilizers play an immediate role during downturn. They are usually by-products of other fiscal policy objectives. However, automatic stabilizers are somewhat arbitrary, reflecting past decisions about the structure of taxation and spending, and are typically weak in emerging market and low-income countries. The impact of automatic stabilizers on fiscal outcomes is positively related to government size and output volatility (Fatás and Mihov, 2001). Hence, the strength of automatic stabilizers depends on the size of transfers (such as the scope of unemployment insurance), the progressivity of the tax system, and the effects of taxes and transfers on labor participation and demand for workers and capital (Galí, 1994).

Discretionary fiscal policy, on the other hand, involves active changes in policies that affect government expenditures, taxes, and transfers and are often undertaken for reasons other than stabilization (IMF, 2008). Fiscal variables respond in relation to specific actions. Discretionary policy measures instead can be used to regularly boost weak automatic stabilizers or offset strong ones. They can be held in reserve to respond to larger aggregate demand shocks. Discretionary measures have an advantage in that they can be tailored to stabilization needs. Though active use of discretionary fiscal measures is often promoted as a countercyclical tool, for many countries, changes in discretionary policy are not well synchronized with the business cycle, suggesting that automatic stabilizer are often a more important source of systematic countercyclical policy actions. The extent of greater role played as counter-cyclical tool by the discretionary fiscal policy or automatic stabilizer depends on how well they are synchronized with business cycle.

Theories suggest fiscal policy should not be pro-cyclical to perform its stabilization function. Keynesian models recommend countercyclical monetary and fiscal policies. Neoclassical models of optimal fiscal policy recommend that fiscal policy should be a-cyclical (Barro, 1979) or counter-cyclical (Baxter and King, 1993). Gavin and Perotti, (1997) found pro-cyclicality of fiscal policy especially in emerging markets and low-income countries. The pro-cyclicality is not limited to Latin American economy only (Talvi and Vegh, 2000). Difficulties in accessing to the international financial market in the period of downturn, availability of little fiscal space, weak legal and political institutions which cannot resist the political pressure to increase public spending in period of upturns, frequent economic shocks are the possible explanations for pro-cyclicality (Gavin and Perotti, 1997). There is evidence that Asian economies have pursued more counter-cyclical fiscal policies in the 2000s, compared with the 1980's and 1990's. Based on a panel data set of the 14 largest economies in Asia, it is found that real government expenditure per capita increased by 1 percentage point for 2001-11 and 0.3 percentage point for 1980-2011 for a decline of real GDP per capita by 1 percent (IMF, 2013). There is widespread evidence that fiscal policy in emerging and less developed economies is pro-cyclical rather than counter-cyclical, in part because of political incentives to run larger deficits in good times, when financing is available (Talvi and Végh, 2000).

There is considerable debate regarding the responses of the fiscal policy to economic environment (business cycle). At the present context, the Asian economies in particular and global economies in general are found to be countercyclical as found above. However, some economies such as India and Vietnam are found to be pro-cyclical. It implies that the response of fiscal policy to

economic environment is a matter of individual country circumstances. Similarly, fiscal policy as counter-cyclicality or pro-cyclicality may also depend on the sample period used for the analysis. In this context this study tries to fill the gap whether the discretionary fiscal policy in the developing countries like Nepal are influenced by business cycle. If economic circumstances are influencing fiscal policy, we try to investigate the nature of such cycles, counter-cyclical or pro-cyclical.

3. Methodology

Defining economic downturns and measuring fiscal stimulus are necessary to understand how fiscal policy has typically responds to downturns. Economic downturns are the periods during which either the growth rate is negative or the output gap is unusually negative. Measuring downturn simply in terms of negative growth is not so sensible because that would miss periods during which output is significantly below potential but still rising. Therefore, output gap is used as a measure of economic downturn in this study. Similarly, overall fiscal balance, the difference between total government revenues and expenditure, is one measure of fiscal stimulus. However, measured overall fiscal balance does not clearly shows the impact of business cycle and hence the response of fiscal policy. Therefore, changes in Cyclically Adjusted Balance (CAB) are used as a measure of discretionary fiscal policy action, whereas changes in cyclical component of overall balance are used as a measure of automatic stabilizers (Fedelino, Anna and Horton 2009). The CAB is the overall balance adjusted for the effects of cyclical output fluctuations on revenues and expenditures. In other words, the CAB is the fiscal balance corrected for the effect of the output gap on revenues and expenditure. It is computed to show the underlying fiscal position when cyclical/automatic movements are removed (Price and Dang, 2011). Accordingly, current OECD methodology defines the cyclically adjusted balance as a residual after netting out variations in revenues and spending as a result of deviations in actual output from potential (Girouard and André, 2005).

As estimated CAB is one measure of discretionary policy actions, the starting point to derive this is to define identity as:

$$\Delta OB = \Delta CB + \Delta CAB - \Delta INT \qquad (1)$$

From (1) the changes in the overall balance (total revenue minus total expenditure) can be decomposed into (i) changes in cyclical balance ; the automatic response of fiscal variables to changes in output (ii) changes in cyclically adjusted balance ; the response of fiscal variables to changes in discretionary policy and (iii) changes in interest payment . Generally interest payments are often kept separate because their movements do not correlate with cyclical output changes. Excluding interest payment from (1) gives:

$$\Delta CAB = \Delta OB - \Delta CB \qquad (2)$$

The changes in CAB, therefore is the difference between the changes in OB and CB (represents automatic stabilizer). Automatic stabilizers ( ) are defined as the change in the cyclical balance:

$$AS = \Delta CB = \Delta OB - \Delta CAB + \Delta INT \qquad (3)$$

Automatic stabilizers are one of the factors that explains changes in overall balances . Their name derives from the fact that they both help "stabilize" the business cycle and are "automatically" triggered by the tax code and by spending rules. For example, taxes that are a function of income react automatically to the cycle. Similarly, some spending programs also react automatically to the cycle, such as unemployment benefits or other social transfers.

Since, OB is just the difference between total revenue and expenditure without any adjustment, the known value of CAB gives CB. Obtaining CAB requires an estimate of the output gap and elasticities of revenue/expenditure to the output gap. Output gap is the difference between actual and potential output (a measure of business cycle). It is expressed as percentage of potential output as:

Output gap = $100*(Y_t - Y_t^*)/Y_t^*$ (4)

Where, is actual output and is potential output. In estimating potential output, different methods such as linear regression, hodrick prescott filter, band-pass filter (frequency domain), kalman filter, structural VAR and production function are applied.

After getting cyclically adjusted revenue and cyclically adjusted expenditure separately, the difference between them yields CAB. The cyclically adjusted revenue is defined as:

$$R_i^* = R_i\left(\frac{Y_i^p}{Y_i}\right)^{\varepsilon_i} \quad (5)$$

Where, R_i^* is cyclically adjusted revenues; it is the nominal revenues that would prevail with no output gap. R_i is nominal revenues. The Y_i^p and Y_i are potential and actual GDP respectively; The ratio (Y_i^p / Y_i) in (5) represents the output gap. The ε_i is elasticity of output gap with respect to revenue. If $\varepsilon_i > 0$, revenues are considered pro-cyclical. Similarly, cyclically adjusted expenditure is defined as:

$$G_i^* = G_i\left(\frac{Y_i^p}{Y_i}\right)^{\eta_i} \quad (6)$$

Where , G_i^* is cyclically adjusted expenditure , G_i is nominal expenditure and η_i is the elasticity of expenditure with respect to the output gap. Then the cyclically adjusted overall balance (CAB) is the difference between cyclically adjusted revenue and cyclically adjusted expenditure as.

$$CAB = R_i\left(\frac{Y_i^p}{Y_i}\right)^{\varepsilon_i} - G_i\left(\frac{Y_i^p}{Y_i}\right)^{\eta_i} \quad \text{or} \quad CAB = R_i^* - G_i^* \quad (7)$$

The CAB can be computed with the assumption that revenues and expenditures that would have prevailed if output had been at potential (a scaling variable). If revenue elasticity is equal to one and expenditure elasticity is equal to zero the cyclically adjusted balance becomes:

$$CAB = R\left(\frac{Y^p}{Y}\right) - G \quad (8)$$

CAB is considered free of business cycle fluctuation; or business cycles are eliminated. Cyclical analysis can be inferred when comparing CAB with actual balance as given in Table 2:

Table 2: Business Cycle and Fiscal Balance

Business Cycle	Fiscal Balance	Economic Inference
Boom: $Y > Y^* \Rightarrow R > R^*, G \leq G^*$	CAB<Actual Balance	Public finances are in better shape than they would be because the economy is in a boom
Recession: $Y < Y^* \Rightarrow R^* > R, G^* \leq G$	CAB>Actual balance	Public finances would have been in better shape, if the economy were not in a recession.

Cyclically adjusted balance can also be an indicator to quantify fiscal stance. Impact of fiscal policy on domestic demand is assumed to be captured by the CAB. It depends on the estimate of the output gap. Fiscal stance quantifies how much fiscal policy adds to or subtracts from domestic demand. Fiscal stances are of two types; expansionary (or loose) fiscal stance and contractionary (or tight) fiscal stance. Cyclically adjusted balance (CAB) is one of the commonly used indicators of fiscal stance. Fiscal stance based on the CAB are:

$$FS_t = -CAB_t \quad (9)$$

$$CAB_t < 0 \Rightarrow Expansionary(FS_t > 0) \quad (10)$$

$$CAB_t > 0 \Rightarrow Contractionary(FS_t < 0) \quad (11)$$

Fiscal stance is Neutral if $CAB_t = 0$

Fiscal impulse measures the change in fiscal stance over time.

$$FI = FS_t - FS_{t-1} \quad (12)$$

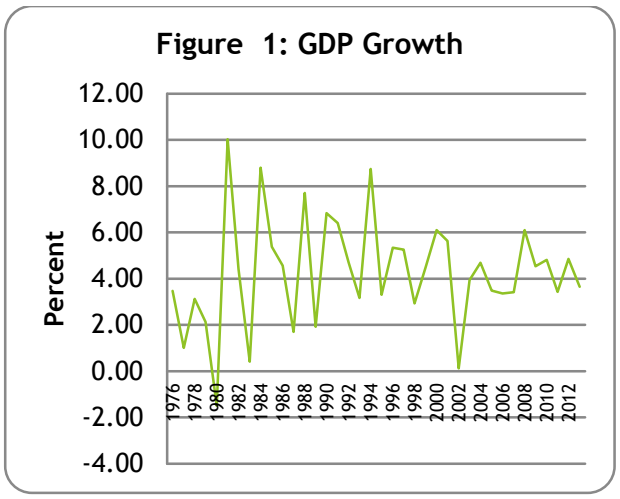
Where, FI is fiscal impulse, FS_t is fiscal stance in period t, FS_{t-1} fiscal stance in one period lag. High fluctuations of CAB over the periods indicate inconsistency and uncertain discretionary fiscal policy of the government.

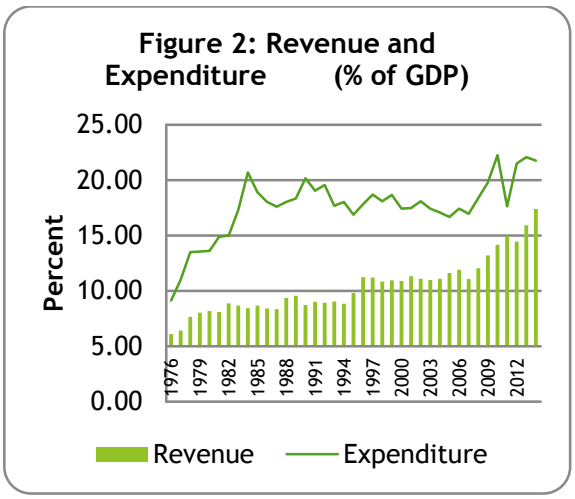
4. Analysis of the Study

The study of fiscal policy responses to cyclical fluctuation of output is one way to access counter-cyclicality or pro-cyclicality of discretionary fiscal policy actions. As the basic objective of the study is to access the historical counter-cyclicality or pro-cyclicality of fiscal policy in Nepal, different fiscal identities are used for the analysis. Use is made of annual data comprising GDP and fiscal variables from 1975 to 2013. Overall fiscal balance (primary and current balance are not used in the present study) is the variable of interest to gauge responses of fiscal policy to cyclical output (or GDP). Government's total revenue minus expenditure yields overall fiscal balance. Cyclical effects on total revenue and total expenditure are decomposed using elasticities of revenue and expenditure with respect to output gap. The cyclically adjusted revenue and expenditure so estimated can be used to compute cyclically adjusted overall fiscal balance. Normally fiscal policy discretion responds to cyclical pattern of output (GDP).

Nepal as one of the least developed countries obtaining around 4.3 percent economic growth over the past five years. Long-run real GDP, measured since 1975 to 2013, is also fluctuating around an average of 4 percent, a low level (Figure 1). The rates of growth show high volatile before 2000 followed by relative calm with significant decline in 2003 in exception. The prevalence of monsoon-based agriculture production in the economy is one of the major factors determining low and fluctuating growth rates in Nepal over the periods.

The revenue and expenditure each remained 16 percent of GDP, on an average, during the sample period (Figure 2). During the last five years, the overall balance as percent of GDP stood at 5.7 percent, on an average. The gap of revenue and expenditure as percent of GDP is narrowing down over the recent past. Revenue as percent of GDP is trending upward whereas the expenditure is not showing upward trend after 1985 and it is fluctuating within the band of 5 percentage point. The government of Nepal each year has implemented discretionary policy options to achieve the macroeconomic goals of obtaining high economic growth accompanied with economic stability, reduction of poverty and unemployment. Appropriate fiscal stimulus and stabilization measures are the important fiscal tool in dampening cyclical fluctuations of the economy. In this context, this study aims to investigate whether fiscal policy in Nepal is counter-cycle or pro-cyclical.

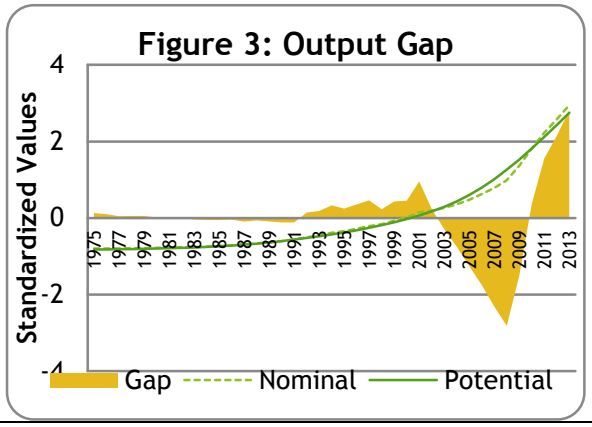




In order to understand response of discretionary fiscal policy to business cycle, the effect of automatic stabilizer should be eliminated in the fiscal indicators. Discretionary fiscal actions are those that change the Cyclically Adjusted Balance (CAB) of the budget whereas the automatic stabilizers are those that change the cyclical budget balance. Based on the estimates of the output gap together with estimates of income elasticities of revenues and expenditures, we extract the cyclical component from budget balance.

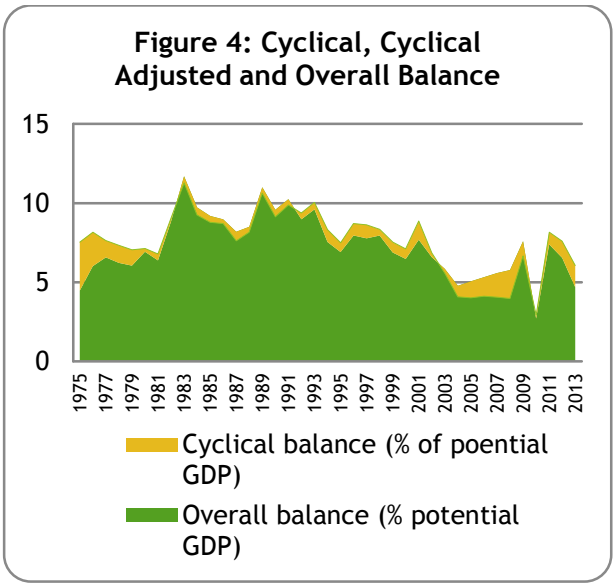
Estimated value of output gap is the input for the estimation of cyclically adjusted balance (CAB). Output gap is the difference between actual and trend component of nominal GDP which is the proxy for business cycle of the economy. As various methods are available to estimate trend components of a time series, this study uses Kalman filter method to estimate trend component of nominal GDP and hence to obtain output gap. Positive output gap (represented by actual output is greater than potential output), is considered good time for the economy whereas negative output gap represents bad time. The output gap shows interesting picture that the output gaps at the recent past are found quite high compared to previous years (Figure 3).

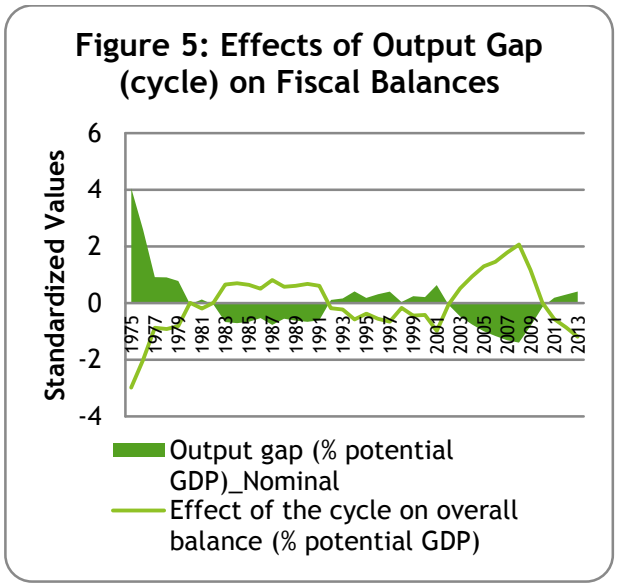
Years	Positive output gap (numbers)
1975-80	5
1981-85	2
2086-90	0
2091-95	4
2096-2000	5
2001-2005	2
2006-2010	1
2011-2013	3



The output cycles after 1992 show quite fluctuating whereas it is relatively calm before the period. During 1992 to 2002, there is positive gap whereas sharp negative gap is experienced since 2002 to 2008 followed by sharp positive gap thereafter. A positive output gap (actual GDP greater than potential GDP) implies that resources are over utilized and vice versa.

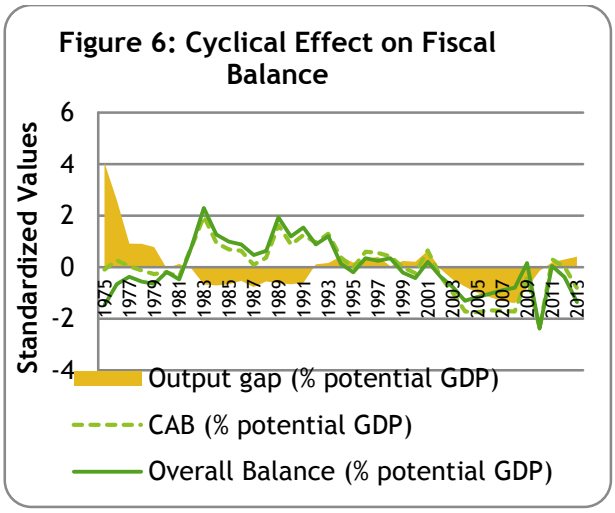
The input of output gap as estimated above accompanied with elasticities of revenue and expenditure with respect to output gap gives cyclically adjusted revenue and expenditure respectively. Following the finding of OECD estimates (IMF, 2008) this study also assumes unitary elasticity of revenue (as revenue is positively related to income) and zero expenditure elasticity (expenditure items except few are not related to income) with respect to output gap. The CAB of the budget is the difference of cyclical adjusted revenue and cyclically adjusted expenditure. The CAB filters the cyclical impact on the budget balance whereas cyclically balance includes cyclical impact. Fiscal policy discretion is measured by changes in CAB whereas automatic stabilizer is measured by changes in cyclical balance (CB). The impact of cyclical balance (% of potential GDP) on overall balance is depicted in Figure 4.





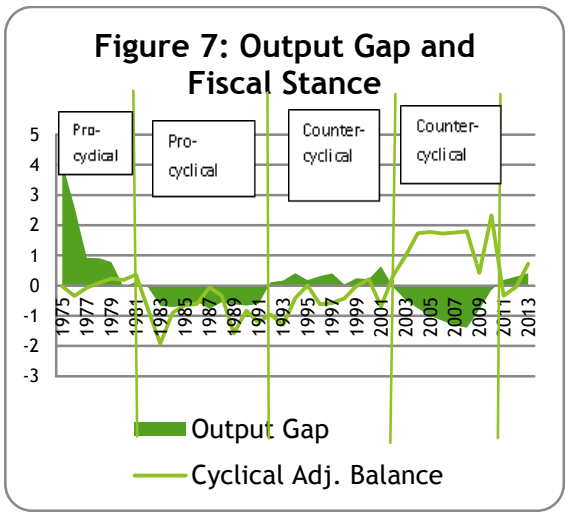
The cyclical impact as percentage of potential GDP is represented by green area in the Figure 4. The cyclical impact during 2005 to 2008 is considerable and declined in 2009 and started increasing till 2013. The shaded area represents output gap which is the difference between potential and actual output as shown in Figure 5. The effect of the cycle on overall balance as percentage of potential GDP is determined by output gap. The pick in output gap corresponds to trough in cycle of overall balance. For instance, positive output gap during 2003-09 is the mirror image of cyclical effect of overall balance during the period (Figure 5).

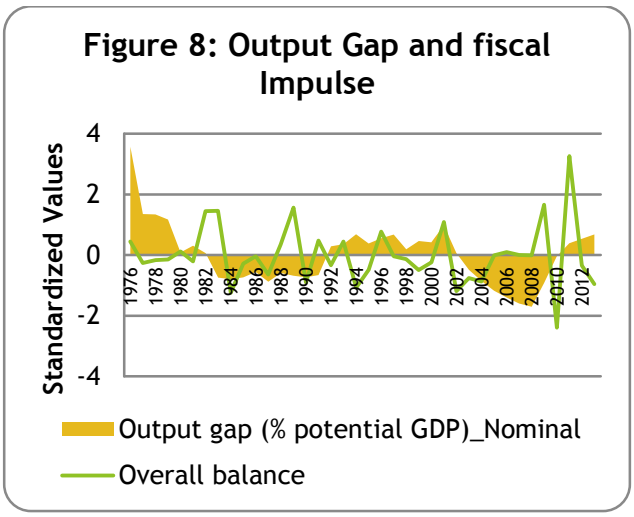
The output gap determines the measures of CAB and overall balance. The measure of overall balance is above (below) the CAB at the period when output gap is negative (positive). It implies that there is certain cyclical impact on overall balance which is reflected by discretionary fiscal policy that accounts for output gap.



Output Gap, Fiscal Stance and Fiscal Impulse

Fiscal stance (expansionary or contractionary) quantifies the addition or withdrawal of domestic demand through fiscal policy. The measure of domestic demand is output gap. The CAB is one of the important indicators of fiscal stance (deficit implies expansionary fiscal policy) since CAB is the fiscal balance corrected for the effect of the output gap on revenue and expenditure. The CAB also indicates the net effect of the changes in discretionary policy actions as opposed to policy stabilizers.





Fiscal policy is indicated as counter-cyclical if it is made expansionary when the economy slows down (bad time). Similarly, fiscal policy are said to be pro-cyclical when it is made expansionary during economic boom. Over the long run Nepalese fiscal policy is consistently expansionary as the CABs as percentage of potential GDP are negative. The CAB was around negative of 8 percent in 1975 decreased lowest of 11 percent in 1983 revert back to 6 percent in 2013. However, the

changes in CAB are not consistently increasing as they are varying over time as determined by the output gap.

The CAB as one of the indicators of fiscal stance (expansionary or contractionary), it measures discretionary fiscal policy response to output cycle. The cyclicality of output gap measures pressing demand situation. The changes in CAB accompanied with output gap measures whether the fiscal policy is counter-cyclical or pro-cyclical. A discretionary fiscal policy is said to be counter-cyclical if CAB shows an upward trend accompanied by the downturn of the economy (negative output gap). Similarly a pro-cyclical fiscal policy indicates a situation of decreasing CAB corresponding to upturn of the economy (positive cycle). In light of this, a demarcation of counter-cyclical or pro-cyclical discretionary fiscal policy of Nepal over the study periods has been presented in Figure 7. Fiscal policy during the period 2005-11 shows counter-cyclical pattern as positive CABs (in terms of normalized values) are corresponding to negative output gaps (negative cycle). The counter-cyclicality of fiscal policy is found to be weak for the period 2011-13 as both the CABs and output gaps during the period are showing upward trend. If we examine fiscal policy periods back to 1980s and 1990s, discretionary fiscal policy shows pro-cyclical pattern during 1980s followed by counter-cyclical during 1990s. As CABs measure the fiscal stance of an economy, recurrently fluctuating CAB depicts policy uncertainty and inconsistency over the time (Figure 6). It indicates uncertain and inconsistent fiscal stance of the government of Nepal.

5. Conclusions

This study discovers whether the discretionary fiscal policy of Nepal is responding counter-cyclically or pro-cyclically to business cycle. Using annual time series of various fiscal balances and nominal GDP data ranging from 1975 to 2013, discretionary fiscal policies found to be counter-cyclical during post liberalization rather than pro-cyclical during pre-liberalization period. In the post-liberalization period, the counter-cyclicality is stronger during 2000s than 1990s. Discretionary fiscal policy shows pro-cyclical pattern during 1980s. A mild pro-cyclicality is found during last two years (2011-13) of the sample period. Among the various measures of fiscal balances, Cyclically Adjusted Balance (CAB) of overall budget balance has been used a measure of discretionary fiscal actions in this study. Factors like stronger institutions and sound macroeconomic policies might overcome recent pro-cyclicality of fiscal policy and allows room for counter-cyclicality fiscal policy in the future.

This study assumes unitary elasticity of revenue (as revenue is positively related to income) and zero expenditure elasticity (expenditure items except few are not related to income) with respect to output gap. The output gap has been estimated based on the trend components of the GDP using Kalman filter method. The CAB, which corrects the effect of the output gap on revenue and expenditure, is taken as an important indicator of fiscal stance in this study. Though fiscal stance of government of Nepal is consistently expansionary as represented by negative CAB over the period, the changes of CAB are not found consistent as those changes are determined by varying output gaps. The fiscal stance over time, as indicated by fluctuating fiscal impulse of overall balance, indicates uncertain and inconsistent fiscal stance of the government. It demands for focus more on automatic stabilizers rather than discretionary fiscal impulse by broadening tax bases and social safety nets.

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Paper No. 32

The composition of public expenditure and economic growth in India: Evidence from Auto-Regressive Distributed Lag Approach

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A K Giri**

Abstract

This study is an attempt to examine the role of sub categories of public expenditures on economic growth in India during the period from 1980 to 2013. To capture the impact of sub-categories of public expenditure, the study uses current government expenditure, developmental expenditure, non-developmental expenditure and review expenditure. The study uses per capita real GDP as a proxy of economic growth. Overall fiscal deficit and gross fixed private capital formation are used as a control variable in the study. All the variables are taken as a percentage of GDP and are transformed into natural logarithms before estimation.To test the stationarity property of the variable, the study employs Ng-Perron unit root test. Autoregressive distributed lag (ARDL) approach is used to examine the long run and the short run relationship between the components of public expenditure and economic growth in India. VECM based Granger causality test is utilized to check the direction of causality and variance decomposition is used to check the exogenous shock of the model in the study. The empirical finding of the study reveals that there exists a long run cointegrating relationship between economic growth, government developmental expenditure, fiscal deficit and gross private investment in India. The ARDL estimates show significant positive long run impact of government development expenditure on economic growth. However, the non government expenditure and revenue expenditure reveals negative and insignificant impact on economic growth. The total government expenditure shows positive impact without being significant. The Granger based VECM causality test estimates indicate short and long run unidirectional causality running from government development expenditure and fiscal deficit to economic growth in India. The results of variance decomposition approach indicate that economic growth in India is explained up to 11% by changes in government developmental expenditure. Therefore, to increase the economic growth, government should increase its spending on infrastructure, social and economic activities.

JEL classification: C22, C51, E62, H50

Key words: economic growth, composition of public expenditure, ARDL, VECM, India

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1. Introduction

Many developing countries including India are currently undergoing substantial macroeconomic adjustments. The effect of fiscal policy on macroeconomic activities has been one of the most unsettled issues in economics. A predominant objective of fiscal policy is clearly sustained and equitable economic growth. Government or public expenditure as a tool of fiscal policy can have profound influence on the stabilization and economic growth depending upon its utilization pattern and management by the government. Public expenditures have played an important role in physical and human capital formation over a period of time. Appropriate public expenditures can also be effective in boosting economic growth, even in the short run. Over the past two decades, the issue of the efficacy of fiscal policy in affecting economic growth is a topic of great concern among the researchers and policymakers all over the world. Barro (1990, 1991), Sala-i-Martin (1997), Khalid et al. (2007), Burney and Yasmeen (1989), Iqbal and Zahid (1998), Shabbir and Mahmood (1992) and Khilji and Mahmood (1997) investigated the effectiveness of fiscal policy in affecting economic growth.

Some economists are of the view that an expansionary fiscal policy leads to lower economic growth due to the crowding out of private investment (Barro, 1981; Darrat, 1988; Friedman, 1978). According to Blinder and Solow (1972), there is no theoretical debate over the crowding-out hypothesis of increase in government expenditures. Mamatzakis (2001) has shown that productive investment increases productivity of private capital. Hence, budget deficits result in accelerated economic growth. In response to high growth rate of the economy, investors may invest more, which leads to crowding-in of private investment.

The sustained rise in the size of government expenditure in most of the developing economies in the past has frequently engaged the development economists in evaluating the effects of expenditure on economic growth. Public expenditure creates public endowments for the society and also generates positive externalities to the economy. Apart from the volume of public expenditure, its composition is considered to be an important factor for economic growth and development. Thus, it is also important to monitor trends in the levels and composition of government expenditures, and to assess the causes of change over time. It is even more important to analyze the relative contribution of various expenditures to production growth and poverty reduction, as this will provide important information for more efficient targeting of these limited and often declining financial resources in the future. Therefore, the effect of public expenditures on economic growth may be a comprehensive indicator of public expenditure productivity. Ideally, the two components of such an indicator should be measurable: the contribution of public sector outputs to economic growth, and the efficiency with which these expenditures yield their outputs.

Contrasts to the standard presumption that public expenditure supports the growth objective, evidences show that it may have desirable as well as undesirable effects on the economy. Some economists believe that while consumption expenditures are non-productive and negatively contribute to economic growth, while the development expenditures are productive and hence contribute to economic growth (Barro, 1991; Aschauer, 1989; Easterly and Rebelo, 1993; Munnell, 1990; Easterly et al., 1992; Gramlich, 1994; Gupta et al., 2002; Mamatzakis, 2001; Turnovsky, 2004). Interest regarding the composition of government expenditure and growth was sparked off by the paper by Devarajan et al. (1996). The authors showed theoretically that a shift in favour of more productive type of expenditure may not raise the growth rate if its initial share is 'too high'. In their empirical study they found, for their sample of developing countries, that an increase in the share of current – rather than capital – expenditure has positive and statistically significant growth effects. The composition of public spending, application in different areas, and the quality of public policy, considering the way they are applied from different budget projects and activities, are the aspects that can affect most and support the economic development (Casasnovas, 2010). As Gupta et al. (2005) explain, the composition of public outlays matters – concentrated spending

on wages tend to have low growth impact while high shares allocate to capital and nonwage goods and services enhance faster output expansion. Government expenditures can be differentiated according to their impact on the steady-state rate of growth. If they have a direct effect on growth rate, they are classified as productive; if they have not, then they are classified as unproductive expenditures (Barro and Sala-i-Martin, 1995). Therefore, the restructuring of public expenditure towards a productive spending generates a positive effect on growth rate without creating distortions in the economy that adversely affect growth.

2. Literature Review

Various empirical studies on the relationship between public expenditure and economic growth has arrived at different and conflicting results. Some studies relate aggregate public expenditures to economic growth; others focus on the relationship between certain expenditure components, such as public investment, education or health expenditures, or their components, and economic growth. Some studies suggest that increase in government expenditure on socio-economic and physical infrastructures impact on long run growth rate. For instance, expenditure on infrastructure such as road, power etc. reduces production costs, increase private sector investment and profitability of firms, thus ensuring economic growth (Barro, 1990; Barro and Sali-i-Martin, 1992; Roux, 1994). On the other hand, observations that growth in government spending, mainly based on non-productive spending is accompanied by a reduction in income growth has given rise to the hypothesis that the greater the size of government intervention the more negative is its impact on economic growth (Laudau 1983; Abu and Abdullah, 2010).

Ram (1986), studied the linkage between government expenditure and economic growth for a group of 115 countries during the period 1950-1980 by using both cross section and time series data, and confirmed a positive influence of government expenditure on economic growth. Bose et al. (2003) also examined the effects of government expenditure for a panel of 30 developing countries over the decades of 1970s using components of expenditures and employed Seemingly Unrelated Regression technique. Their results revealed that the share of government capital expenditure in GDP is positively and significantly correlated with economic growth with the exception of recurrent expenditure which is insignificant.

Jiranyakul and Brahmasrene (2007) investigated the relationship between government expenditures and economic growth in Thailand for the period 1993 to 2006 and employed Standard Granger Causality test and OLS method. The results showed a unidirectional causality from government expenditure to economic growth without feedback. Furthermore, estimation from the OLS confirmed the strong positive impact of government expenditure on economic growth during the period of investigation. Alexiou (2009) used pooled time series and cross-section data for 7 countries in the South Eastern Europe spanning from 1995 to 2005 to carry out a survey study using five variables used in the estimation, government spending as dependent variable on capital formation, development assistance, private investment and a proxy for trade-openness. All have positive and significant effect on economic growth, while population growth was found to be statistically insignificant. Olukayode (2009) investigated the impacts of government expenditure on economic growth in Nigeria using time series data from 1977 to 2006 in which government expenditure is disaggregated into private investment, human capital investment, government investment and consumption spending at absolute levels. The results showed that all the expenditures have positive effects on economic growth.

Vu Le and Suruga (2005) investigated the simultaneous impact of public expenditure and FDI on economic growth from a panel of 105 developing and developed countries for the period 1970 to 2001 and applied fixed effects model and threshold regression techniques. Their main findings were categorized into three: FDI, public capital and private investment play roles in promoting economic growth. Secondly, public non-capital expenditure has a negative impact on economic

growth and finally, excessive spending in public capital expenditure can hinder the beneficial effects of FDI. Taban (2010) examined the relationship between government spending and economic growth for the period 1987 to 2006 by applying bounds testing approach and MWALD Granger causality test. The author found that the share of government spending and share of investment to GDP have negative impacts on economic growth in the long run.

Similarly, Ighodaro and Okiakhi (2010) used time series data for the period 1961 to 2007 and applied Co-integration test and Granger causality test to examine the growth effect of government expenditure disaggregated into general administration and community and social services in Nigeria. The results revealed negative impact of government expenditure on economic growth. Abu and Abdullah (2010) investigates the relationship between government expenditure and economic growth in Nigeria from the period ranging from 1970 to 2008.They used disaggregated analysis in an attempt to unravel the impact of government expenditure on economic growth. Their results reveal that government total capital expenditure, total recurrent expenditure and education have negative effect on economic growth. On the contrary, government expenditure on transport, communication and health result in an increase in economic growth. They recommend that government should increase both capital expenditure and recurrent expenditure including expenditure on education as well as ensure that funds meant for development on these sectors are properly utilized. They also recommend that government should encourage and increase the funding of anti-corruption agencies in order to tackle the high level of corruption found in public offices in Nigeria.

Some studies also found mixed results on the impact of government expenditure on economic growth, for instance, Donald and Shuanglin (1993) investigated the differential effects of various forms of expenditures on economic growth for a sample of 58 countries. Their findings indicated that government expenditures on education and defense have positive influence on economic growth, while expenditure on welfare has insignificant negative impact on economic growth. Belgrave and Craigwell (1995) examined the impact of government expenditure on economic growth disaggregating the level of government expenditure on economic growth into functional and economic categories of Barbados for the period 1969-1992 and employed Augmented Dickey Fuller and Engle and Granger co-integration technique. Their results revealed that there is a positive relationship between capital expenditure, agriculture, housing and community, road, communication and health expenditures on economic growth respectively. However, the effects of education and recurrent expenditure are negative. Deverajan et al. (1996) shed light on the composition of public expenditure and economic growth for the panel of 43 developing countries from 1970 to 1990 and applied Ordinary Least Squares. Their findings suggest that increase in the share of recurrent expenditure has positive and statistically significant growth effects and by contrast, capital as a component of public expenditure has a negative impact on economic growth. These results, according to the study imply that, developing countries' governments have been misallocating public expenditure in favour of capital expenditures at the expense of recurrent expenditures.

Dilrukshini (2002) analyzed the relationship between public expenditure and economic growth in Sri Lanka over the period 1952 to 2002 and applied Johansen co-integration technique and Granger causality test. The findings suggest that the growth of public expenditure in Sri Lanka is not directly dependent and determined by economic growth. Abu and Abu (2003) employed multivariate co-integration and variance decomposition approach to examine the causal relationship between government expenditures and economic growth for Egypt, Israel, and Syria. In the bivariate framework, the authors observed a bi-directional (feedback) and long run negative relationships between government spending and economic growth. Moreover, the causality test within the trivariate framework (that include share of government civilian expenditures in GDP, military

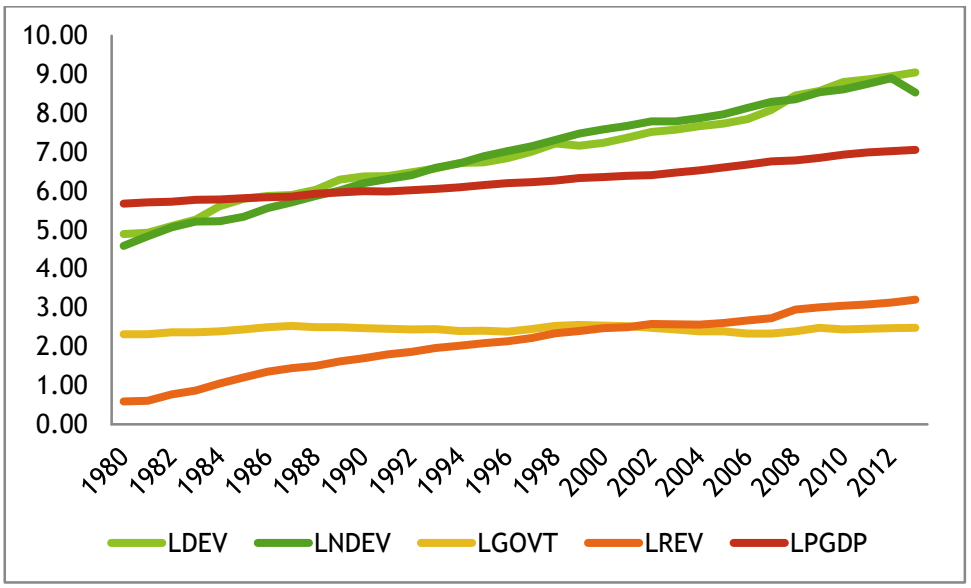
burden, and economic growth) illustrated that military burden has a negative impact on economic growth in all the countries while civilian government expenditures have positive effect on economic growth for only both Israel and Egypt.

Niloy, Emranhul and Osborn (2003) used a disaggregated approach to investigate the impact of public expenditure on economic growth for 30 developing countries in 1970s and 1980s. The authors confirmed that government capital expenditure in GDP has a significant positive association with economic growth, but the share of government recurrent expenditure in GDP was shown to be insignificant in explaining economic growth. At the sectoral level, government investment and expenditure on education are the only variables that had significant effect on economic growth, especially when budget constraint and omitted variables are included. Furthermore, Komain and Brahmasrene (2007) examined the association between government expenditures and economic growth in Thailand, by employing the Granger causality test. The results revealed that government expenditures and economic growth are not co-integrated. Moreover, the results indicated a unidirectional relationship, as causality runs from government expenditures to growth. Lastly, the results illustrated a significant positive effect of government spending on economic growth.

3. Composition of government expenditure in terms of capital and current expenditure in India

Public expenditure in India classified in terms of development, non-developent, revenue and total expenditure for the period 1980 to 2013 is summarized in form in figure 1. The trend of expenditure shows a positive link with that of economic growth in India.

Figure - 1: Trend and composition of government expenditures in India (as a percent of GDP)



3.1 Relationship Between Public Expenditure and Economic Growth in India

Examining the pattern of public expenditure and economic growth rate in India, it could be observed from Figure 1 that there was a dramatic slump in the behaviour of total public expenditure as a percentage of GNP in 1996-97. This was following a period of secular rising trend in the total public expenditure. This dip in total expenditure may partly be attributed to the sustained and cautious policy measures undertaken by the state and the central governments since the early 1990s. This measure was aimed at reducing the fiscal profligacy and pruning the

unproductive government expenditures. This fall in expenditure could also partly be attributed to the shortfall in revenue receipts especially arising due to the fall in custom and excise duties. However, the implementation of Fifth Pay Commission in the immediate period i.e. 1997-98 has further led to a sharp rise in the current expenditure. This again pushed up the level of aggregate expenditure in 2001-02 to almost the maximum level as attained in the 1987-88 in terms of as a percentage of GDP.

Since the government could not control over the current expenditure in the subsequent years which was committed in nature, the government adopted a fiscal compression strategy by cutting down capital expenditure. Thus, the fiscal adjustment has been made with regards to the compression of capital expenditure.

4. Data source, variables and methodology

4.1 Data source and definition of variables

Annual time series data, which covers the time period from 1980 to 2013, is used in the present study. The data used in the study are obtained from different sources, including: Handbook of Statistics on Indian Economy published by the Reserve Bank of India, National Sample Survey Organization (NSSO), database of World Bank and International Financial Statistics (IFS) Yearbook.

Definitions of variables

To measure the economic growth, per capita real gross domestic production (PGDP) is used. To capture the effect of public expenditure, we have used four different proxies of public expenditure: (1) development expenditure as a share of GDP (DEV), (2) non-development expenditure (NDEV) (3) revenue expenditure (REV) and (4) current expenditure by the Government (GOVT). We used overall fiscal deficits (FD) and fixed capital formation (GFCF) as control variables in this study. All of the variables are taken a percent of GDP and also transformed into their natural logarithm.

The following general specifications are used in the empirical model to examine the relationship between economic growth and public expenditure.

LPGDP = f (LPUBEX, LFD, LGFCF) .... (1)

	LPGDP	LDEV	LNDEV	LREV	LGOVT	LGFCF	LFD
LPGDP	1.0000						
LDEV	0.9868	1.0000					
LNDEV	0.9713	0.9844	1.0000				
LREV	0.9555	0.9850	0.9920	1.0000			
LGOVT	0.1160	0.2188	0.2083	0.2842	1.0000		
LGFCF	0.7367	0.7295	0.7182	0.7037	0.0498	1.0000	
LFD	-0.4267	-0.3709	-0.4471	-0.3927	0.3711	-0.3918	1.0000

Where, all the variables are defined earlier. On the basis of the cross correlation matrix among the chosen proxy of public expenditure, we have used four different models.

Model (A): LPGDP = f (LDEV, LFD, LGFCF) .... (2)

Model (B): LPGDP = f (LNDEV, LFD, LGFCF) .... (3)

Model (C): LPGDP = f (LREV, LFD, LGFCF) .... (4)

Model (D): LPGDP = f (LGOVT, LFD, LGFCF) .... (5)

3.2 Methodology

3.2.1 Co-integration

To empirically analyze the long run relationship and dynamic interaction of public expenditure and economic growth, the model has been estimated by the auto regressive lag (ARDL) co-integration procedure developed by Pesaran et al. (2001). The procedure is adopted for three reasons. The ARDL modeling approach was originally introduced by Perasan and Shin (1999) and later extended by Perasan et al. (2001). The procedure has several advantages over others. First, the short- and long-runs parameters are estimated simultaneously. Second, the bound test procedure does not require the pre testing of the variables included in the model for unit root unlike other techniques such as Engle Granger (1987) and Johansen & Juselius (1992). These approaches require that all the variables to be integrated of the same order (I(1)). Otherwise the predictive power will be lost (Kim et al 2004; Perron 1989, 1997). However ARDL technique is applicable irrespective of whether regressor in the model is I (0) or I (1). The procedure will however crash in the presence of I (2) series. Third, the test is relatively more efficient in small sample data sizes as is the case of this study. Fourth the error correction method integrates the short run dynamics with long run equilibrium without losing long run information. The unrestricted error correction model (UECM) of ARDL model is used to examine the long run & short run relationship take the following form.

The ARDL procedure involves the estimation of equation (6) as follows:

$$\Delta LPGDP = \delta_1 + \delta_2 LPUBEX_{t-1} + \delta_3 LFD_{t-1} + \delta_4 LGFCF_{t-1} + \sum_{i=1}^{q} \alpha_i \Delta LPGDP_{t-1} + \sum_{i=1}^{q} \beta_i \Delta LPUBEX_{t-1} + \sum_{i=1}^{q} \mu_i \Delta LFD_{t-1} + \sum_{i=1}^{q} \mu_i \Delta LGFCF_{t-1} + \varepsilon_t \quad \ldots\ldots (6)$$

Where the series are as defined earlier and T is time trend and L implies that the variables have been transformed in natural logs. The first part of the equation (1) with δ_2 and δ_3 refer to the long run coefficients and the second part with α, β and μ refer to the short run coefficients. The null hypothesis of no c0-integration H_0:δ_2=δ_3=δ_4=0 and the alternative hypothesis H_1:δ_2≠δ_3≠δ_4≠0 implies co-integration among the series (equation 1).

ARDL bounds test procedure

The first step in the ARDL test is to estimate equation (6) by OLS in order to test for existence of a long run relationship among variables by conducting an F-test for the joint significance of the coefficients of the lagged levels of variables i.e. H_0 as against H_1 as stated earlier. Two asymptotic critical values bound provide a test for co-integration when the independent variables are I(d) where (0 ≤d ≤1); a lower value assuming the regressors are I(0) and an upper value assuming purely I(1) regressors of the F- statistics is above the upper critical values, the null hypothesis of no long run relationship can be rejected. Conversely, if the test statistics fall between the lower and the upper bound of critical values, the null hypothesis cannot be rejected. Further, if the calculated values lie between lower and upper bounds, the decision about the co-integration is inconclusive (Pesaran et al 2001). The ARDL bound testing approach to co-integration uses

〖(ρ+1)〗 ^q formulas to estimate the number of regressors. Where ρ indicates the maximum number of lags used and q represents the total number of variables. In the second step, once the co-integration is established the conditional ARDL long run model can be estimated as:

$$\Delta LPGDP = \alpha_0 + \sum_{i=1}^{q} \delta_1 \ LPGDP_{t-1} + \sum_{i=1}^{q} \delta_2 \, LPUBEX_{t-1} + \sum_{i=1}^{q} \delta_3 \, LFD_{t-1} + \sum_{i=1}^{q} \delta_4 \, LGFCF_{t-1} + \varepsilon_t \quad \ldots. (7)$$

This involves selection of the orders of ARDL (q,q_1,q_2,q_3,q_4) models using SIC. The third and final step, we obtain the short run dynamic parameters by estimating an error correction model with the long run estimates. This is specified as below:

$$\Delta LGPGDP = \mu + \sum_{i=1}^{q} \alpha_i \, \Delta \, LGPGDP_{t-i} + \sum_{i=1}^{q_1} \beta_i \, \Delta \, LPUBEX_{t-1} + \sum_{i=1}^{q_2} \mu_i \, \Delta \, LFD_{t-i} +$$

$$\sum_{i=1}^{q_3} \sigma_i \, \Delta \, LGFCF_{t-i} + + \phi ECM_{t-1} + \varepsilon_t \quad \ldots.. (8)$$

Where α,β,μ,σ,ω are short run dynamic coefficient to equilibrium and ϕ is the speed adjustment coefficient. To check the goodness of fit of the ARDL model, diagnostic tests and stability tests are conducted. The diagnostic tests examine the serial correlation, functional form, normality, and heteroskedasticity associated with the model. The structural stability test is conducted by employing the cumulative residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ).

3.2.3 Causality test

Granger Causality Test

The co-integration relationship indicates the existence of causal relationship between variables but it does not indicate the direction of causal relationship between variables. Therefore it is common to test for detecting the causal relationship between variables using the Engle and Granger (1987) test procedure. There are three different models that can be used to detect the direction of causality between two variables X and Y depending upon the order of integration and the presence or absence of co-integration relationship. If two variables say X and Y are individually integrated of order one I (1) and co-integrated, then Granger causality test may use I(1) data because of super consistency properties of estimators. If X and Y are I(1) and co-integrated, the Granger causality test can be applied to I(0) data with an error correction term. If X and Y are I(1) but not co-integrated, Granger causality test requires transformation of the data to make I(0). For this paper, the presence of co-integration relation- ship the application of Engle and Granger (1987) causality test in the first differenced variables by means of a VAR will misleading the results, therefore an inclusion of an additional variable to the VAR system such as the error correction term would help us to capture the long- run relationship. The augmented form of the Granger causality test involving the error correction term is formulated in a multivariate pth order vector error correction model given as below;

$$\begin{pmatrix} \Delta LPGDP_t \\ \Delta LPUBEX_t \\ \Delta LFD_t \\ \Delta LGFCF_t \end{pmatrix} = \begin{pmatrix} C1 \\ C2 \\ C3 \\ C4 \end{pmatrix} + \sum_{i=1}^{p} \begin{bmatrix} \beta_{11i} & \beta_{12i} & \beta_{13i} & \beta_{14i} \\ \beta_{21i} & \beta_{22i} & \beta_{23i} & \beta_{24i} \\ \beta_{31i} & \beta_{32i} & \beta_{33i} & \beta_{34i} \\ \beta_{41i} & \beta_{42i} & \beta_{43i} & \beta_{44i} \end{bmatrix} \begin{pmatrix} \Delta \mathrm{LPGDP_{t-i}} \\ \Delta \mathrm{LPUBEX_{t-i}} \\ \Delta \mathrm{LFD_{t-i}} \\ \Delta \mathrm{LGFCF_{t-i}} \end{pmatrix} + \begin{pmatrix} \gamma_1 \\ \gamma_2 \\ \gamma_3 \\ \gamma_4 \end{pmatrix} ECM_{t-1} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \end{pmatrix} \quad \ldots(9)$$

The C's, β's and ·'s are the parameters to be estimated. ECMt-1 represents the one period lagged error-term derived from the co-integration vector and the ε's are serially independent with mean zero and finite covariance matrix. From the Equation (9) given the use of a VAR structure, all variables are treated as endogenous variables. The F test is applied here to ex- amine the direction of any causal relationship between the variables. The public expenditure (LPUBEX) does not Granger cause economic growth (LPGDP) in the short run, if and only if all the coefficients of β12i's are not significantly different from zero in Equation (9). Similarly the economic growth do not Granger cause energy in the short run if and only if all the coefficients β21i's are not significantly different from zero in the Equation (9). There are referred to as the short-run Granger causality test. The coefficients on the ECM represent how fast deviations from the long-run equilibrium are eliminated. Another channel of causality can be studied by testing the significance of ECM's. This test is referred to as the long run causality test. The short-run and long-run Granger causality results are re- ported below in Table 6.

4. Empirical results and analysis

All the series included in the study are normally distributed. Results of stationary properties are checked by applying the Ng-Perron (2001) unit root test and results are reported in Table 1. The results suggest that all the variables are non-stationary in levels but are first difference stationary. It is, therefore, worth concluding that all the variables used in this study are integrated of order one. While ARDL bounds testing to co-integration can be employed regardless of the order of integration of each series, but if any series is integrated of I(2) or higher level than the calculated F-statistic becomes invalid (Ouattara, 2004). Thus, we have checked the stationary properties of the used variables.

Table 1: Stationarity Test of the Variables (Ng-Perron Test)

Variables	MZa	MZt	MSB	MPT
LDEV	-12.3849	-2.48825	0.20091	7.35891
LNDEV	-5.24974	-1.02872	0.19596	15.3977
LREV	-3.46121	-1.22706	0.35452	24.7349
LGOVT	-17.3000	-2.91000	0.16800	5.48000
LFD	-13.3995	-2.58718	0.19308	6.80742
LGFCF	-9.29788	-2.09120	0.22491	10.0541
ΔLDEV	-14.3302	-2.67619	0.18675	6.36231
ΔLNDEV	-23.8000	-3.42000	0.14300	4.03000
ΔLREV	-8.96096	-2.11339	0.23584	10.1813
ΔLGOVT	-20.8980	-3.22553	0.15435	4.40218
ΔLFD	-27.0918	-3.66722	0.13536	3.44048
ΔLGFCF	-16.0161	-2.82968	0.17668	5.69057

Source: Author's own Calculation by using E-views 8.0

Δ denotes the first difference of the series

After investigating the order of integration of all variables, we apply ARDL co-integration approach to examine the long run and short run coefficients. The results of estimated F-test statistics are presented in Table 2. The results indicate that there is long run relationship among the variables at 5 percent level of significance in the context of model (A) only.. Moreover, the optimum lag is 1. Further, the model is correctly specified and it passes all the diagnostic tests as well. Hence there is no autocorrelation, heteroscedasticity, which is evident from the insignificant values of

serial correlation LM tests, ARCH tests, White heteroscedasticity and Ramsey RESET. The data is normally distributed evident from the value of Jarque-Bera tests.

Panel I: Bounds testing to co-integration:

Estimated Equation : LPGDP = F (LPUBEX, LFD, LGFCF)

Table 3: ARDL Bound test

Indicators	Model (A)	Model (B)	Model (C)	Model (D)
Optimal lag	1	1	1	1
F – Statistics	5.6801	2.1215	2.1501	3.2816

Panel II: Diagnostic Tests:

Diagnostic Tests Indicators	Model (A)	Model (B)	Model (C)	Model (D)
Normality J-B value	1.2712 (0.76)	0.5900 (0.74)	1.2501 (0.55)	0.2814 (0.96)
Serial Correlation LM Test	0.4701 (0.49)	0.4869 (0.62)	0.8939 (0.59)	0.4327 (0.29)
Heteroscedasticity Test (ARCH)	0.1232 (0.72)	0.5690 (0.97)	0.0271 (0.86)	0.9481 (0.59)
Ramsey Reset Test	0.4286 (0.52)	1.3912 (0.11)	1.0255 (0.14)	0.9124 (0.19)

The next step is to estimate the long run and short run coefficients of ARDL model. The optimum model is chosen by Schwarz Bayesian criterion. The estimated long run coefficient of ARDL approach for two model specification is reported in table 4. The results of long run estimates of ARDL suggest that development expenditures have statistically positive and significant impact on economic growth which implies that an increase in development expenditures makes it possible for private investors to invest more; led to the increased productivity and hence economic growth. The results are consistent with the findings (Barro, 1991; Aschauer, 1989; Easterly and Rebelo, 1993; Munnell, 1990; Easterly et al., 1992; Gramlich, 1994; Gupta et al., 2002; Mamatzakis, 2001; Turnovsky, 2004). The coefficient of fiscal deficit is negatively associated with economic growth whereas capital formation is positively affect economic growth.

Table 4: Long Run estimates, dependent variable is LPGDP

Regressor	Model (A)	Model (B)	Model (C)	Model (D)
LDEV	0.2602*** (2.9040)	----	----	----
LNDEV	----	0.1504 (0.9296)	----	----
LREV	----	----	-0.2078 (-0.3657)	----
LGOVT	----	----	----	2.3586 (1.1755)
LFD	-0.0568** (-2.6740)	-0.8851 (-1.0246)	-0.2563 (-0.5487)	-1.6989 (-1.5869)
LGFCF	0.0150** (2.2514)	2.238 (1.3655)	4.5654 (1.3082)	3.1600*** (3.4964)
CONST	2.5988*** (3.5482)	0.4689 (0.1563)	-5.7527 (-0.6911)	-5.5488 (-1.2999)

		Robustness Indicators		
R^2	0.9985	0.9987	0.95477	0.9985
Adjusted R^2	0.9929	0.9984	0.9982	0.9982
D.W. Stat	1.7851	1.7521	2.2132	2.1421
Serial Correlation,	0.8710 [0.26]	0.9512 [0.85]	0.1904 [0.26]	0.5023 [0.45]
Heteroscedasticity	0.5981 [0.58]	0.85 [0.66]	0.0871 [0.89]	1.0775 [0.16]

Note: Figures in parentheses are estimated t-values. ** and *** indicate significant at 5 and 1 percent level of significance, respectively.

The Results of short-run dynamics using the ECM version of ARDL are reported in Table 5. The short-run results are not much different from the long-run ones. The coefficient of the error correction term is an adjustment coefficient capturing the proportion of the disequilibrium in economic growth in one period which is corrected in the next period. The larger the error term, the earlier the economies return to the equilibrium rate of growth; following a shock. The estimated error correction term of models (A) is -0.0881 and significant at 5% level. This indicates that following a shock, there is relatively slow return to the equilibrium growth in the following year. The coefficients of development expenditure and fixed capital formation are positively related to economic growth.

Table 5: Error Correction representation, dependent variable is ΔLPGDP

Regressor	**Model (A)**	**Model (B)**	**Model (C)**	**Model (D)**
ΔLDEV	0.0238* (2.1893)	----	----	----
ΔLNDEV	----	0.0068 (0.6116)	----	----
ΔREV	----	----	-0.20997*** (-2.9785)	----
ΔLGOVT	----	----	----	0.0840 (1.2088)
ΔLFD	-0.0095 (-0.5841)	-0.0066 (0.6116)	-0.0085 (-0.6023)	-0.1226 (-0.7415)
ΔLGFCF	0.0902* (1.7289)	0.1012* (1.9447)	0.1526*** (3.2753)	0.1126* (2.1847)
ΔCONST	0.2310** (2.9213)	0.0212 (0.1467)	-0.1923 (-1.3665)	-0.1978 (-1.3710)
ECM (-1)	-0.0881** (-2.1250)	-0.0452 (-1.2305)	-0.0331 (-1.1258)	-0.0365 (-1.6253)

		Robustness Indicators		
R^2	0.49859	0.4795	0.5525	0.4974
Adjusted R^2	0.4057	0.3831	0.4697	0.4067
D.W. Stat	2.0986	0.0084	1.7875	2.1431
SE regression	0.0173	0.0176	0.0163	0.0173
F-stat.	6.7120	6.2192	8.3365	6.7434

Note: Figures in parentheses are estimated t-values. *, ** and *** indicate significant at 10, 5 and 1 percent level of significance, respectively.

Although co-integration among the variables in model (A) indicates the presence of Granger causality, at least in one direction, it does not indicate the direction of causality between variables (Masih and Masih, 1998). The direction of the Granger causality can only be identified through the error-correction model (ECM) derived from the long-run co-integrating vectors. The results are presented in table 6. The results suggest that there is unidirectional causality from development expenditure to economic growth and fiscal deficit to development expenditure. It is also found that bi-directional causality exists between fiscal deficit and economic growth. In the long run only the first equation is significant at 1% when economic growth variable is taken as dependent variable.

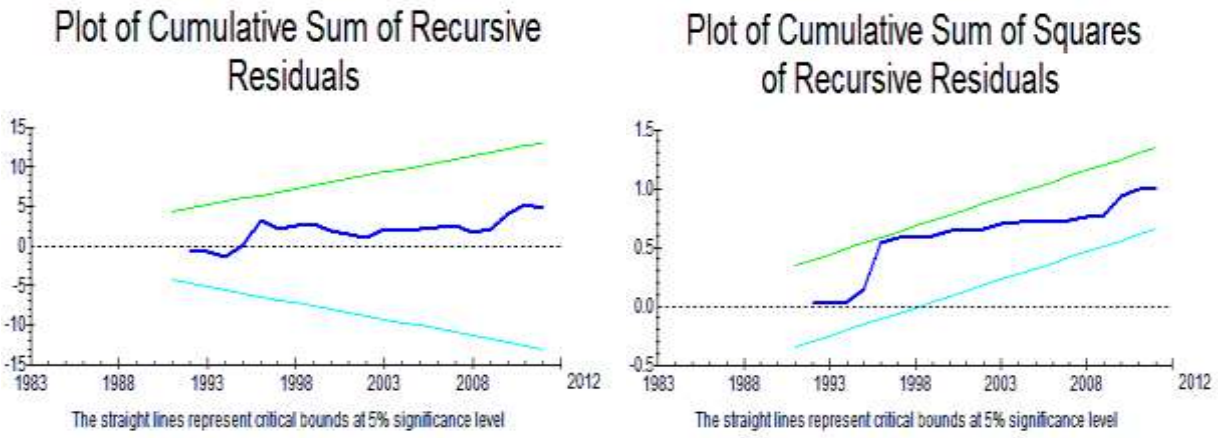
Table 6: Granger causality test result

Dependent variables	*Sources of causation*				
	ΔLPGDP	**ΔLDEV**	**ΔLGFCF**	**ΔLFD**	**ECT (t-values)**
ΔLPGDP	-----	2.1360**	1.2535	8.3802***	-2.1530***
ΔLDEV	1.9388	-----	0.7784	2.1469**	-1.2613
ΔLGFCF	0.34412	0.7549	-----	1.9880	-1.4650
ΔLFD	2.0951*	0.3513	2.0389	-----	-1.8620

Note: *, ** and *** indicate significant at 10, 5 and 1 percent level of significance, respectively.

Finally, the CUSUM and CUSUMSQ are presented in Figure 1. Examination of plots shows that CUSUM and CUSUMSQ statistics are well within the 5% critical bounds implying that short run and long run coefficients in the ARDL-Error Correction Model are stable. Our results suggest parameter consistency under both tests (short and long run).

Figure 1: Stability Test of Model (A)



5. Conclusion

In this study, we apply the ARDL bounds testing approach to co-integration to examine a long-run relationship between economic growth and public expenditure in India over the time period 1980-2013. As control variables fiscal deficit and fixed capital formation are also used. To capture the effect of public expenditure, we have used four different proxies of public expenditure: (1) development expenditure as a share of GDP (DEV), (2) non-development expenditure (NDEV) (3) revenue expenditure (REV) and (4) current expenditure by the Government (GOVT). We used overall fiscal deficits (FD) and fixed capital formation (GFCF) as control variables in this study. All of the variables are taken a percent of GDP.

The Ng-Perron test is used to check for the stationarity properties of the series. All variables are non-stationary in their level, but first difference stationary. The series are co-integrated. It is found that development expenditures have statistically positive and significant impact on economic growth which implies that an increase in development expenditures makes it possible for private investors to invest more. The results of Granger causality suggest that there is unidirectional causality from development expenditure to economic growth and fiscal deficit to development expenditure; bi-directional causality exists between fiscal deficit and economic growth.

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Paper No. 33

Is Public Debt the cause of Inflation in Nepal?

Sajana Silpakar*

Abstract

This paper empirically examines if public debt is favorable or not for an economy like Nepal where there exists the bottlenecks in the supply side. More specifically it examines if Public debt is one of the causes of Inflation in Nepal or not. For this annual data, covering the span from 1990/91 to 2013/14 are analyzed using E-views. The empirical results suggest that public debt and inflation are insignificantly related to each other and for Nepal; there is adverse relation between inflation and public debt. The results further explain that money supply and Indian inflation are the significant factors affecting Nepalese price level. Moreover, inflation in Nepal is also found to be irrelevant to the lagged function of both CPI and public debt. Although public debt is insignificant in determining the rate of inflation; it shows negative relation with price level. So, it can be concluded that public debt in Nepal is favoring the price stability and inferred that government can take public loan as per its need, taking into consideration of its limit.

Key words: Public Debt, Inflation

JEL classification: E31, E62

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1. Introduction

Inflation is the continuous and persistent rise in the general price level in an economy over time. Inflation in general is very crucial for economic growth of an economy. High inflation deteriorates the economic growth and mild inflation favors the growth. There are different and various cost of the inflation in any economy depending upon its state of development. Inflation is caused by different variables in different economic environment. Mainly, excess demand, lack of supply and structural bottleneck causes inflation. When an economy experiences excess demand with limited supply of commodities along with structural rigidities, high inflation is experienced in an economy.

Public debt is a fundamental tool used by the government for deficit financing. Debt if uses in a productive and efficient manner can boost the growth of an economy enhancing the Quality of life of the people but if not utilized properly, it could adversely affect and jeopardize the economy. Government borrows for curtailing the purchasing power, private and governmental. Government can borrow debt from different sources i.e. the central bank, commercial banks, non-financial institutions and foreign markets. Here we only deal with the domestic debt which has the direct and evident relation with the inflation.

Stable price level is a primary objective of the monetary policy issued by the central banks including Nepal Rastra Bank. Although monetary policy is responsible for controlling and maintaining price stability in Nepal, policies introduced by fiscal policy also affects in controlling high price level. So, coordination between fiscal and monetary policy is another challenge of any government for the stable price. Budget deficit and how it is financed is also important aspect in maintaining the stable price level. Generally deficits are financed through loans; internal and external loans. External

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loans actually comes beyond the boundary of the economy which increase the money supply in domestic economy increasing AD leading to demand pull inflation. Similarly, internal loans do not have such impact on money supply and increase in AD. But, if internal loans are financed by the central bank through overdrafts may cause higher CPI. Long-term loans and Short terms loans have different effects in an economy. Since long-term debts may have high cost of interest and debt servicing, these debts may significantly affect the inflation. The longer is the maturity of debt the more volatile and persistence is inflation (Elisa et. al, 2012). Similarly, short term debt might have smaller effect on it. Short-term debt is important for monetary management, is better off condition for the Government.

Borrowing from the central bank i.e. monetizing the deficit has no direct cost but has serious implications on inflation because it increases the aggregate demand of the people, which serves for high inflation. Therefore this process of deficit financing is not encouraged. Monetarist economist states that "inflation is always and everywhere a monetary phenomenon". So according to classicists, budget deficit are considered to be a source of inflation only if it is monetized. The high levels of public debt are reflected in reduced rates of economic growth and rising levels of inflation (Jose Lopse da Veiga, 2014).

An increase in the public debt may, in certain cases, heighten the risk of inflation. If the public debt grows strongly, the government may in fact be tempted to reduce the value of that debt by generating inflation. That happens if the public debt is monetized. In that case, the government issues debts which are bought by the central bank, that purchase usually being mandatory. The money which the government thus receives from the central bank is used to finance the budget deficit. The money supply expands substantially as a result, and there is inflationary pressure which may lead to hyperinflation (Nautet and Meensel, n.d.).

Generally, Government prepares deficit budget to surplus budget. In case of Nepal also Government expenditure always exceeds estimated government revenue. That means there is budget deficit which is financed either from revenue collection or taking loans (domestic or foreign). Debt/Loans taken from different financial and non-financial institutes are used for financing deficit. Public Debt is a liability of a government to its stakeholders. There are certain costs of taking loans from domestic or foreign sources, including interest payments. Domestic loans are raised through issuing short term treasury bills and long term bonds, for which interest payments are needed. So, whenever government redeemed such debt, it would heighten the money supply.

Particularly for Nepal, Public debts are taken in accordance with the estimated budget deficit. However this debt might not be completely used for government expenditure. This might create budget surplus, but such debt are also used to redeem the previous loans taken and its interest payments. Such repayment will increase the money supply in domestic economy leading to high price level.

There are extensive studies conducted to identify the causes of inflation in Nepal but there lack the study of the relation between fiscal and monetary variable to inflation. As inflation also affects in the long-term economic planning of a country, fiscal variables need to be studied if this is one of the causes of Inflation in Nepal. If yes, what is the causal relation between the public debt and inflation and what could be its impact on economy. Similarly, this study also tries to find out what recommendations could be drawn to minimize these effects.

2. Theoretical and empirical Review

Classical economists explained economics as a monetary phenomenon, their theories based on the quantity theory of money, which emphasized on a proportional relation between rate of inflation, and the growth rate of money implying permanent rise in money growth leads to inflation in long

run. Similarly, monetarist economist also advocated that inflation is completely a monetary phenomenon. According to them budget deficits are considered to be the source of inflation only to the extent that they are monetized. Later on Sargent and Wallace (1981) found that the sustainability of budget may require money growth which in turn converts inflation to a fiscal-driven monetary phenomenon.

Theoretically, budget deficit could be a source of inflation, and its impact on inflation depends on how long it lasts, and how it is financed. On the one hand if government only suffers from a temporary budget it could only lead to a temporary increase in price level, but not inflation no matter how it is financed. On the other hand, if budget deficits are permanent and are financed by money creation, then inflation occurs (Mishkin, 2004). So it can be said that public debt are financed by the creation of money, inflation is permanent phenomenon.

Inflation appears in an economy when there is continuous rise in the general price level. Expansionary fiscal policy is the policy where Government cuts the taxes, increase public spending and on other hand central bank also increases the money supply through monetizing the budget deficit. Such expansionary policy of the government helps in increasing the aggregate demand (AD) of an economy by boosting its production/output and thus increasing the disposable income of the people. Similarly, central banks can monetize this deficit, which will increase the money supply and thus the cash in hand of the general people increasing their AD. This helps the economy to have a higher economic growth. However there is a negative side -when AD increases the prices of goods and services increases in an economy leading to the higher inflation rate and affecting the economic growth adversely. Different economic schools have varieties of opinions regarding the validity of the public debt.

The relationship between public debt and inflation seem to be prominent in nature but very few studies has discussed this relationship. Ahmad et all (2012) investigated the inflationary effects of domestic debt in Pakistan for the period of 1972 to 2009 and found that domestic debt and domestic debt servicing increase price level in Pakistan. They concluded that in CPI function, the volume of domestic debt had positive and significant effect on price level. Similarly, the effect of domestic debt servicing on price level is also positive and significant effect on price level. Erkam and Cetinkaya (2014) also studied the relation between the Budget deficits and inflation for Turkey and found that budget deficit causes inflation when the rate of inflation were relatively high and he relationship disappears when low averaged inflation prevailed in an economy.

Metin (1998) also studied the relationship between inflation and the budget deficit in Turkey and found that an increased in scaled budget deficit immediately increases inflation. Similarly, monetization of the deficit also affected the inflation but in second lag only. He concluded that budget deficits significantly affect inflation in Turkey. Bildirici and Ersin (2007) conducted a study to investigate the economic relationship between inflation and domestic debt. They found that countries with high inflation experienced the inflationary process as there witnessed increasing costs of domestic debt. Similarly they found that for countries with low inflation, high borrowing with low costs of borrowing and fiscal discipline. They concluded that increasing costs of borrowing is epidemic to those with non-Ricardian fiscal policies. Veiga et all (2014) studied the relationship for 52 African countries and found that any increase in public debt is converted into an increase in the average inflation rates. Similarly, Van (2014) had conducted a study on budget deficit, money growth and inflation for Vietnam and found that money growth has positive effects on inflation while budget deficit has no impact on money growth and therefore inflation.

3. Data and Methodology

For this research annual data series from 1990 to 2014 are analyzed using E-views 8 Software. Generally National Consumer Price Index (CPI) is used to compute the value of inflation in Nepal.

According to the Quantity Theory of Money, Inflation is completely a monetarist phenomenon and determined by the Quantity of money Supplied in an economy. Quantity Theory of Money can be expressed as following:

$MV=PT$ ..... (I)

Where,

M= Money supplied

V= Velocity of money

P= Price level

T= Volume of Transactions

Above relation explains that Price Level of an economy is determined by the level of money supplied in an economy. Since V and T are taken constant, Price Level is affected by Money Supply positively.

Similarly different Studies reveal that inflation in developing countries is not only the function of money supply but it is also affected by the structural bottlenecks and imported inflation, government expenditure and public debt which actually increase the money supply in an economy. Especially in case of Nepal imported inflation from India is also significant for the rise in general price level, since there are supply shocks due to lower productivity and production. Government expenditure also increases money supply that is cash in hand of the people will help increasing aggregate demand raising price level. Similarly, public debt if financed by monetization-increasing money supply- in an economy certainly contributes to raise general price level. So, we can summarize the relation as below:

$NCPI= \alpha 1 + \alpha 2M2 + \alpha 3GE + \alpha 4PD+ \alpha 5ICPI + \varepsilon$ ..... (II)

Where,

NCPI = Consumer Price Index of Nepal

M2 = Broad Money Supply

GE = Government Expenditure

PD = Public Debt

ICPI = Consumer Price Index of India

Since the rate of inflation is measured in terms of the percentage change the above equation can be written as:

$INFN = \beta 1 + \beta 2\Delta M2 + \beta 3\Delta GE + \beta 4 \Delta PD + \beta 5 INFI + \varepsilon$ ..... (III)

Where,

INFN = Inflation of Nepal

$\Delta M2$ = Percentage change in Money Supply

Δ GE = Percentage change in Government Expenditure

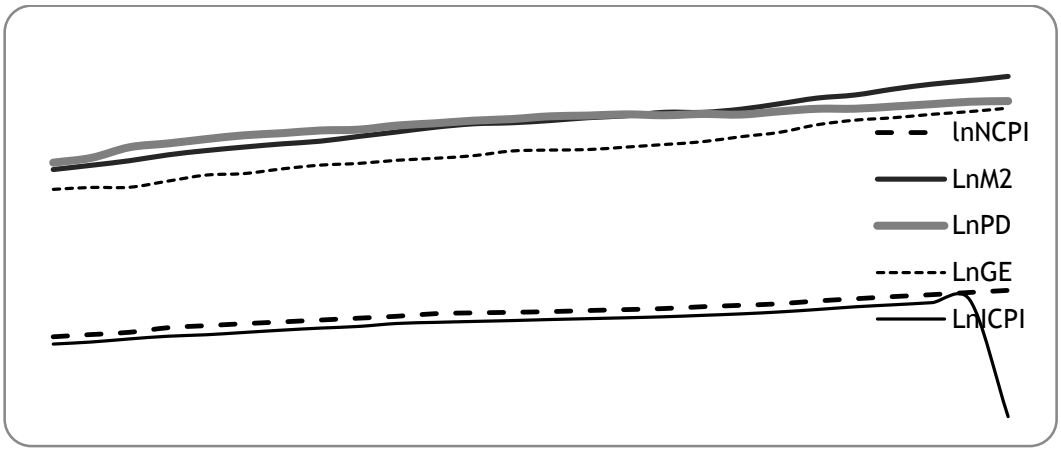
ΔPD = Percentage change in Public Debt

INFI = Inflation of India

4. Results and analysis of the Relationship

The analysis is based on the seconsary data for the time period 1989/90-2013/14 gathered from the A Handbook of Government Finance Statistics and QuarteleyEconomic Bulletins of Nepal Rastra Bank. In Nepal, Inflation is measured in terms of the percentage change of Consumer Price Index (CPI) per unit of time. Simialary, for the uniformity of the data Indian Consumer Price Index is taken for computing the rate of Indian inflation. Ordinary Least Sqaure Technique has been adopted to estimate the equation of the public debt.

Fig 1: Trends of NCPI, ICPI, M2, PD and GE



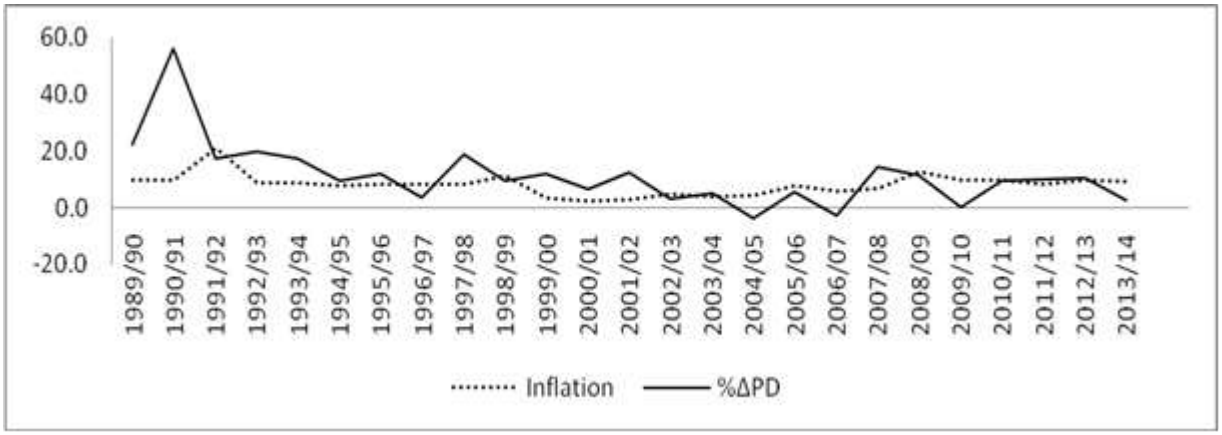
Source: Author's Calculation

The above graph shows that both NCPI and ICPI are in increasing trend and moving towards same direction with no fluctuation. It represents pegged exchange rate with Indian currency during the study period and huge trade link with India, Indian inflation is significant in determining the rate of inflation in Nepal. Similarly, money supply and government expenditure also experienced the rising trend with respect to time except for public debt.

Before 2003/04 public debt was rising but after 2003/04, public debt rises but in a slower rate. The reason behind the fall in rate of change of public debt is from 2002 Nepal Rastra Bank had restricted the overdraft facility to the government of Nepal which control the outflow of the public debt to some extent. Similarly it is also evident that the government expenditure is also in rising trend which is one of the causes of the increase in money supply in domestic front.

The major objective of this paper is to find out if public debt is inflationary of deflationary in Nepal to ease the policy makers to issue any policy regarding the matter.

Fig 2: Inflation and percentage change in Public debt of Nepal



Source: Author's Calculation

The above graph shows the time series representation of rate of inflation and percentage change in the public debt. It explains that Nepal had experienced the highest inflation in 1991/92 and lowest in 2000/01. Here when the rate of inflation was at its peak public debt had not changed significantly but in 1990/92 the public debt was at its highest value, which indicates that there might be a lagged effect of public debt in determining the rate on inflation in Nepal. Although the rate of inflation is consistently high during last five years public debt has no such evidences.

For the time series, data of all variables are subjected to unit root test (ADF test) for checking the stationary and non-stationary of such data. We found the following results for the unit root test:

Table 1: ADF-test results (unit root tests)

	Intercept				Intercept and trend			
	Level		First Difference		Level		First Difference	
Variable	t-stat	p-value	t-stat	p-value	t-stat	p-value	t-stat	p-value
lnGE	0.546	0.984	-4.0713	0.0047	-1.47	0.8122	-4.006	0.0226
lnICPI	-0.245	0.919	-2.3742	0.1594	-3.728	0.0439	-2.2602	0.4371
lnM2	-0.278	0.9151	-3.2607	0.0286	-2.027	0.557	-3.178	0.112
lnNCPI	-0.695	0.8297	-3.065	0.043	-2.409	0.366	-3.017	0.148
lnPD	-4.782	0.00008	-3.2683	0.0281	-3.941	0.0252	-4.234	0.014

Source: Author's Calculation

ADF statistics for unit root test of the above table shows that the variables are stationary in I (1) except for the public debt which is found to be stationary in I (0). So, first difference of the lnGE, lnICPI, lnM2 and LnNCPI are taken for further analysis. The ADF test statistics shows that there is no long run relation of public debt. So, there is no need of conducting co integration test. Rather we conduct the causality test to find out if public debt is significant and possess positive or negative relation with inflation of Nepal.

Granger causality test has been conducted to find out the direction of the relationship between the inflation in Nepal and other variables. The test results shows that there is a unidirectional relationship between Indian Inflation and Inflation, Public debt and Inflation, Indian inflation and

money Supply and Money supply and public debt. This shows that Inflation in Nepal is granger caused by the Indian inflation and public debt of Nepal. Similarly, Indian inflation also causes the money supply and money supply also causes public debt of Nepal. So, we can conclude that there is one way relationship between Inflation in Nepal and Public debt and Indian inflation.

In case of Nepal, since money supply is in desirable ceiling, it does not affect the Inflation in Nepal. Here in the result Indian inflation causes the money supply of Nepal, so it is relevant to include the lagged inflation of Nepal in determining the present inflation, since there might be inflation of previous year causing inflation of present year. Similarly, the lagged effect of public debt is also considered for the estimation of the Nepalese inflation.

First, a simple ordinary least square estimation is estimated to see of there exists any strong and significant relation between the public debt and inflation of Nepal. The results indicate that although the coefficient of public debt is negative at 16 percent level of significance, which replicate that although public debt is deflationary in nature but there is no significant relation between inflation of Nepal and public debt. This is represented in following table:

Table 2: Empirical Results of estimation of equation without lagged values

Dependent Variable (DlnNCPI)					
Variables Name	LnPD	DlnM2	DlnICPI	DlnGE	Constant
Coefficients	-0.012215	0.187283	0.456200	0.110358	0.149010
t-stat	-1.443047	2.035014	2.317930	1.672007	1.378187
Probability	0.1653	0.0560	0.0318	0.1109	0.1842
R^2=0.62					
DW-Stat=2.62					

Source: Author's Calculation

Similarly, when the lagged values of public debt and inflation in estimating the inflation relation with public debt, it is noted that the relation is still insignificant and such lagged function have insignificant relation in determining the value of inflation in Nepal.

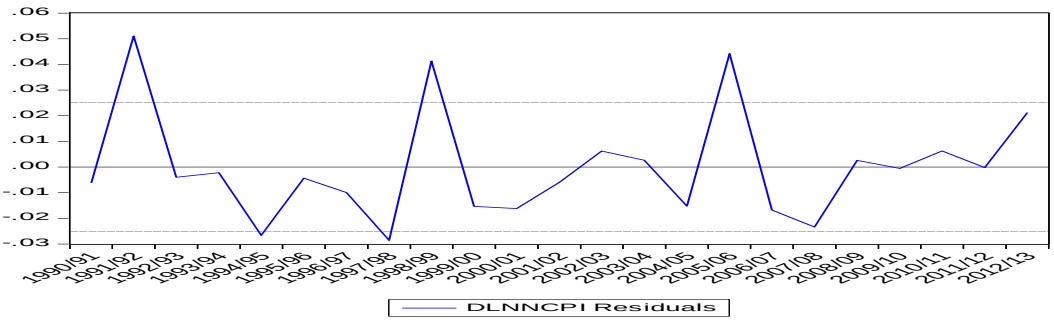
Table 3: Empirical Results of estimation of equation with lagged values of public debt and CPI

Dependent Variable (DlnNCPI)							
Variables Name	Constant	LnPD	DlnM2	DlnICPI	DlnGE	$DlnPD_{-1}$	$DlnNCPI_{-1}$
Coefficients	0.249	-0.088	0.207	0.547	0.092	0.068	-0.047
t-stat	1.463	-0.914	2.016	2.283	1.378	0.768	-0.252
Probability	0.162	0.374	0.060	0.036	0.184	0.453	0.803
R^2=0.637							
DW-Stat=2.47							

Source: Author's Calculation

Although the coefficients value is negative (-0.088) which elucidate that public debt is deflationary in Nepal, the relation is insignificant as the probability value is high. The empirical results show that Money supply and Indian Inflation are the key factors determining the inflation of Nepal. The lagged values of the public debt and CPI are also insignificant in terms of influencing the price level.

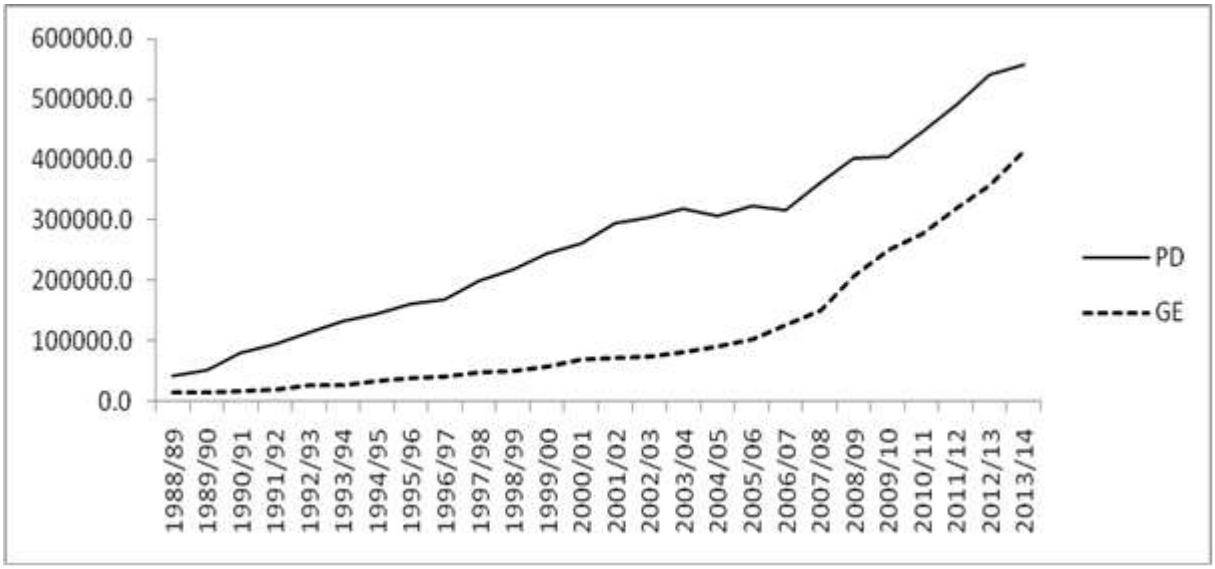
Fig 3: Residual Plot of NCPI



Source: Author's Calculation

The above table indicates that Indian Inflation and Money Supply plays significant role in determining the inflation rate in Nepal. From the above table, it is evident that if Indian inflation increases by 0.54 percentage points, Nepalese inflation will increase by one percentage point. Similarly, if money supply increases by 0.21 percentage points, Inflation rate increases by 1 percentage points.

Fig 4: Public debt and Government expenditure of Nepal



Source: Author's Calculation

Because of the instable political environment after 1990, it is seen that the government expenditure is less than the public debt taken by the central government. From the above figure, it is evident that there has been an increasing gap between public debt and government expenditure during 1991 to 2005 which shows that the debt taken arenot utilized in the capital expenditure. There is less usage of the public debt in the developmental activities and only used for debt repayment of foreign loans, which does not increase money supply at the domestic front.

Similarly, such debt are in decreasing trend after Nepal Rastra Bank had restricted overdraft limitations to Government Public Debt which reduces the amount of public debt in terms of overdraft reducing the money supply in an economy. So it shows that for Nepal there is no significant relationship between Public debt and inflation in Nepal.

5. Conclusion

The study concludes that there is no significant relationship between inflation and public debt that is for Nepal public debt is not causing inflation in Nepal. Because the budget allocated for developmental expenditure could not be expensed properly, the money supply had not increased, purchasing power of the people also remained constant constraining their demand. So, demand pull inflation could not occur, which ceases the possibilities of increasing inflation in an economy. Again, the surplus budget are used for the repayment of the foreign loans from different sources which also lacks the money supply in domestic economy affecting the aggregate demand which in turn helped in stable price level.

Public Debt as such is issued by central bank as the monetary policy instrument for reducing money supply that is for absorbing money supply from an economy which actually used to reduce inflation in Nepal. So, it can be concluded that public debt in Nepal is favoring the price stability and government can take public loan as per its need, taking into consideration of its limit. As in the above table, public debt and inflation are negatively related to each other reflecting inflation would reduce if government takes public debt. Therefore, it can be concluded that fiscal policy and monetary policy are interrelated to each other. The policy variables used for stabilizing price level is also affected by the policy variables of fiscal policy. So they should be prepared in coordination considering the economic situation of the country.

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Paper No. 34

The Determinants of Non-Performing Loan in Nepalese Commercial Banks

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Abstract

The non-performing loans (NPL) of financial institutions are considered as a significant issue in the context of Nepal for last few decades. The immediate consequence of large amount of NPLs in the banking system is bank failure. Non-performing loans are one of the main reasons that cause insolvency of the financial institutions and ultimately hurt the whole economy. Finding the factors affecting NPL covering both micro (banks specific) and macroeconomic variables may help to reduce the NPL and improve the profitability of each commercial banks and may also help for improvement of the economy as a whole.

In this context, the paper aims to identify the impact of macroeconomic variables (GDP, Inflation, and Real Effective Exchange Rate) and bank specific variables (size, change in loan, real lending rate of interest, and share of loan to total assets) on the non-performing loan of the commercial banks in Nepal.

The study is conducted mainly with secondary data. The data are collected for 26 commercial banks covering the period of 2002-2012 with 227 observations. It followed both qualitative and quantitative approach to analyze the findings of the study.

It is found that the government owned banks have the highest non-performing loan in all the years, while the standard chartered bank has the lowest non-performing loan. However, newly established banks also have low non-performing loan. In terms of size, the government owned banks occupy the largest share, while the share is low in the newly established banks like Citizens bank, Grand bank and Kist bank.

Macroeconomic variable such as the real effective exchange rate has significant negative impact on non-performing loan which is inconsistent with the findings of previous studies. The impact of GDP growth rate is found to be insignificant in this study. One year lagged inflation rate has significant positive impact on non-performing loan. The banks which charge relatively higher real interest rate have higher non-performing loan, which is consistent with the findings of previous studies. If the bank is government owned bank, the non-performing loan would be higher than that of the private owned banks since ownership dummy has positive coefficient and significant at one percent level. As well, more lending in the previous years and current year reduces the non-performing loan since the coefficient of change in loan in current and previous years have negative coefficient and significant at one percent level.

Key Words: *Non-performing loan, Commercial banks, Inflation, Gross Domestic Product, Size, Assets*

1. Background

Financial institution is an institution which collects funds from the public and places them in financial assets, such as deposits, loans, and bonds, rather than tangible property. To be specific, bank is a financial intermediary accepting deposits and granting loans that offers the widest menu

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of services of any financial institution. The various functions of banks are carrying out currency exchanges, discounting commercial notes and making business loans, offering deposits services(saving deposits), safekeeping of valuables, supporting government activities like credit, granting consumer loans, financial advising, cash management, and offering equipment leasing (Rose & Hudgins, 2010).

It is observed that the bank credit depends upon the activity. As economy grows bank credit accelerates, while the slow growth of the economic activity or the decline in economic activity results decline in bank credit. Hence, it is widely accepted that bank credit exhibits pro-cyclicality (Dash & Kabra, 2010). The pro-cyclical trend of the bank credit can be explained with the help of many factors. The supplier of the credit (bankers) may feel high credit risk during the slowdown of the economy and may provide fewer score. While during expansionary situation, the banks may evaluate credit with high score and may find less risky and there will be higher expansion of credit.

Macroeconomic theory tells us that expansionary situation creates optimistic environment and recession or declining phase may generate pessimistic environment in the business (Mankiw, 2011). Hence, business people will demand more credit for their investment activities during the expansionary phase of the economy, while they may be reluctant to invest and reduce the demand of credit during contractionary phase of the economy (Dash and Kabra, 2010).

Financial institutions are very important in the economic growth of the economy as they help to make easy credit flow and enhance economic activity with increasing investment in productive sectors of the economy (Richard, 2011). Sound financial sector is more important for the economic growth of any country (Rajaraman & Visishtha, 2002). Commercial banks are the major source of credit for business firms and households in many countries (Rose, 1997). Better performance of these financial institutions play a significant role for the economic prosperity of any country and poor performance of these institutions result the slowdown of economic growth and affects badly to the region of the world. Since "the NPA of banks is an important criterion to assess the financial health of banking sector" (Ahmed, 2010), an identification of the potential problem and close monitoring is a paramount importance for the better performance of this sector. Banking crisis exists in the country if the non-performing assets (NPAs) touch 10 percent of GDP. The loss of income from NPAs not only brings down the level of income of the banks but also hinders them from quoting better lending rates (Khan and Bishnoi, 2001).

Studies also found that an increase in the riskiness of loan assets is rooted in the bank's lending policy adductive to relatively unselectively and inadequate assessment of sectoral prospects (Sergio, 1996). Banking business is exposed to various risks such as credit risk, liquidity risk, interest risk, market risk, operational risk, and management risk. However, credit risk stands out as the most detrimental all of them Iyer, 1999). The risk of erosion in asset value due to simple default or non-payment of interest and principal of dues by the borrowers is credit or default risk (Sharma, 1996).

Rapid credit growth, which was associated with lower credit standards contributed to higher loan losses in certain states in the USA (Keeton, 1999). Studies in Argentinean banking system found that non-performing loans (NPLs) are affected by both bank specific factors and macroeconomic factors (Bercoff et al., 2002). Studies found that the real growth in GDP, rapid credit expansion, bank size, capital ratio, and market power were found as explanatory variables for non-performing loans in Spanish commercial and saving banks (Salas & Saurina, 2002). Similarly, Jimerrez & Saurina (2006), by examining the Spanish banking sector, provide evidence that non-performing loans are determined by GDP growth rate, real interest rate, and lenient credit terms. This study further shows that lenient credit terms result the herd behavior and agency problem that may entice bank managers to lend excessively during boom periods. It has also been viewed that bank's lending policy could have crucial influence on non-performing loans (Reddy, 2004).

An effective risk management is central to good banking, and the tradeoff between risk and return is one of the prime concerns of any investment decision whether long term or short term and effective credit risk management allows a bank to reduce risks and potential NPAs. Once a bank understands their risks and costs, they will be determining their most profitable business, and thus price their products according to the risk. Therefore, the bank must have an explicit credit risk strategy and support by organizational changes, risk management technique and fresh credit process and systems. The NPL of financial institutions are considered as a significant issue in the context of Nepal for last few decades. The immediate consequence of large amount of NPLs in the banking system is bank failure. Many empirical studies on the cause of bank failures find that asset quality is a statistically significant predictor of insolvency and that failing banking institutions always have high level of non-performing loans prior to failure (Barr and Siems, 1994).

There is no standard form to define non-performing loans globally. Variation may exist in terms of the classification system, the scope, and contents as per country. As a regulatory financial institution of Nepal, the central bank i.e. Nepal Rastra Bank has classified the loan basically into the pass loan, sub-standard loan, doubtful loan, and loss or bad loan. Pass loan is that type of loan whose interest or principal payments are less than three months in arrears. Sub-standard loans whose interest or principal payments are longer than three months in arrears of lending conditions are eased. Doubtful is liquidation of outstanding debts appears doubtful and the accounts suggest that there will be a loss, the exact amount of which cannot be determined. Loss loans are regarded as not collectable, usually loans to firms which applied for legal resolution and protection under bankruptcy laws. Pass loans are under the category of performing loans, whereas sub-standard loan, doubtful loan, and loss loan are under the non-performing loans (Consolidated Directives of NRB, 2013).

Considering these facts, it is necessary to control non-performing loans for the economic growth in the country, otherwise, the resources can be jammed in unprofitable projects and sectors which not only damages the financial stability but also the economic growth. In order to control the non-performing loans, it is necessary to understand the root causes of these non-performing loans in the particular financial sector (Rajaraman and Visishtha, 2002). If we look into the causes of Great Recession 2007-2009 which damaged not only an economy of USA but also economies of many countries of the world, studies find that non-performing loans were one of the main cause of this recession (Richard, 2011).

Exploring the determinants of an ex-post credit risk is an issue of substantial importance for regulatory authorities concerned with financial stability and for banks' management. The ex-post credit risk takes the form of NPLs. Reinhart and Rogoff (2010) point out that those NPLs can be used to mark the onset of a banking crisis. In most of the past studies, that investigate the determinants of NPLs, either macroeconomic or bank-specific determinants (but not both) are used as explanatory variables (Louzis et al., 2012). Rinaldi et al., (2006) analyze household NPLs for a panel of European countries and provide empirical evidence that disposable income, unemployment, and monetary conditions have a strong impact on NPLs. Berge and Boye (2007) find that problem loans are highly sensitive to the real interest rates and unemployment for the Nordic banking system over the period 1993–2005. Boss et al. (2009) examine the coupling of credit risk of the main Austrian corporate sectors with the business cycle. Segoviano et al., (2006) focus on the macroeconomic variables to understand the determinants of non-performing loan.

Previous literatures also analyzes the effect of bank specific characteristics on non-performing loan. Berger and DeYoung (1997) draw attention to the links between bank-specific characteristics and focus on efficiency indicators and problem loans. Specifically, this study formulate possible mechanisms, namely 'bad luck', 'bad management', 'skimping', and 'moral hazard', relating efficiency and capital adequacy. They test the derived hypotheses for a sample of US commercial

banks spanning the period from 1985 to 1994 and conclude that, decreases in measured cost efficiency generally lead to an increased future problem loans.

The success of commercial banks depends on profitability. Loan is the major component of earning assets of commercial banks. However, the profitability will be more if the bank have less non-performing loan. On the other hand, if the non-performing loan is high, the banks may not be able reap profit. Instead, they may be in loss because the banks need to put reserves for the amount of non-performing loans (Farhan et al., 2012). The three letters NPA strike terror in banking sector and business circle today. The dreaded NPA rule says simply this: when interest or other due to a bank remains unpaid for more than 90 days, the entire bank loan automatically turns a non performing asset (Barth et al., 2004). The recovery of loan has always been problem for banks and financial institution (Goyal & Kaur, 2011). Borio and Lowes (2002) estimate that the output loss due to banking crisis was about two digit percentage of GDP. Downturn of national economy, insider lending, political connection of bank owners, failure of disclosure of vital information by customers, and lack of proper skills of the banking staff are found as some of reasons of an increase in non-performing loans in and banks by different studies (Wareru & Kalani, 2009; Richard, 2011).

In Nepal, commercial banks have a mushrooming growth in the last two decades. The number of commercial bank have risen to 31 at present with 1425 branches and it occupies a share of about 77 % of the total asset/liabilities of banks and financial institutions in Nepal (NRB, 2012). Nepal is also facing banking crisis and some of the bank and financial institutions have already failed during last few years and are in the process of liquidation (Sapkota, 2011). Studies show that the failure of banks in Nepal was also the result of the high non-performing assets, lending without differentiating markets, products and borrowers' credit worthiness, and excessive loan exposure to real estate (Sapkota, 2011).

The amount of non-performing loan is one of the indicators of its performance. Less the NPL, better the financial health of the economy. If the non –performing loan is more, there will be poor financial health and crisis may result in the economy. In the past before 2001, Nepal bank limited and RBBL nearly collapsed .The main reason behind it was the non-performing loan in a larger chunk of over fifty percent. To deal with this, NRB with the support of IMF and World Bank adopted a reform program (Ahikary et al., 2007).

2. Previous studies

There are few studies in India and in Europe which analyze the sensitivity of non-performing loans to macroeconomic and bank specific factors (Das & Kabra, 2010, Beck et al., 2011; and Louzis et al., 2012). The study of Dash & Kabra (2010) employs panel data set of six commercial banks of India covering 10 years (1998/99 -2008/09). It includes macroeconomic variables like inflation rate, real effective exchange rate, and annual growth rate of Gross Domestic Product (GDP) as the explanatory variables to effect non-performing loan in India. The study found that the real effective exchange rate had a strong positive impact on the level of non-performing loans and growth in real GDP had inverse relationship with non-performing loan. However, the size of the bank and inflation are not important determinants of NPL in the Indian commercial banking system (Dash &Kabra, 2010).

Similarly, Louzis et al., (2012) analyzed the macroeconomic and bank specific determinants of non-performing loans in the banking sector of Greece using quarterly data of 2003-2009. In this study, the macroeconomic variables, specifically the real GDP growth rate, the unemployment rate, the lending rates, and public debt were considered as the explanatory variables to effect on the level

of NPLs. In case of banks specific variables, performance (measured by ROE), efficiency (measured by the ratio of operating expenses and operating income), and category of loan were the major explanatory variables to effect non-performing loan.

On the other hand, Beck et al. (2011) reviewed the trends in the credit quality of banks' loan books over the past decade, measured by non-performing loans, based on an econometric analysis for a panel of 80 countries. This study considered the main explanatory variables as real GDP growth rate, Real Effective Exchange rate, and equity prices.

In Nepal, there are not any scientific study regarding the impact of macroeconomic and banks specific variables on non-performing loan. Some studies aimed to evaluate the financial sector reforms adopted after 1990 (Bhetuwal, 2005). Since this reform has its objective to reduce the pile of non-performing loan by prudent loan appraisal and improved monitoring mechanism, it may have some importance for the reduction of non-performing loan in Nepal. Study shows that lack of ability of the bankers to properly assess the impact of economic indicators on the growth and sustainability of the business, lack of proper knowledge among the bankers for the evaluation of project idea and management of the project, and incompetence to properly assess the exit modality as and when necessary were the main internal factors contributing for non-performing loan.

During past few decades, many banks both in developed, emerging and developing economies face difficult situation and problems in performance. Such bank failure and financial distress have affected many banks and some of which have closed down by the regulatory authorities (Richard, 2011).

Nepal is also facing banking crisis and some of the bank and financial institutions have already failed during last few years and are in the process of liquidation (Sapkota, 2011). Studies show that the failure of banks in Nepal was also the result of the high non-performing assets due to the result of lending without differentiating markets, products, and borrowers' credit worthiness and excessive loan exposure to real estate (Sapkota, 2011).

There is about NRs. 16,325 million NPL within the commercial banks of Nepal (NRB, 2012). Though this is about 3 % of the total loan, it varies among the banks from 0.6 % to about 7.27 %. The share of non-performing loan to total loan is high (above 5%) in case of government owned banks than the private sector banks. Hence, this study aims to find out the macroeconomic (GDP growth rate, Inflation rate & real effective exchange rate) and banks specific determinants (size, loan to asset ratio, total assets, ownership dummy, real interest rate) of non-performing Loans in commercial Banks of Nepal.

3. Methodology

The study is mainly based on the secondary information. The secondary information is collected from almost all the commercial banks that have the data on non-performing loan is available. Hence, the secondary data is gathered for 26 out of 32 commercial banks of Nepal. Remaining banks are new and the information on the non-performing loan is not yet available for the study period. The data for the said banks are collected and analyzed for the period of 2002/3 to 2011/12. The secondary information is collected from the published documents of the commercial banks and Nepal Rastra Bank. The data from Quarterly Economic Bulletin and Banking and Financial Statistics published by Nepal Rastra Bank and the Economic Survey published by Ministry of Finance, Government of Nepal are utilized for the purpose of the study. The information is also collected from the balance sheet and annual reports of selected commercial banks and used for purpose of the study.

Following the model adapted by Dash and Kabra (2010) the study is conducted with the following econometric model.

Econometric Model: Relationship between Non-Performing Loan and Macroeconomic & Bank Specific Variables.

This model is based on the literature by Dash & Kabra (2010). The data for this analysis is collected from the secondary sources and is analysed on the basis of the following function and equation.

> Non-Performing Loan = f(SIZE, natural logarithm of ratio of loan to assets, change in Loans in the current year, change in loan in the previous year, real interest rate in the current year, real interest rate in the previous year, annual inflation rate of current and previous year, growth rate of GDP in the current and previous year, real effective exchange rate in the current and previous year, ownership dummy)

The following equation can be developed, from the above function for the estimation of the coefficient of variables.

$$\ln NPLA_{it} = \beta_{0i} + \beta_1 \ln LA_{it} + \beta_2 SIZE_{it} + \beta_3 \Delta LOANS_{it} + \beta_4 \Delta LOANS_{it-1} + \beta_5 RIR_{it} + \beta_6 RIR_{it-1} + \beta_7 \ln INF_t + \beta_8 \ln INF_{t-1} + \beta_9 \Delta GDP_{rt} + \beta_{10} \Delta GDP_{rt-1} + \beta_{11} \ln REER_t +$$

$$\beta_{12} \ln REER_{t-1} + \text{Ownership dummy} + \varepsilon_{it}$$

$$i = 1,\ldots N,\ t = 1,\ldots T$$

Where, $\varepsilon_{it} \sim N||D(0, \sigma^2)$

where: $lnNPL\_A_{it}$ and $lnNPL\_A_{it-1}$ represent the natural logs of the ratio of NPLs to total loans for bank *i* inyear *t* and *t-1*; ΔGDP_{rt} and ΔGDP_{rt-1} represent the annual growths in real GDP at time *t* and *t-1*respectively; RIR_{it} and RIR_{it-1} denote the real interest rates measured as the difference between the weighted average lending rate and the annual inflation rate) at time *t* and *t-1*; $lnREER_t$ and $lnREER_{t-1}$ indicates the natural log of the real effective exchange rate at time *t* and *t-1*; $lnINF_t$ and $lnINF_{t-1}$ indicate the natural logs of the annual inflation rate at time *t* and *t-1*; $SIZE_{it}$ is the ratio of the relative market share of each bank's assets that capture the size of the institution at time *t*; $lnL\ A_{it}$ is the natural log of the loans to total asset ratio for bank *i* in year *t;* $\Delta LOANS_{it}$, $\Delta LOANS_{it-1}$ represent the growth in loans for bank *i* in year *t, and t-1* respectively; and ε_{it} is the error term. Some of the variables will be converted into natural logs. Similarly the impact of explanatory variables may be found after a year lag. Hence, most of the variables are used in lags.

The data on bank wise NPL is available only from Mid-July 2003. Hence the present study covers the 10 year i.e. Mid-July 2003 to Mid-July 2012 in most of the banks' data.

The Table 1 shows the detail of the variables used in Model I.

Table 1

Definition of Variables, Expected Sign and Possible Reasons for Model I

Factor Context	Variable Name	Calculation	Expected Impact	Reasons
Dependent Variable	$NPLA_{it}$	NPL_{it}/total loans		
Explanatory Variables				
$L A_{i,t}$	$Loans_{it}/Assets_{it}$		+ve	Higher the share of loan to total assets, higher will be the possibility of NPL.
$Size_{it}$ (relative market share of Bank I at time t.)	$Asset_{it}/\sum Asset_{it}$		Ambiguous	Larger the size of the bank, better the risk management strategies and superior loan portfolio. On the other hand, there is also possibility that larger banks have more lending and may have more NPL.
ΔGDP_{rt} (The annual growth rate in real GDP at time t)	$(GDP_t - GDP_{t-1})/GDP_{t-1}$		-ve	Higher growth in GDP indicates better performance of the economy and business. Hence, there will be better repayment and low NPL
RIR_{it} (Real Interest Rate of bank I at time t)	Weighted average lending rate of bank i at time t –annual inflation rate at time t		+ve	Higher the real interest rate, higher will be the cost of borrowing to business and higher will be the NPL
INF_t (Inflation at time t)	$(CPI_t - CPI_{t-1})/CPI_{t-1}$		+ve	Higher the inflation rate , higher will be the cost of the business, which ultimately may result less return from the business and low capacity to repay loan and higher will be the NPL.
$REER_t$ (real effective exchange rate)	Real exchange rate with IC * trade share with India + Real exchange rate with US $ * trade share with rest of the world		+ve	Normally, higher exchange rate may result in higher imports and less exports and low performance of the national business and higher NPL.

Factor Context	Variable Name	Calculation	Expected Impact	Reasons
Δ $Loans_{it}$	$Loans_{it}$-$Loans_{it-1}$/$Loans_{it-1}$		Ambiguous	Excessive lending may result in more NPL.On the other hand, more additional lending may help productive outcome and may help to reduce NPL.
Ownership Dummy	Government owned bank=1,otherwise 0		+ve	Government owned banks have more NPL than other banks

4. Findings

Impact of macroeconomic & bank specific variables

The major macroeconomic variables that affect the non-performing loan are the inflation rate, growth rate of GDP, Real Effective Exchange Rate and the bank specific variables are size of the bank, change in loan, lending rate etc. Three models are developed to understand the impact of macroeconomic and bank specific variables on non performing loan.

Table 2

Descriptive statistics of macroeconomic and bank specific variables

Variables	Mean	Std. Deviation	N
Ratio of NPL to total Loan	6.63	11.45	227
Annual growth rate of real GDP	3.93	1.11	227
Weighted average lending rate	8.96	2.41	227
Rate of change in Loan	23.19	29.93	202
Asset of individual bank/total asset of commercial banks	4.63	4.55	227
Ownership dummy	.13	.34	227
REER	116.8	10.5	227
Inflation rate	7.7	2.81	227
Ratio of loan to total assets	58.5	15.0	227
RIR	1.26	2.87	227
Natural log of NPL_A	.93	1.48	216

Variables	Mean	Std. Deviation	N
Natural log of L_A	4.02	.34	227
Natural log of inflation	1.97	0.40	227
Natural log of REER	4.76	.09	227
Lagged Rate of change in loan	25.2	30.49	175
Lagged real interest rate	1.14	2.98	201
Lagged natural logarithm of Inflation	1.93	0.41	201
Lagged natural logarithm of REER	4.75	.09	201
Lagged real growth rate of GDP	3.85	1.15	201
Non-Performing Loan	1103.2	2578.70	227
Loan amount	13964	10066.47	227
Asset of the bank	26931	22318.82	227

Source: Researcher's Calculation based on NRB, 2012 and Annual Reports of Related Banks

Similarly, in the second model only lagged variables are used for the regression analysis. The third model is developed by dropping all the lagged variables.

The descriptive statistic of the variables used in all of the four models is presented in Table 1. Table 1 shows that the total number of observations is 227 for the variables. However, for the lagged and natural logarithm variables the number of observations is decreased. The mean value of NPL to total loan (dependent variable) is 6.63. Similarly, the mean value of ratio of loan to total assets is 58.51. Similarly, the variable, size has the average value of 4.63.The mean value of weighted real interest rate is 1.25, and weighted average lending rate is 8.96. The mean value of GDP growth rate, REER, and inflation rate are 3.93, 116.7 and 7.7 respectively. The mean and standard deviation of other variables along with their number of observations are shown in table2

Regression result of the impact of macroeconomic and bank specific variables on non-performing loan.

$$lnNPLA_{it} = \beta_{0i} + \beta_1 lnLA_{it} + \beta_2 SIZE_{it} + \beta_3 \Delta LOANS_{it} + \beta_4 \Delta LOANS_{it-1} + \beta_5 RIR_{it} + \beta_6 RIR_{it-1} + \beta_7 lnINF_t + \beta_8 lnINF_{t-1} + \beta_9 \Delta GDP_{rt} + \beta_{10} \Delta GDP_{rt-1} + \beta_{11} lnREER_t +$$

$$\beta_{12} lnREER_{t-1} + \text{Ownership dummy} + \varepsilon_{i,t}$$

$i = 1,...N,\ t = 1,...T$

Where, $\varepsilon_{it} \sim N||D(0, \sigma^2)$

Table 3 shows the summary findings of regression results of all three models.

Table 3
Regression Coefficients and its Significance of Variables–Model 1
Dependent Variable: Natural logarithm of Ratio of NPL to total loan

Explanatory variables	**Coefficients**		
	Model I	**Model II**	**Model III**
Constant	21.13	36.135***	45.319
$lnLA_{it}$	2.76***		
$Size_{it}$	-0.024	-0.019	-0.032
$\Delta loan_{it}$	-0.020***		-0.032***
$\Delta loan_{it-1}$	-0.007***	-0.015***	
RIR_{it}	0.023		0.118***
RIR_{it-1}	0.208***	0.185***	
$lnINF_t$	-0.294		-0.116
$lnINF_{t-1}$	0.975	1.171**	
GDP_{rt}	-0.057		0.020
GDP_{rt-1}	-0.033	-0.046	
$lnREER_t$	4.602		-9.093***
$lnREER_{t-1}$	-10.417**	-7.628***	
Ownership dummy	1.454***	1.807***	1.888***
R-squared	0.624	0.528	0.596
Adj. R-squared	0.591	0.506	0.579
F statistics	18.841	23.110	34.679

Source: Regression analysis (with the help of SPSS software) based on the data from Banking and Financial Statistics of NRB and Annual Reports of concerned banks.
** Significance at 5% level

*** Significance at 1 % level

The findings in Table 3 show that in model I, the coefficient of natural logarithm of loan to assets is positively and significantly related with the natural logarithm of ratio of non-performing loan to total assets. This indicates that both move in the same direction i.e. as the loan to asset ratio increases the non-performing loan to total assets.

The coefficient of loan growth rate and lagged loan growth rate are significant at 1 percent level of significance. The sign of the coefficient is negative indicating that more increase in loan results in the decrease in NPL. Hence, to reduce the non-performing loan, the growth of loan must be higher in the previous year and current year. It may be because additional loan may have productive outcome and may have caused decrease in NPL. The major amount of NPL lies with the government owned banks due to the ineffective management of 80's and 90's. Hence, the recent lending of last10 years may have a positive impact as these banks adopted the banking sector reform programs with the support of World Bank and International Monetary Fund. Similarly, these banks have made a policy shift in lending and monitoring mechanism. All these reforms on lending may have positive impact on non-performing loan. Hence, it is found that the change in loan during the current year and previous year both have negative impact on NPL i.e. an increase in loan may result the decrease in NPL.

There is also a provision of renewal and restructuring the loan by which bank will convert the non-performing loan as performing loan with a fresh loan. Hence, the changes in loan in the current year and previous year have negative and significant impact on NPL. This finding is consistent with our hypothesis and the findings of previous studies (Dash & Kabra, 2010).

Similarly, the lagged real interest rate has positive impact on non-performing loan and is significant at 1 percent level of significance, which is consistent with prior study. This indicates that higher interest rate increases the non-performing loan.

The coefficient of natural logarithm of lagged real effective exchange rate is negative and significant at 5 % level of significance. This indicates that increase in lagged real effective exchange rate may decrease in non-performing loan of the commercial banks. These findings are inconsistent with the findings of Dash & Kabra (2010) and may be due to the reason that the exchange rate with IC is pegged and the trade share with India is highest and the lagged REER may have positive impact on performance of borrowers and might have caused reduction in non-performing loan.

The ownership dummy has positive and significant impact on the non-performing loan. The dummy was taken whether the bank is government owned or not. The table 3 shows that it has a coefficient of 1.454 which indicates that if the bank is government owned, it will cause 145.4% increase in non-performing loan. These findings are consistent with the findings of Ahmed (2008).

The Table 3 also shows that there exist a positive and significant relationship between real interest rate and the non-performing loan of commercial banks of Nepal (Modle III). Increase in real interest rate (RIR) result the increase in cost of fund which leads to the decrease in repayment capacity of loan. Thus, the non-performing loan also increases with the increase in real interest rate. This finding is consistent with our hypothesis and theory.

The macroeconomic variable like growth rate of GDP has no significant impact on the non-performing loan. These findings are inconsistent with the findings of Dash & Kabra (2010). In Nepal, the single largest share of GDP comes from the agriculture sector and the performance of the agriculture sector basically depends on monsoon. If the monsoon is good, the performance of the agriculture sector will be better and the GDP growth rate will be high. On the contrary, if there is poor monsoon, the performance of the agriculture sector will be poor and the GDP growth rate will be low. Commercial banks of Nepal lend very insignificant amount in agriculture sector and hence, the performance of GDP may not have any significant effect on the non-performing loan.

Inflation in Nepal is mostly affected by the inflation in India. The study shows that Nepal's inflation is influenced by the inflation in India (NRB, 2011) and hence, its impact on the repayment of the borrowers of the commercial banks will be insignificant and the impact on non-performing loan may be insignificant. The finding is consistent with the findings of Dash & Kabra (2010).

The value of R^2 is 0.624. Here, the adjusted R square is 0.591 which shows that the 59.1% of the variation in non- performing loan is explained by the independent variables. The F-test is a measure of the overall significance of the estimated regression. Here, the value of F-statistics is 18.841 and is significant at 1% level of significance. Hence, the overall model is significant (Model I). In the remaining two models the value of R^2, adjusted R^2 and the F statistics are not much difference.

5. Conclusion

The study shows that the non-performing loan increases with the increase in the real lending rate and one year lagged inflation rate. However, the real effective exchange rate is negatively and significantly related to non-performing loan. Similarly, both growth rate of loan of the current year and the growth rate of loan of the previous year have negative impact on non-performing loan of the commercial banks. Similarly, increase in loan to asset ratio decreases the non-performing loan significantly. The non-performing loan increases if the bank is a government owned bank. However, the macroeconomic variable like the growth rate of GDP has no significant impact on non-performing loan.

Thus, the study concluded that major macroeconomic variables that affect the non-performing loan of the commercial banks of Nepal are real effective exchange rate and lagged inflation rate. Similarly, the major bank specific variables that affect the non-performing loan of the commercial banks of Nepal are the change in loan of the current and previous year, loan to asset ratio, real interest rate for lending, and ownership pattern of the bank.

The findings can be summarized in the following points..

1. Macroeconomic variables such as the real effective exchange rate have significantly negative impact on non-performing loan which is not consistent with the findings of previous studies of Dash & Kabra (2010) in case of Indian commercial banks.
2. The impact of GDP growth rate is found to be insignificant in this study which is in contrast with the findings of Dash & Kabra (2010) in case of Indian Commercial banks.
3. One year lagged inflation rate has significantly positive impact on non-performing loan (Model 2) which is in contrast with the findings of Dash & Kabra (2010) in case of Indian Banking system.
4. The bank which charges relatively higher real interest rate have higher non-performing loan, which is consistent with the findings of previous studies.
5. Similarly the change in loan rate of the previous year has significantly negative impact on non-performing loan. As there is higher increase in loan of the previous year, non-performing loan will decrease significantly.
6. If the bank is a government owned bank ,the non-performing loan would be higher than that of the private owned banks.

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Paper No. 35

Trade-offs between Real Economic Activity and Bank Profitability for Implementing New Regulatory Standards: South Asian Perspective

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Abstract

To ensure financial stability and more resilient banks, new capital requirements are introduced through Basel accords along with a strengthened common equity buffer. These tighter capital requirements are expected to have negative effects on the level of long run steady-state output but also an estimated positive benefit by reducing the probability of banking crises and the associated banking losses, thus, inducing their profitability. In our paper, we want to focus on the long run effects on GDP and bank profitability in South Asia due to changes in banking regulation particularly through stronger capital requirements.

JEL Classification: E52 (Monetary Policy), E58 (Central Banks and Their policies)

Keywords: Trade-offs, Basel III, Multivariate Logit Model, Capital Adequacy Ratio, Liquidity 3

1. Introduction

The banking industry of South Asia1 generally proved its resilience during the Global Financial Crisis of 2007-2008. This development was achieved due to the implementation of stringent regulatory and supervisory standards within a stable, sounder and more flexible macroeconomic management framework over the past decade. Stringent capital ratios are expected to reduce the probability of systematic banking crises and smaller output volatility, thereby, leading to welfare gains. On the other hand, these tighter capital requirements are passed through an increased lending rate as the banks shift the burden to their customers. This in turn reduces consumption - investment and finally the growth rate of real economy through 'Bank Lending Channel'. South Asian countries are making stronger efforts in line with BASEL reforms. Afghanistan, Bhutan, and Maldives have not yet implemented Basel II, but they are compliant with Basel I (Sophastienphong & Kulathunga, 2010; Financial Stabilty Institute, 2012). Bangladesh, India, Nepal, Pakistan, and Sri Lanka have already embraced various stages of Basel II. Some of these countries have even started working to implement BASEL III in coming years. These new macro and micro prudential regulations are helping these countries to address the issue of financial stability through improved

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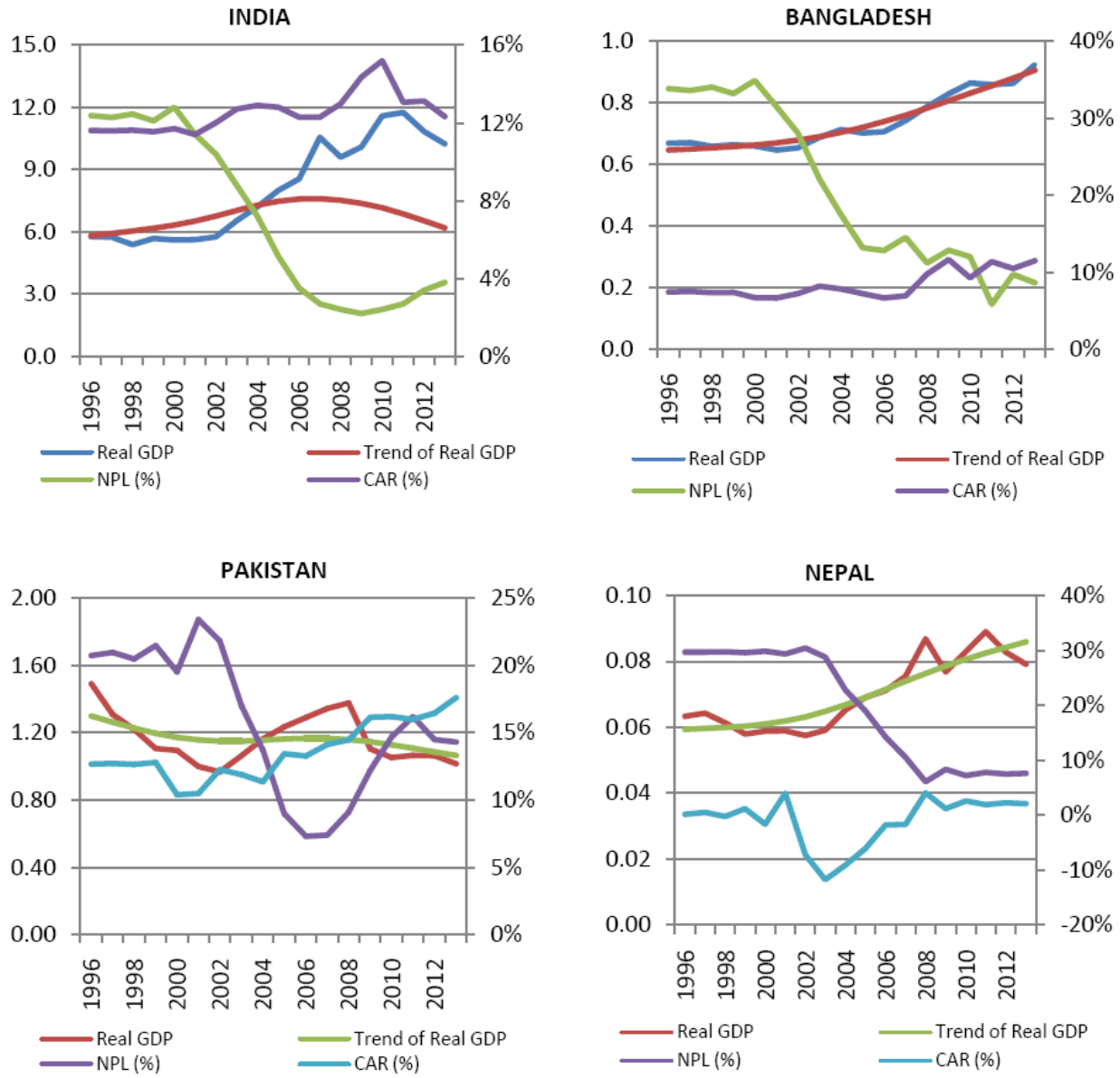
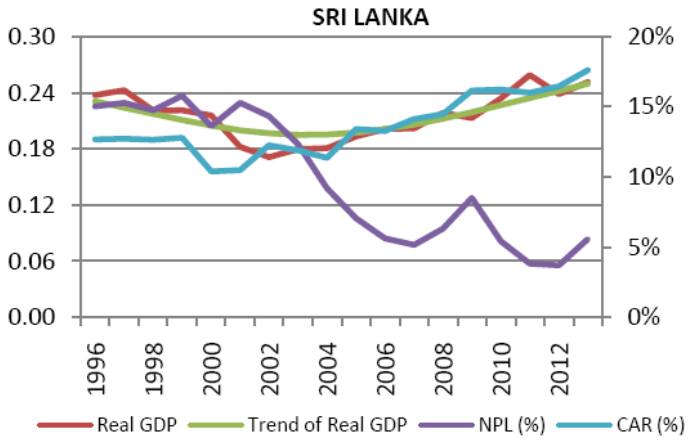
management of risk and supervision. But the relevant costs of rising lending rate should also be taken under consideration in determining the net welfare gain of these accords. Therefore in spelling out a strategy to move with BASEL III, it is important to assess the implications of regulatory reforms on the economic performance of these countries.

We have showed the real GDP, trend of real GDP, capital adequacy ratio and nonperforming loans for India, Bangladesh, Pakistan, Nepal and Sri Lanka from 1996 to 2013 in Graph 1

Graph 1: Real GDP and Trend (Billion, USD), Non Performing Loan (NPL) and Capital Adequacy Ratio (CAR)





Source: Compiled by authors from GFSR (2014); CBW; GFSA (2010) and WDI Database (2014) 5

The graphs for each country show strong negative association between capital adequacy ratio and nonperforming loans. The correlation coefficients between the two variables in Bangladesh, India, Nepal, Pakistan and Sri Lanka are - 0.68, - 0.75, - 0.40, - 0.42 and - 0.74 respectively while for the whole panel data set it becomes - 0.51. These results provide some evidence that tighter capital requirements might contribute to the resilience of South Asian banking industry through lowering the ratio of nonperforming loans. Moreover, from the total 85 of our observations, the nonperforming loan exceeded above 10 percent in 51 cases and 36 cases out of them are accompanied with a fall in real GDP from its trend level. It implies that the problems in banks might have been associated with the fall in real GDP. Therefore an output gain can be achieved with tighter capital requirements which reduce the cases of systematic banking crises. Conversely, rises in capital requirement also contribute to the rise in lending rate (our panel data set gives a correlation coefficient + 0.33) which in turn influences real GDP inversely.

In this paper we specifically focus on the net economic benefits of higher capital levels. By using a series of models, the benefits and costs of increasing the capital requirements are estimated and a net welfare gain is found. The paper is organized in the following way. It starts with reviewing the existing literature on the economic benefits and costs of implementing tighter regulatory standards particularly coming through Basel accords. This is followed by Section 3 which captures the estimation of the economic benefits of tightened capital ratios. The next section estimates the economic costs of tightened capital ratios due to a rise in lending rate. Section 5 calculates the net benefits of the new regulation through comparing the results of Section 3 and Section 4. The final section includes the conclusions and policy implications.

2. Literature review

The economic benefits of stringent capital and liquidity regulations are mainly reflected in the literature through a more robust banking sector which is less prone to crises while the costs are reflected through a reduction in output. Existing literature on the issue can be categorized in three sections: the impact of capital and liquidity requirements on the probability of banking crises occurring (see, Barrell et al., 2009; Kato et al., 2010; Wong et al., 2010; Gauthier et al., 2010; Caggiano & Calice, 2011; Miles et al., 2013 and Yan et al., 2012), expected GDP loss associated with a banking crisis (see, Hutchison & Noy, 2005; Demirgüç-Kunt et al., 2006; Laeven & Valencia, 2010, 2013; Turrini et al., 2011; Furceri & Mourougane, 2012; Furceri & Zdzienicka, 2012 and Kapp & Vega, 2014) and economic costs due to arise in lending cost (see, Basel Committee on Banking Supervision, 2010; Wong et al., 2010; Gambacorta, 2011; Caggiano & Calice, 2011; Turrini et al., 2011 and Miles et al., 2013).

Barrell et al. (2009) and Kato et al. (2010) build reduced form probit models for investigating the statistical relationship of probability of crisis occuring with bank capital and liquidity. Wong et al. (2010) used a cost-benfit analysis approach to assess the impact of tightened capital ratios for Hong Kong. By using a probit model for estimating banking crises and vector error correction models (VECM) for estimating long term output reduction, they concluded that regulatory reforms would bring a net long term gain for Hong Kong economy. The Bank of Canada (2010) did a similar cost-benfit analysis approach for Canadian economy and depicted that the net gain of incresing the bank capital ratio by 2 percentage points will amount to 0.8 percent of GDP. Gambacorta (2011) also used a VECM approach to evaluate the new regulatory standards for the US economy over the period 1994 to 2008. They found that the estimated positive benefit of reforms through reducing the probability of banking crises and associated banking loss overrun the negative effects on the level of output. However, these approaches are subject to Lucas critique for not allowing counterfactual experiments.

Using aggregate and bank-level panel data sets, Hutchison & Noy (2005) and Demirgüç-Kunt et al. (2006) measured the temporary GDP loss. To do that they took the peak point of pre-crisis period growth rate and continued till that growth is retrieved. Laeven & Valencia (2010, 2013) calculated the temporary cumulative GDP loss taking the peak to trough output loss of output through the period of a banking crisis. Furceri & Zdzienicka (2012) calculated the permanent GDP loss using an unbalanced panel of 159 countries over the period 1970 to 2006. They concluded about significant output losses which are relatively higher in richer economies given their higher level of financial deepening and larger current account imbalances.

Turrini et al. (2011) used a dynamic stocastic general equilibrium (DSGE) model with a banking sector and financial frictions to calibrate the changes in spreads, lending and output due to changes in capital and liquidity requirements. The advantage of this model over the VECM analysia is that it allows counterfactual policy experiments in a consistent conceptual framework. Some other studies using DSGE framework are Van den Heuvel (2008) and Meh & Moran (2010). Using US data, Van den Heuvel (2008) found that the welfare cost of current capital adequacy regulation is equivalent to a permanent loss in consumption of between 0.1% and 1%. Meh & Moran (2010) also concluded that bank capital shocks create sizeable declines in output and investment.

Miles et al. (2013) used an assumed probability distribution to estimate the long-run costs and benefits of having banks fund more of their assets with loss-absorbing capital, or equity. They estimated the changes in economic activity described by a production function with constant elasticity of substitution due to a capital effect via an increase in the banks' weighted average cost of capital.

By using a series of models, Basel Committee on Banking Supervision (2010) found that capital and liqudity reforms attain net benefits range from 0.68 percent to 1.90 percent of GDP for advanced economies. Caggiano & Calice (2011) examined the impact of higher capital ratios on the probability of banking crises and aggregate output in a comprehensive panel of African Economies. While they quantified the econommic benfits in terms of lower probability of banking crises using a multivariate logit model, economic costs are quantified in terms of lower economic growth due to higher cost of lending using two-step fixed effect panel data models. They concluded that the stringent regulatory standards might lead to long term net welfare gains to African economies.

There is no other study investigating the macroeconomic impacts of new regulatory capital accords for the South Asian countries as per the best of our knowledge. Our work on the issue, thus, will contribute to fill the gap. In our paper we have mainly tried to focus on the benefits and costs of stringent capital ratios rather than estimate the optimal capital requirement for South Asian economies. The estimation of the model is done using annual data over the period 1996-2013 for

five South Asian countries which are Bangladesh, India, Nepal, Pakistan and Sri Lanka. The other three countries (Afghanistan, Bhutan and Maldives) are excluded for lack of sufficient data.

3. Estimating the economic benefits of tightened capital ratios

a. The impact of capital ratios on the probability of crises occurring

A multivariate panel logit model is used to estimate the impact of tighter capital requirements on bank crises. The model is widely used in the empirical literature on the causes of banking crises since its inception by Demirguc-Kunt & Detragiache (1998). In the model the probability of banking crisis is assumed to be a function of a set of potential explanatory variables. Given the hypothesized functional form, typically linear, the estimated logit gives the estimated probability of crisis. The dependent variable probability of banking crisis (Pi,) is a binary variable which takes a value of 1 if country i is hit by a crisis at time t and 0 otherwise.

$$P_{i,t} = \phi\left(\Upsilon_k Z_{k,t}\right) = \sum_{k=1}^{K} \Upsilon_k Z_{k,t}$$

where Zk,t represents a set of macroeconomic variables including capital adequacy ratio, real interest rate, private sector credit to GDP as well as growth of GDP deflator, GDP, current account balance, terms of trade and credit. The set of the explanatory variables are chosen following other recent works in the subject, particularly Demirgüç-Kunt et al. (2006), Barrell et al. (2009), Wong et al. (2010) and Caggiano & Calice (2011). ϒ be the vector of k parameters to be estimated and ϕ the cumulative probability density function which is assumed here to be logistic. The log-likelihood function of the model that must be maximized is: ln(L)= ni=1

$$\ln(L) = \sum_{i=1}^{n} \sum_{t=1}^{T} \{ P_{i,t} \ln[\phi(\Upsilon' Z_{k,t})] + (1 - P_{i,t} \ln[1 - P_{i,t}]\}$$

We have followed the conventional and widely used definition of banking crises suggested by Demirguc-Kunt & Detragiache (1998), Davis & Karim (2008), Hosni (2014) and Wong et al. (2010). According to them banking crisis occurs when the banking sector's non perfoming loan ratio exceeds 10 percent. We have taken a general-to-specific approach by progressively reducing the general model with including only those explanatory variables that are statistically significant at 1%, 5% and 10% level, as done by Caggiano & Calice (2011) and Yan et al. (2012).

Table 1: Banking Crisis Determinants a

Dependent Variable: Probability of Bank Crises					
Model 5	Model 4	Model 3	Model 2	Model 1	
Capital Adequacy Ratio	-0.798***	-0.759***	-0.948**	-1.153**	-1.168**
GDP Growth	-0.472*	-0.719**	-0.674*	-0.885*	-0.896*
Private Sector Credit to GDP	-0.365***	-0.394***	-0.469***	-0.538***	-0.541***
Real Interest Rate	0.386***	0.400***	0.569**	0.683**	0.717**

Dependent Variable: Probability of Bank Crises					
Model 5	Model 4	Model 3	Model 2	Model 1	
Private Sector Credit Growth	0.065	0.095*	0.165**	0.163*	
GDP Deflator Growth	0.203	0.283	0.292		
Current Account Balance Growth	0.001	0.001			
Terms of Trade Growth	0.023				
McFadden R-squared	0.720	0.734	0.747	0.767	0.768

The estimated result shows that an increase in capital adequacy ratio, GDP growth, private sector credit to GDP reduces the probability of banking crises across all the five models in statistically significant way. We find that high real interest rate and private sector credit growth are positively associated with banking crises across Model 1-5 and Model 1-3 respectively in statistically significant way. Our coefficient of interest is the coefficient attached to capital adequacy ratio 11 which is robustly significant across all the specifications at 5% level (at 1% level in Model 4-5). We can also observe that the origin of banking crisis in South Asia is mainly influenced by real economy indicators (real GDP growth and real interest rate) and banking sector indicators (capital adequacy ratio, private sector credit to GDP and credit growth) while the external sector indicators (terms of trade and current account balance) do not have any statistically significant impact on banking crisis. This result implies that the external factors have limited role to play on the banking industry of South Asia. We can also compute the expected benefit from the estimated model through calculating the marginal effect of a change in the explanatory variable of our interest. To derive the marginal effect of capital adequacy ratio on the probability of crisis the following function is used:

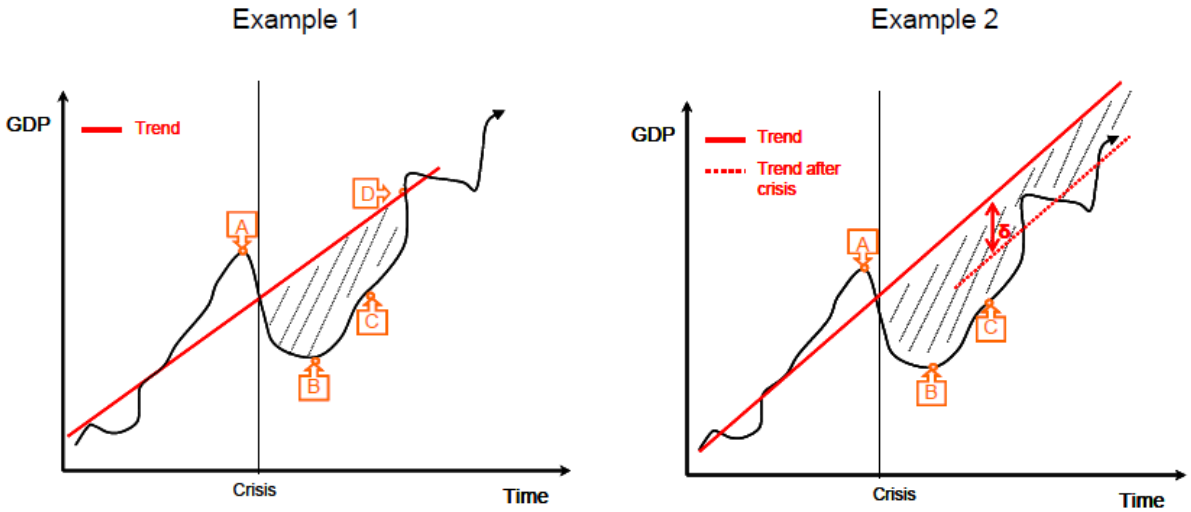
$$\frac{\partial E\,(\text{Probability of Bank Crisis} \mid \text{Capital Adequacy Ratio}, \Upsilon)}{\partial\ \text{Capital Adequacy Ratio}} = f(-\ \text{Capital Adequacy Ratio}'\Upsilon)\Upsilon_{\text{Capital Adequacy Ratio}}$$

where E(Probability of Bank Crisis|.) is the conditional expected value of bank crisis, Υ is the vector of parameters and f(.) is the logistic function. By using the above function we have got a value of 0.18 as the marginal effect of capital adequacy ratio on the probability of banking crises from Model 5. This implies that the likelihood of a crisis would be reduced by 18 basis points if capital adequacy ratio is raised by 1 percentage point.

b. Estimation of the loss in real GDP arising from a bank crisis

When a crisis occurs output falls and it takes time before the output returns back to the old steady state path. Thus the loss of a crisis can be calculated by the discounted cumulative output loss. We have estimated the economic costs in terms of the forgone GDP loss, following Laeven & 12

Valencia (2010, 2013), Basel Committee on Banking Supervision (2010), Caggiano & Calice (2011) and Kapp & Vega (2014). Graph 2: Measuring the costs of crises - a schematic review



Point A: pre-crisis peak. Point B: post-crisis trough. Point C: GDP growth equals trend GDP growth for the first time after the crisis. Point D: the level of GDP returns to the pre-crisis level.

Source: Basel Committee on Banking Supervision (2010)

Graph 2 provides an overview of our approach with two examples: Example 1 (temporary GDP loss which eventually catches pre-crisis path at point D) and Example 2 (permanent GDP loss which remains at a lower path permanently labeled δ). In our analysis, we have not distinguished between permanent and temporary loss as our sample data shows no permanent impact on equilibrium path of GDP due to a banking crisis. GDP losses are calculated taking the cumulative difference between the actual and trend real GDP. Trend real GDP is derived by applying HP filter to the real GDP series.2 This gives median GDP loss of 4.5% of trend real GDP due to a banking crisis in South Asian countries.3 Kapp & Vega (2014) found median losses between 4.9% and 7.15% using the financial crises database of Laeven & Valencia (2010, 2013) across 170 countries from 1970 onwards. Furceri and Mourougane (2009) estimate that financial crises lower potential output by between 1.5% and 2.4% on average for the economies of the Organisation for Economic Cooperation and Development (OECD). However Caggiano & Calice (2011) have got a much higher number of 33% for African countries. This is due to their definition of crises which specify a more severe one rather than only considering the nonperforming loans.

c. The benefits associated with reduced bank crisis

From the results in 2.a and 2.b, we have calculated the macroeconomic benefit of reforms using the following formula:

$$\text{Benefit} = \Delta\text{Probability crisis} * \Delta\text{GDP} = 0.0018 * 0.045 = 0.0081 \text{ percent}$$

The result, thus, implies that an increase in capital adequacy ratio by 1 percentage point causes an output gain of 0.0081 percent of potential GDP.

4. Estimating the economic costs of stronger capital requirements

In this section, we provided the estimation of the costs of stronger capital requirements. The main text and further workings of Basel Committee on Banking Supervision (2010) show that stronger capital requirements will lead to a rise in the cost of lending as the banks will try to pass on the impact on their customers to maintain a similar level of return on equity. This in turn will reduce investment and consumption and thus lower output in the long run. Several approaches are applied in the literature to estimate the associated costs of tightened capital levels which include VECM (see, Wong et al., 2010; Gambacorta, 2011) and DSGE models (see, Van den Heuvel, 2008;

Christiano et al., 2010). As we have a panel data set we are using fixed effect models to estimate the impact of capital buffers on output. We are using two-step approach to quantify the impact. At the first step we are assuming that banks pass through the cost of higher capital requirement to customer through increasing the lending rate, thus, estimating the impact capital ratios on lending rate. The following panel data fixed effect model is used for estimation which also captures unobserved heterogeneity across countries:

$$L_{t,i} = \alpha_i + \lambda_1 CAR_{i,t} + \lambda_2 ROE_{i,t} + \in_{i,t} \quad (1)$$

where L is the lending rate, CAR is the capital adequacy ratio and ROE is the return of equity. Secondly we are assuming that this lending rate which is also the cost of credit has an impact on economic activity through lowering consumption and investment, thus, estimating the impact of lending rate on output growth. At the second step we estimated the impact of lending rate on real output using the following panel data model:

$$Y_{t,i} = \omega_i + \phi\, L_{i,t} + v_{i,t} \quad (2)$$

where Y is the real GDP and L is the lending rate.

Before doing any estimation, we perform several transformations on our data. First, real GDP and lending rate are transformed into their natural logarithm forms. As capital adequacy ratio and return on equity have some negative values, they are not transformed into logarithm. Then the stationarity of the variables are assessed by testing the presence of unit roots in the yearly panel data for the five South Asian countries over the period 1996 to 2013. We use the Im, Pesaran, and Shin (2003) panel unit root test for checking the stationarity of the transformed variables. This panel unit test allows heterogeneous first order coefficients. We know that for a short time series the ADF test is biased towards accepting the hypothesis of unit root presence in the series. Other panel unit root tests like Levin and Chien-Fu Lin (2002) include an identical first order autoregressive term in all the panel series. The results of the Im, Pesaran, and Shin (2003) panel unit root test are reported in the Table 2.

Table 2: Im, Pesaran and Shin (2003) panel unit root tests

	Level: without a trend		Level: with a trend		First Difference	
	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.
Capital Adequacy Ratio	1.607	0.946	0.210	0.583	-2.903	0.001
Return on Equity	-0.316	0.375	0.265	0.604	-2.172	0.014
Real GDP	1.560	0.940	0.266	0.605	-2.470	0.006
Lending Rate	-2.601	0.004	-2.139	0.016		

The null hypothesis is that the variables have a unit root. We include a drift term and conduct the test both with and without a trend. The second and the third column show whether the series have a unit root in level values without a trend and with a trend respectively. The fourth column checks the presence of a unit root in the first difference of those series that have a unit root in their level values. According to the Im, Pesaran, and Shin (2003) test results, for the capital adequacy ratio, return on equity and real GDP; the null hypothesis of unit root could not be rejected in their levels implying they are nonstationary. Given these unit root test results, we transform the

nonstationary series to a stationary process by differencing. The first differences of these variables are indeed stationary at 1% significance level except return on equity which is stationary at 5% level. The remaining variable, lending rate does not display a unit root. Fixed effect panel estimation outputs of estimating Equation 1 and Equation 2 with initial stationary and transformed stationary variables are summarized in Table 3 and Table 4 respectively. Equation 1 is identified as balanced question in the literature where the dependent variable is stationary while some of the explanatory variables are nonstationary Granger (1999). In such case while the explanatory variables have unit roots but the linear combination does not, the set of regressors is said to be co-integrated. We have used White period standard errors to correct for heteroskedasticity.

Table 3: Estimating the impact of capital ratios on lending rate

Dependent Variable: Lending Rate		
Regressors	**Coefficient**	**Robust SE**
Constant	2.437***	0.0004
Capital Adequacy Ratio	0.013***	0.004
Return on Equity	-0.0002***	0.00005
N	85	
Number of groups	5	
R-squared	0.503	
Prob (F-statistic)	0.000	

*Indicates statistical significance at the 10% level
**Indicates statistical significance at the 5% level
***Indicates statistical significance at the 1% level

The estimated result shows that an increase in capital adequacy ratio raises the lending rate at 1% level of significance. Besides capital adequacy ratio, we have also got statistically significant parameters for return on equity. Return on equity has a negative effect on lending rate at 1% level of significance. This is because if returns on equity decreases banks need to increase thelending rate to keep their profitability unchanged, other things remaining the same. Our coefficient of interest is the coefficient attached to capital requirement which is capital adequacy ratio into first differenced. The fixed effects model results suggest that a 1 percentage point increase in capital adequacy ratio will raise the lending rate by 1.3 basis points.

Table 4: Estimating the impact of lending rate on real GDP

Dependent Variable: Real GDP		
Regressors	**Coefficient**	**Robust SE**
Constant	0.220***	0.082
Lending Rate	-0.087**	0.033
N	85	
Number of groups	5	
R-squared	0.123	
Prob (F-statistic)	0.060	

*Indicates statistical significance at the 10% level
**Indicates statistical significance at the 5% level
***Indicates statistical significance at the 1% level

As expected, the estimated result in Table 4 shows that an increase in the lending rate by 1 percentage point reduces the real GDP by 8.6 basis points at 1% level of significance.

In sum, other things being equal, a one percentage point increase in capital adequacy ratio will lead to an increase in lending rate by 1.3 basis points which in turn will reduce the real GDP by (0.013*0.087 = 0.001131) 0.1131 basis points. These results are lower than that found by

Caggiano & Calice (2011) and Wong et al. (2010). While Caggiano & Calice (2011) have found that a 1 percentage point increase in capital adequacy ratio would lead to a rise in lending spread by 8.4 basis points, thus, a fall in real GDP by 7.8 basis points. Wong et al. (2010) have found that the resulting effect will be 4.8 and 4.3 basis points respectively. Angelini & Clerc (2014) found that a 1 percentage point increase in the capital ratio translated into a 0.09 percent loss in the level of steady state output.

5. Comparing the benefits and costs of tightened capital ratios

This section brings together the economic benefits and costs derived in Section 3 and 4 to derive the net benefit in terms of the real GDP. From Section 3, we get an output gain of 0.0081 percent of GDP due to an increase in capital adequacy ratio by 1 percentage point. From Section 4, we estimated the cost is 0.0011 percent of real GDP. Thus the net welfare gain is equivalent to 0.007 percent of real GDP. The capital adequacy ratio used in the paper is different from that of BASEL III regulatory measures of capital namely ratio of tangible common equity capital (paid up capital plus retained earnings net of regulatory adjustment) to risk weighted assets, TCE/RWA. Therefore, to make a comparison, we need to map capital adequacy ratio into TCE/RWA. It could be done by using an OLS model:

$$\mathrm{CAR} = \omega + \psi * \frac{\mathrm{TCE}}{\mathrm{RWA}} + \varepsilon$$

To run the above model, we need to have at least a short time series for TCE/RWA which is not possible as none of the South Asian countries has yet implemented BASEL III. However, as proxy of TCE/RWA of BASEL III, we could use Tier 1 capital to RWA using definitions from BASEL I and BASEL II.

6. Conclusions and policy recommendations

Implementation of new capital and liquidity requirements under BASEL III framework has emerged as a crucial issue for banking sector reforms in South Asia. The reforms are making the South Asian banking sector more resilient by reducing the probability of systematic banking crisis, thus, creating an welfare gain by eliminating negative output shock and reducing output volatility. But at the same time tightened capital requirements are passed from the banks to their customers through an increased lending rate which in turn inversely influences consumption -investment and finally GDP. By using a panel multivariate logit model and median output loss for a banking crisis, we have calculated the economic benefit of stronger capital requirement. Similarly the cost is computed by using fixed effect panel models in a two step approach framework. The results show that a 1 percentage point increase in capital adequacy ratio leads to an increase in net benefit by 0.007 percent of real GDP. However, we expect that after a cut off level the marginal economic benefit of tighter capital requirement will decline which in turn would decline the net benefit as well. Almost all the countries are maintaining a capital adequacy ratio much above 10 percent except Nepal. As mentioned earlier, we have not tried to derive the optimal level of capital requirement in our paper. Rather we have tried to assess how the South Asian countries should go with implementing BASEL accords.

We must mention some caveats that remain in the study. First, it was really difficult to get data for all of the variables of these countries over 1996-2013 from a single source. When the sources changed, some minor fluctuations were observed which might produce some bias in the results. This can be addressed in further research on this topic. Second, model limitations and particularly mapping capital ratios with relevant BASEL regulations inevitably influence the results. Finally, we

have not incorporated liquidity in our model following Caggiano & Calice (2011), Kapp & Vega (2014) as well as not having sufficient data. However, Wong et al. (2010), Gambacorta (2011) and Yan et al. (2012) used loan to deposit ratio (LTD), liquidity to deposit ratio (LIQ) and net stable funding ratio (NSFR) respectively as liquidity terms in their models.

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8. Appendix

A.1. Definitions and sources of variables

Variables	Definitions	Sources
Capital Adequacy Ratio (CAR)	Bank Regulatory Capital to Risk-Weighted Assets (%)	Global Financial Stability Report (GFSR) Data, International Monetary Fund (IMF), 2014; Central Bank Websites (CBW)
Nonperforming Loans (NPL)	Bank nonperforming loans to total gross loans (%)	GFSR, IMF, 2014; CBW; Getting Finance to South Asia (GFSA), 2010
Return on Equity (ROE)	Bank return on equity (%)	GFSR, IMF, 2014; CBW; GFSA, 2010
GDP Deflator (GD)	GDP Deflator Growth	World Development Indicators (WDI) Database, 2014
GDP (Y)	Real GDP	WDI Database, 2014
GDP Growth (YG)	Real GDP Growth	WDI Database, 2014
Private Sector Credit (CREDIT)	Domestic credit to private sector (% of GDP)	WDI Database, 2014
Private Sector Credit Growth (CG)	Growth of domestic credit to private sector	WDI Database, 2014
Real Interest Rate (r)	Nominal interest rate adjusted for inflation as measured by the GDP deflator (%)	WDI Database, 2014
Terms of Trade (TOT)	Net barter terms of trade	WDI Database, 2014
Lending Rate (L)	Bank rate that usually meets the short and medium term financing needs of the private sector (%)	WDI Database, 2014
Current Account Balance (GCAB)	Current Account Balance Growth	WDI Database, 2013

A.2. Banking crises determinants
(Logit results with significant variables only – Model 5)

Dependent Variable: CRISES				
Method: ML - Binary Logit (Quadratic hill climbing)				
Date: 12/29/14 Time: 21:37				
Sample: 1996 2013				
Included observations: 90				
Convergence achieved after 6 iterations				
Covariance matrix computed using second derivatives				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	22.70130	6.321939	3.590875	0.0003
CAR	-0.798115	0.285930	-2.791293	0.0052
GY	-0.472510	0.261132	-1.809467	0.0704
CREDIT	-0.365827	0.105360	-3.472177	0.0005
R	0.386753	0.142696	2.710332	0.0067

McFadden R-squared	0.720238	Mean dependent var	0.622222
S.D. dependent var	0.487548	S.E. of regression	0.246734
Akaike info criterion	0.482057	Sum squared resid	5.174616
Schwarz criterion	0.620935	Log likelihood	-16.69256
Hannan-Quinn criter.	0.538061	Deviance	33.38512
Restr. deviance	119.3338	Restr. log likelihood	-59.66692
LR statistic	85.94871	Avg. log likelihood	-0.185473
Prob(LR statistic)		0.000000	
Obs with Dep=0	34	Total obs	90
Obs with Dep=1		56	

Paper No. 36

The Relationship between Stock Market and Sector Returns, and Inflation: Evidence from Colombo Stock Exchange

Thuraisingam Udayaseelan*

Abstract

This paper intends to test the relationship between nominal stock market and sector returns, and inflation in Sri Lanka using monthly data from 1985:1 to 2014:06. The primary objective of this paper is to investigate whether there is a relationship between stock market and sector returns, and inflation in Sri Lanka. Ordinary least square (OLS) estimates, instrumental variable estimates and cointegration methods are used to test the said relationship. These three different methods of analysis are used in order to test whether the relationship is method dependent. Following the literature, inflation is used as the candidate of instrument under instrumental variable estimates. The empirical analysis shows that there is no significant relationship between stock market and sector returns, and inflation under OLS and instrumental variable estimates. In addition, the relationship is mixed for sector returns, having insignificant positive and negative relationships under same methods. These results suffer from serial correlation, Heteroskedasticity and non-normality of error term with lower r-squares. However, cointegration procedure results that there is significant long term relationship between stock market and sector returns, and inflation in Sri Lanka. Accordingly, this paper does not find evidence to support the relationship between the stock market returns and sector returns and inflation in Sri Lanka under OLS and instrumental variable estimates, however, cointegration procedure finds evidence to support the relationship between stock market and sector returns, and inflation in Sri Lanka. Therefore, the empirical results show that relationship is also method dependent.

JEL classification: *D53, E31, E44*

Key words: *stock market returns, sectors returns, inflation, OLS, instrumental variable, Johansen cointegration procedure*

1. Introduction

Lu (2008) finds that

> "Sensitivities to inflation vary significantly across industries and tend to be higher for noncyclical industries than those of cyclical industries."

Lu's findings reflect the importance of the relationship between sector (industry) returns and inflation in any economy.

Fisher (1930) explained a one-to-one relation between inflation and nominal interest rates in the long run. This means that the real interest rates are not related to the expected inflation and are determined entirely by the real factors in an economy, the time preference and the productivity of

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the capital. Prior to Fisher, few economists (Clark, 1895; Douglas, 1740; Haas, 1889; Marshall, 1887; Mill, 1848) dealt with the relationship between nominal interest rate and inflation.

One of the major assumptions of the Fisher hypothesis is that the real rate of interest does not change according to the changes in expected inflation over time. Further, the Fisher hypothesis notes that an adjustment in the growth rate of money supply in the long term will induces an alteration in inflation with an immediate variation in the nominal rate of interest. The changes in price level reflect in the nominal rate of interest, keeping the real rate of interest constant, when all other variables remain constant. However, Kinal & Lahiri, (1988) and Granville & Mallick (2004) noted that the changes in real economic factors may result in the changes in the real rate of interest. This violates the assumption of constant real rate of interest overtime. If, in the long term, the Fisher hypothesis is supported, it has insinuations on monetary policy. This implies that real rate of interest is solely determined by the real economic factors and cannot be influence by monetary policy (Carmichael & Stebbing, 1983). Further, when the Fisher hypothesis holds, the changes in the short term interest rates reflects the fluctuations in the expected inflation and therefore, be a good predictor of future inflation (Mishkin, 1992).

Fisher hypothesis is not only tested on fixed income securities market, but also tested in other financial markets as well. Accordingly, empirical studies on the relationship between stock market returns and inflation have been comprehensively performed in developed countries after late 1970's. However, the research related to developing economies on this area is very few and those are also conducted in the recent past. Samarakoon (1996) tested the relationship between stock market returns and inflation in Sri Lanka more than a decade ago. As a result, this paper aims to test the relationship between stock market and sector returns, and inflation in Sri Lanka.

The discussion of the relationship between nominal interest rate and inflation has a long history of more than two and half centuries. However, Fisher (1930) is the first to theorise the relationship in the form, in which it is used today. Fisher hypothesis postulates a proportional relationship between nominal interest rate and inflation in the long run with perfect foresight. Even after eight decades, no agreement has been reached with respect to the relationship between the nominal interest rate and inflation. The empirical literature on the relationship between nominal interest rate and inflation shows that the relationship depends on various factors.

With this background, this paper intends to add knowledge to the current literature on the relationship between stock market and sector returns, and inflation on various grounds. First, this paper tests the relationship taking into account a period of 23 years with 276 observations. Hence, in terms of number of observations this paper covers a broader period than Samarakoon (1996) and ever before in the Sri Lankan context. Secondly, in addition to market returns, the current paper combines the returns of fourteen sectors to test the said relationship, where the previous researches (for example; Samarakoon, 1996) neglected the relationship between sector returns and inflation. Thirdly, Colombo Stock Exchange (CSE) has been growing in terms of new infrastructure, number of new listed companies and investors, market capitalisation, and increased foreign participation. The research on the relationship between stock and sector returns, and inflation in Sri Lanka is one of the current and most needed areas; however, research on this respect in Sri Lanka is very less. Therefore, this paper tries to fulfil such dearth of literature. Fourthly, as this paper provides insights into the relationship between stock market and sector returns, and inflation; policy makers may utilise such finding for their policy decisions with respect to different sectors of the economy. Fifthly, the findings of the study will also be useful to the stock market participants to improve their investment decisions with special reference to mitigating the inflation risk by investing in the sectors, which are good hedge against inflation, if any. Finally, due to the academic interest, this paper uses three different methods to investigate whether the relationship between stock market and sector returns, and inflation is method dependent.

The primary objectives of the paper are to find the nature of the relationship between stock market returns and inflation, and to investigate whether the relationship between sector returns and inflation differs across various sectors of the economy, using monthly data covering a period of 23 years from Sri Lanka. In addition, OLS estimates, instrumental variable estimates and cointegration methods are used as tools of analysis as different methods of analysis may produce dissimilar results. Accordingly, the paper answers the following questions; (i) whether the stock market returns are good hedge against inflation, (ii) what sectors of the CSE are good hedge against inflation, if any, (iii) whether the real rate of return, under stock market and sector returns separately, is independent of inflation and (iv) whether the relationship between stock market and sector returns, and inflation are method dependent.

The paper is structured as follows. Section 2 reviews the literature. Section 3 develops the econometric models. Section 4 reports the preliminary data analysis. Section 5 describes the empirical results, and finally, section 6 concludes the research.

2. Literature Review

The empirical studies on the relationship between stock market returns and inflation have not reached any consensus yet even in the developed stock markets, as in the case of the relationship between interest rate and inflation. However, Boudoukh & Richardson (1993) find evidence supporting a positive relationship between nominal stock returns and inflation in the long run, and noted that researchers explain a negative correlation between the stock market returns and inflation in the short run. One argument that may support this finding in the short run is that when interest rate increases/decreases, investors shift their investments to/from fixed income securities. As the primary objectives of the investors is to optimise the returns while accepting a certain level of risk.

The empirical studies performed in developed and developing countries on the relationship between stock market returns and inflation find mixed evidence. For example; Boudoukh & Richardson (1993) find that stock market returns and actual and expected inflation positively related in USA and UK in the long run using the data for the period 1802-1990. In contrast, Lee (2007) finds significant negative correlation between stock returns and inflation during 1811-1969 in UK. Similarly, Khil, & Lee (2000) find negative relationship between stock returns and inflation for ten countries out of eleven countries studied.

Engsted, & Tanggaard (2002) find that the Fisher effect does not perform well as the time period horizon increases for US stock returns, however, for Danish stocks that improves as the time horizon increases.

Ryan (2006) using Irish annual data over two centuries finds that real returns are independent of expected inflation and a positive relationship between ex post nominal stock returns and inflation in the long run. As against Ryan (2006), Sari & Soytas (2005) find a negative relationship between stock returns and inflation using monthly data from Turkey. Further, Christos (2004) using monthly stock returns and inflation in Greece finds positive insignificant relationship, and when lagged inflation is used negative insignificant relationship under OLS estimates. Further, Johansen cointegration test and Granger causality test also find that there is neither long run relationship nor causality between nominal stock returns and inflation in Greece, respectively.

Samarakoon (1996) studied the relationship between stock market returns and inflation in the Sri Lankan context for a period of ten years with monthly and quarterly data from 1985 to 1996 and finds that both expected and lagged inflation are positively and significantly related to stock returns in Sri Lanka. Findings of Samarakoon (1996) are similar to Boudoukh & Richardson, 1993; Ryan, 2006; Alagidede, 2009, among others. Alike, in a recent study, Alagidede (2009) finds a positive

relation between stock returns and inflation using OLS estimates in Kenya and Nigeria, however, using instrumental variable estimates consistent results is found in Kenya, Nigeria and Tunisia.

In another developing economy, Pakistan, Akmal (2007) using Autoregressive Distributed Lag (ARDL) approach and error correction method finds that stocks become a hedge against inflation in long run but not in short run.

Kim & In (2006) find that the correlation between industry returns and inflation does not reduce when the time horizon increases, and that industry returns are a hedge against inflation based on different industries, using hedge ratio and wavelet analysis in the US. Kim & In (2006) also find that the industries with a pro-cyclical association with the whole economy result a pitiable hedge against inflation. They further find that the industries, which provide essentials, for example; Energy, Chemicals and Healthcare, have a negative hedge ratio in the short run and it becomes positive in the long run. Accordingly, they concluded that the relationship between sector returns and inflation depends on the cyclical association of each industry.

Lu (2008) also finds a negative relationship between stock market returns and inflation in the short term, and it reduces or becomes positive when the horizon is increased. Further, Lu (2008) finds that sensitivity of stock returns of noncyclical industries to inflation is higher than that of cyclical industries.

Accordingly, the empirical results on the relationship between stock market and sector returns, and inflation have reached no consensus on the said relationship.

3. Econometric Models

The basic Fisher equation, nominal stock returns equal real return plus inflation rate, is utilised as the basis of empirical analysis. The basic Fisher equation is that

$$(1+i_t) = (1+r_t) * (1+\pi) \quad (1)$$

where; i_t is the nominal interest rate,

r_t is the real rate of interest, and

π_t is the inflation rate.

When rearranged, the equation (1) will become:

$$i_t = r_t + \pi_t + r_t.\pi_t \quad (2)$$

Following conventions and as term on the extreme right side of equation (2) is very small, it is dropped from the estimation of Fisher effect. Accordingly, the equation will become

$$i_t = r_t + \pi_t \quad (3)$$

This equation (3) is transformed into an econometric model for estimation as follows.

$$i_t = r_t + \beta_0 \pi_t + e_t \quad (4)$$

Accordingly, equation (4) is used as the econometric equation for the study of the aforementioned relationship.

OLS estimates, instrumental variable estimates and cointegration methods are used as methods of analysis. OLS estimate is one of the basic methods of analysis. Since the independent variable is related to the error term, OLS estimate is not the most appropriate method of analysis, for an explanation with regard to this, see Udayaseelan & Jayasinghe (2010). Further, OLS estimates use first difference of the variables, as such, the variables lose the long term memory. As a result the results may not be of validity. Even with these deficiencies, researchers use OLS estimates to infer the relationship between the stock returns and inflation/Fisher hypothesis in Sri Lanka.

Instrumental variable estimate is used when error term is related to independent variable/s. Thus, instrumental variable estimates method is also used as a method of analysis to test the said relationship7. Accordingly, under OLS and instrumental variable methods, the following formula will be used;

$$i_t = r_t + \beta_0 \pi_t + e_t \qquad (5)$$

According to Boudoukh & Richardson (1993), Wong & Wu (2003) and Alagidede (2009) lag inflation rate is the more appropriate nominee as an instrument. Hence, lag inflation is used as the candidate of instrument. As OLS and instrumental variable estimates require stock market and sector indices, and inflation index to be differentiated, those indices are differentiated. Samarakoon (1996) also uses first differences of stock market returns and Colombo Consumer Price Index (CCPI).

Anari & Kolari (2001) noted that when indices are differentiated; they lose the long term memory. As OLS and instrumental variable estimates use the data, which has lost long term memory as noted by Anari & Kolari (2001), the findings may not be reliable as in the case of using levels of the same data.

Cointegration method is used as the method of analysis, to test the relationship between stock market and sector returns, and inflation due to the following reasons. First is to find whether the relationship is method dependant. Second is to follow the argument of Anari & Kolari (2001). Third, cointegration method is advanced than OLS and instrumental variable estimates. Finally, all the indices are integrated in order one.

When $\beta_0 = 1$, the Fisher hypothesis holds, on the other hand, if $\beta_0 = 0$ that there is no relationship between stock market and sector returns, and inflation, under OLS and instrumental variable estimates. When the stock market and sector returns, and inflation are cointegrated that there is a long run relationship between the variables. Further, Granger causality tests are also used to examine the direction of causation.

4. Preliminary Data Analysis

The required data on stock market and sector returns, and inflation are obtained from the publications of CSE and the Central Bank of Sri Lanka (CBSL), respectively. Stock market returns are measured through All Share Price Index (ASPI) and S&P SL 20 Index (SPI). SPI was referred to as Milanka Price Index and Sensitive Price Index in the past. Sector returns are measured through respective sector indices. Sector returns are confined to fourteen sectors, as those are the

[7] The studies, which use instrumental variable estimates are Boudoukh & Richardson, 1993; Solnik & Solnik, 1997, Alagidede, 2009; among others.

sectors, which have the presence since 1985. Inflation is measured through Sri Lanka's official measure of inflation, Colombo Consumer Price Index (CCPI).

The use of CCPI as measure of general price level produces several deficiencies. First, the load dispensed to the items in the index remained constant over time (1952=100). Second, it took into account only consumer goods. Third, whether the basket of consumer items in CCPI represent consumption patterns of Sri Lankan. Even with these weaknesses, CCPI remained as the most appropriate, universally accepted and official measure of inflation in Sri Lanka. As a result CCPI is selected as the measure of inflation. Compilation of CCPI (1952=100) was discontinued from April 2008, thus, splicing was done to CCPI (2006/07=100) with CCPI (1952=100) to get inflation index for the full sample period of 1985:01 to 2014:06.

Table I: List of Ellipsis

Ellipsis	Indices	Nominal Rate p.a.	Inflation Premium p.a.
ASPI	: All Share Price Index	15.28%	4.82%
SPI	: S&P 20 SL	26.99%	16.53%
BFI	: Banking, Finance and Insurance	19.08%	8.62%
BFT	: Beverage, Food and Tobacco	20.15%	9.69%
C&E	: Construction and Engineering	11.40%	0.94%
C&P	: Chemicals and Pharmaceuticals	15.75%	5.29%
F&T	: Footwear and Textile	7.27%	-3.19%
H&T	: Hotels and Travels	11.98%	1.52%
INVT	: Investment Trusts	20.02%	9.56%
L&P	: Land and Property	7.33%	-3.13%
MFG	: Manufacturing	12.47%	2.01%
MTR	: Motor	19.56%	9.10%
OIL	: Oil Palms	27.12%	16.66%
S&S	: Stores and Supplies	19.84%	9.38%
SRV	: Services	20.38%	9.92%
TRD	: Trading	18.51%	8.05%
CCPI	: Colombo Consumer Price Index	10.46%	0.00%

The paper uses ex post inflation as the proxy for ex ante inflation8. This means actual inflation for the period of investment is considered as the expected inflation for such period. The study will employ data covering a period from 1985:1 to 2014:06 with two market indices and 14 sector indices. The list of market returns, selected fourteen sector returns, CCPI and abbreviations with nominal annual rate with annual inflation premium are reported in Table I.

The nominal rate is the geometric mean of the stock market and sector, and inflation indices over the sample period. ASPI and C&P outperformed inflation by approximately 5 per cent per annum, in simple terms, stock market returns over the sample period has outperformed inflation by 5 percent. SPI and OIL resulted in large positive double digit inflation premium. Seven sectors, BFI, BFT, INV, MTR, S&S, SRV, and TRD have produced single digit inflation premium above 5 percent. C&E, H&T and MFG have produced a marginal inflation premium over the sample period. F&T, L&P sectors have under-performed inflation during the period concerned. C&E sector produced an

[8] *Actual inflation is used by Alagidede, 2009; among others, to investigate the relationship between stock returns and inflation.*

annual return approximately equivalent to the annual inflation. On surface, this analysis reveals that stock market has performed well above inflation, however, very few, two, sectors have not produced inflation premium under the sample period concerned in Sri Lanka.

Unit root test results, which is not presented, in order to conserve space, will be made available on request, reveal that all market and sector indices, and inflation rates are integrated order one, I(1). Thereafter, stock market and sector returns and inflation rate are tested for unit roots. The unit root results revealed that stock market and sector returns, and inflation rate have the properties of stationarity.

After testing the unit root properties of the indices, stock market and sector returns are computed as follows:

$$i_{jt} = \left(PI_{jt} / PI_{jt-1} \right) * PI_{jt-1} * 100$$

where; i_{jt} is the return of jth asset from time t-1 to t,

PI_{jt} is the price index of jth asset at time t, and

PI_{jt-1} is the price index of jth asset at time t-1.

Inflation rate is also computed on the same manner.

Descriptive statistics of data is provided in Table II. Arithmetic average returns per month of both market indices and all sector indices are above average monthly inflation for the sample period concern. This, generally, imply that there is a positive real return on market and over all sector indices. This finding is somewhat different from annual stock market and sector returns. Moreover, volatility of inflation is very less (1.61 percent) compare to the volatility of stock market returns of 7.44 percent and 10.84 percent, and sector returns. Standard deviations of eight sector return, out of fourteen sectors, are double digit, while standard deviations of other six sector returns are higher than 8.00 percent. This reveals that price volatility is much higher than inflation risk attached to the investment in stock market.

Table II: Descriptive statistics

Index	Mean (%)	Median	Maximum	Minimum	Standard Deviation
ASPI	1.46	0.80	36.30	-16.82	7.44
SPI	2.51	0.80	87.14	-17.73	10.84
BFI	1.91	0.84	65.45	-20.92	9.84
BFT	1.87	0.77	53.17	-19.94	8.35
C&E	1.66	0.00	98.54	-60.49	12.77
C&P	1.62	0.91	46.67	-20.47	9.16
F&T	1.20	-0.33	79.19	-28.44	11.79
H&T	1.33	-0.30	72.64	-23.02	9.34
INV T	2.18	0.08	63.10	-30.36	11.85
L&P	0.98	-0.20	71.10	-23.32	9.32
MFG	1.31	0.41	34.97	-23.20	8.21
MTR	1.97	0.34	69.44	-19.75	10.26
OIL	2.85	0.00	173.10	-33.82	15.91
SRV	2.12	0.51	61.39	-32.93	11.26

Index	Mean (%)	Median	Maximum	Minimum	Standard Deviation
S&S	2.60	0.02	353.78	-37.64	21.45
TRD	1.93	0.71	52.87	-25.92	10.46
CCPI	0.85	0.64	6.20	-3.39	1.61

5. Empirical Results

The paper aims to study the nature of the relationship between stock market and sector returns, and inflation with monthly data in Sri Lanka. OLS estimates, instrumental variable estimates, and cointegration method are used to test the said relationship over the period of 1985:1 to 2014:06. The following subsections explain the empirical results under each method of analysis.

5.1 Empirical Results under OLS Estimates

This subsection explains the regression results on the relationship between stock market and sector returns, and inflation in Sri Lanka under OLS method as presented in Table III.

Market and sector returns have no significant relationship with inflation under OLS estimates in Sri Lanka. It is interesting to note that even the market returns are not significant. In addition, Wald test also failed to reject $\beta_1 = 0$ and reject that $\beta_1 = 1$ at even one percent significant level, resulting that there is no relationship between stock market return and inflation under OLS method.

Table III: Empirical Results under OLS Estimates

Statistics	ASPI	SPI	BFI	BFT	C&E	C&P	F&T	H&T
α	14.402	7.189	41.0413	39.345	0.8245	6.009	1.949	10.121
	(1.511)	(1.173)	(1.535)	(1.946)c	(0.124)	(0.287)	(0.538)	(1.448)
β_1	6.893	5.742	0.358	33.805	15.152	24.043	0.217	-2.107
	(0.872)	(1.129)	(0.061)	(1.915)c	(1.950)c	(1.384)	(0.072)	(-0.363)
R2	0.002	0.0036	0.000	0.0114	0.02118	0.005	1.5E-05	0.00038
f-Statistic	0.759	1.275	0.00026	4.0605	7.619	1.916	0.00522	0.132
Probability	0.384	0.259	0.987	0.04466	0.006	0.167	0.942	0.716
DW Stat	1.758	1.931	1.81777	2.112	1.714	1.9068	1.597	1.639
JB Stat	3523	67963	41292	5796	5,436	3894	392	1,229
LM Tet	2.667c	2.261	1.4026	4.731a	3.96b	0.548	0.000	10.488a
White Test	1.502	0.961	0.625	3.296b	2.507c	2.322c	2.349c	1.223
$\beta_1 = 1$	0.555	0.869	0.00084	3.823c	6.647c	1.7601	0.06777	0.287

Statistics	ASPI	SPI	BFI	BFT	C&E	C&P	F&T	H&T
$\beta_1 = 0$	0.759	1.275	0.00026	4.0605c	7.619c	1.916	0.00522	0.132

Notes: a, b and c denotes significant at 1, 5 and 10 per cent levels, respectively

t-statistics are in parenthesis (continued)

Table III: Empirical Results under OLS Estimates (continued)

Statistics	INVT	L&P	MFG	MTR	OIL	S&S	SRV	TRD
α	19.77	2.428	5.842	31.906	250.055	-35.55	78.011	30.723
	(0.231)	(11.545)a	(1.046)	(0.583)	(0.944)	(-0.202)	(1.284)	(0.684)
β_1	61.101	-1.667	6.399	22.645	155.997	186.45	-32.437	17.593
	(0.859)	(-1.278)	(1.381)	(0.499)	(0.725)	(1.274)	(-0.643)	(0.472)
R2	0.00209	0.0046	0.005	0.0007	0.0014	0.00459	0.00118	0.00063
f-Statistic	0.739	1.633	1.906	0.247	0.525	1.625	0.414	0.223
Probability	0.3905	0.202	0.168	0.618	0.468	0.203	0.52	0.637
DW Stat	1.8726	2.142	1.782	1.6189	2.278	1.918	2.222	1.605
JB Stat	7550	1452	1687	28392	122563	47418	12158	9776
LM Test	2.304	8.459a	2.076	6.891a	7.186a	0.751	2.227	7.925a
White Test	0.0775	0.651	4.566b	0.0523	1.22	0.094	0.194	0.172
$\beta_1 = 1$	0.715	4.18b	1.357	0.227	0.518	1.607	0.44	0.198
$\beta_1 = 0$	0.739	1.633	1.905	0.249	0.525	1.625	0.41	0.223

Notes: a, b and c denotes significant at 1, 5 and 10 per cent levels, respectively

t-statistics are in parenthesis

Real return of majority of the sector indices is not significant at five per cent level. All regressions have very small R-square. Durbin-Watson (DB) statistic ranges from 1.59 to 2.27, resulting that there is no serial/auto correlation problem. Results of histogram normality test reveal that all regressions suffer from non-normality of error term. Heteroskedasticity problem is also found under all regressions through White Heteroskedasticity test, as it is not significant at five per cent level. Wald test failed to find evidence supporting that $\beta_1 = 1$ for majority of sectors. This finding

shows that there is no significant relationship between sector returns and inflation in Sri Lanka under OLS estimates.

5.2 Empirical Results under Instrumental Variable Estimates

This subsection illustrates that the empirical results under instrumental variable estimates. Following literature lagged inflation is used as the candidate instrument. The empirical results under instrumental variable estimates are reported in Table IV.

Table IV: Empirical Results under Instrumental Variable Estimates

Statistics	ASPI	SPI	BFI	BFT	C&E	C&P	F&T	H&T
α	28.042	8.241	36.693	22.669	6.316	35.581	2.132	20.375
	(2.127)b	(1.045)	(1.066)	(0.866)	(0.738)	(1.298)	(0.457)	(2.225)b
β_1	-21.22	3.575	9.32	68.176	3.834	-36.904	-0.161	-23.243
	(-1.056)	(11.418)	(0.187)	(1.799)c	(0.309)	(-0.93)	(-0.024)	(-1.75)c
R2	-0.036	0.003	-0.0004	-0.0004	0.0094	-0.0293	-0.00003	-0.037
f-Statistic	1.117	0.098	0.0349	3.2370	0.0956	0.865	0.00056	3.07
Probability	0.291	0.754	0.851	0.0728	0.757	0.352	0.985	0.0804
DW Stat	1.759	1.933	1.816	2.115	1.725	1.91	1.598	1.653
JB Stat	3886	68528	40858	4568	5,948	4106	389	1187
LM Test	5.372c	4.474	2.894	10.987b	7.405b	0.876	17.123a	17.675a
White Test	1.583	0.96	0.622	4.073c	2.457c	2.221	2.358c	2.833c
$\beta_1 = 1$	1.224	0.0501	0.0279	3.143c	0.0522	0.912	0.0295	3.343c
$\beta_1 = 0$	1.117	0.098	0.0349	3.237c	0.0956	0.865	0.00056	3.073c

Notes: a, b and c denotes significant at 1, 5 and 10 per cent levels, respectively
t-statistics in parenthesis
(continued)

Table IV: Empirical Results under Instrumental Variable Estimates (continued)

Statistics	INVT	L&P	MFG	MTR	OIL	S&S	SRV	TRD
α	75.139	0.637	6.865	95.222	250.055	110.69	164.995	31.354
	(0.679)	(0.311)	(0.945)	(1.338)	(0.964)	(0.485)	(2.075)b	(0.543)
β_1	-53.015	2.025	4.291	-107.85	155.998	-114.95	-211.71	16.293
	(-0.331)	(0.683)	(0.412)	(-1.046)	(0.725)	(-0.348)	(1.838)c	(0.194)
R2	-0.0052	-0.018	0.0048	(-0.023)	0.0015	-0.0074	-0.034	0.0006

Statistics	INVT	L&P	MFG	MTR	OIL	S&S	SRV	TRD
f-Statistic	0.109	0.468	0.169	1.095	0.535	0.121	3.378	0.038
Probability	0.74	0.494	0.681	0.296	0.469	0.728	0.066	0.846
DW Stat	1.866	2.127	1.781	1.646	2.28	1.923	2.217	1.606
JB Stat	7672	1375	1741	24736	122563	49116	10645	9783
LM Test	4.904c	12.903a	4.169	11.925a	7.186a	1.281	4.479	15.2778a
White Test	0.045	1.004	4.495b	0.032	1.22	0.1102	0.368	0.173
$\beta_1 = 1$	0.114	0.119	0.099	1.115	0.518	0.123	3.411c	0.033
$\beta_1 = 0$	0.114	0.468	0.169	1.095	0.525	0.121	3.378c	0.038

Notes: a, b and c denotes significant at 1, 5 and 10 per cent levels, respectively

t-statistics in parenthesis

Both market indices, ASPI and SPI, have different signs and, in particular, market return, represented by ASPI is significant at 5 percent and negative. Similarly, coefficient of seven sector returns, namely, BFI, BFT, C&E, L&P, MFG, OIL and TRD also have positive but not significant relationship with inflation. In contrast, similar number of sector returns, namely, C&P, F&T, H&T, INVT, MTR S&S and SRV are negative but not significant, at conventional level. It is interesting to note that neither market returns nor sector returns have significant relationship with inflation. However, R-square is very minimal showing that the regression lacks the ability to explain the relationship between stock market and sector returns, and inflation under instrumental variable estimates.

Jarque-Bera (JB) statistic of Histogram-Normality test reveals that the error terms are significant under all regressions in the cases of market and sector returns even at one percent level. Therefore, it is concluded that residuals are not normally distributed. Durbin-Watson (DW) statistic ranges from 1.59 to 2.28 with respect to stock market and sector returns, resulting that there is no serial correlation problem. Thus, it is concluded that there is no serial correlation problem associated with the regressions. White Heteroskedasticity test reveals that most of regressions have the problem of Heteroskedasticity. Thus, regressions under instrumental variable estimates suffer from Heteroskedasticity problem. In summary, the error term is not normally distributed, the variance of the error term is not constant over time and R-square is very minimal under instrumental variable estimates.

In conclusion, instrumental variable estimates results that there is no significant relationship between stock market and sector returns and inflation in Sri Lanka under the sample period concerned and the regressions suffer from low R-square, non-normality of error term and Heteroskedasticity problems.

5.3 Empirical Results under Johansen Cointegration Method

This subsection explains the Johansen's cointegration procedure and its application to test the Fisher hypothesis in CSE. Two contemporary techniques are available for any dynamic specification model. They are cointegration procedure and Autoregressive Distributed Lag (ARDL). ARDL technique has a drawback, which is loss of information related to the long term relationship

between the variables. However, cointegration procedure has overcome this problem and useful in representing the relationship between the variables both in the short term and long term. Another advantage of cointegration procedure is that it reduces the problems associated with multicollinearity (Hasan, 1999).

Johansen's procedure of cointegration involves numerous steps to examine the Fisher hypothesis stressing the long term and short term relationship between nominal rate of interest and inflation. First step is examining the stationarity properties of stock market and sector indices and inflation. Second step is determining the order of integration of the variables, thereafter if the variables are integrated in the same order, Johansen's cointegration procedure can be applied to test that the series are cointegrated. Fourthly, Johansen & Juselius procedure can be employed to identify the cointegrating vector; meanwhile, the direction of causality between nominal interest rate and inflation will also be ascertained.

Traditionally, in order to proceed with cointegration techniques, it is essential to use data series with the same order of integration. Accordingly, both stock market and sector returns and CCPI have I(1) characteristics. As a result Johansen's cointegration method is employed to test the Fisher hypothesis. Johansen's cointegration procedure put numerous restrictions on the point estimates of cointegration vector, which can be examined employing likelihood ratios. The Fisher hypothesis is a long term relationship that postulates a one-to-one relationship between nominal stock market and sector returns, and inflation, which tolerate the short term fluctuations of the nominal stock market and sector returns from its equilibrium long term connection with inflation.

Table V: Johansen Cointegration Test Results

Variables	Hypothesized No. of CE(s)	Unrestricted Cointegration Rank Test (Trace)			Unrestricted Cointegration Rank Test (Maximum Eigen value)			No. of CE(s)	Cointegration Equation β_1	α	-1/ECT
		Eigen value	Trace Statistic	5% Critical Value	Eigen value	Max-Eigen Statistic	5% Critical Value				
ASPI	None	0.15	62.88a	20.26	0.15	56.99a	15.89	1	-1.06	33.60	-5236
CCPI	At most 1	0.02	5.88	9.16	0.02	5.88	9.16		(-0.47)	(3.70)a	
SPI	None	0.16	71.49a	20.26	0.16	60.83a	15.89	1	3.11	-15.21	452
CCPI	At most 1	0.03	10.66c	9.16	0.03	10.66b	9.16		(32.78)a	(-4.48)a	
BFI	None	0.15	62.82a	20.26	0.15	56.90a	15.89	1	0.23	17.96	2667
CCPI	At most 1	0.02	5.92	9.16	0.02	5.92	9.16		(0.20)	(3.91)a	
BFT	None	0.16	64.16a	20.26	0.16	61.45a	15.89	1	0.98	9.05	414
CCPI	At most 1	0.01	2.71	9.16	0.01	2.71	9.16		(1.85)	(4.18)a	
	None	0.16	70.01a	20.26	0.16	62.74a	15.89	1	0.95	4.54	295
C&E CCPI	At most 1	0.020	7.27	9.16	0.02	7.27	9.16		(4.27)a	(5.00)a	
C&P	None	0.14	62.52a	20.26	0.14	55.13a	15.89	1	8.94	98.59	-3333
CCPI	At most 1	0.02	7.39	9.16	0.02	7.39	9.16		(1.22)	(3.31)a	
F&T	None	0.14	59.7a	20.26	0.15	56.26a	15.89	1	1.63	-11.80	-1280
CCPI	At most 1	0.01	3.44	9.16	0.01	3.44	9.16		(1.42)	(-2.53)a	
H&T	None	0.15	60.76a	20.26	0.15	56.48a	15.89	1	-0.02	18.07	3676
CCPI	At most 1	0.01	4.27	9.16	0.01	4.27	9.16		(-0.02)	(3.84)a	
INVT	None	0.14	59.07a	20.26	0.14	54.00a	15.89	1	2.89	-15.27	-1178
CCPI	At most 1	0.01	5.06	9.16	0.01	5.06	9.16		(2.32)a	(-3.01)a	
L&P	None	0.14	57.96a	20.26	0.14	55.27a	15.89	1	6.19	104.36	-1866
CCPI	At most 1	0.01	2.69	9.16	0.01	2.69	9.16		(0.81)	(3.40)a	
MFG	None	0.15	61.56a	20.26	0.15	56.53a	15.89	1	0.30	2.42	-2146
CCPI	At most 1	0.01	5.03	9.16	0.01	5.02	9.16		(0.41)	(0.82)	

Variables	Hypothesized No. of CE(s)	Unrestricted Cointegration Rank Test (Trace)			Unrestricted Cointegration Rank Test (Maximum Eigen value)			No. of CE(s)	Cointegration Equation β_1	α	-1/ECT
		Eigen value	Trace Statistic	5% Critical Value	Eigen value	Max-Eigen Statistic	5% Critical Value				
MTR	None	0.14	58.95a	20.26	0.14	55.21a	15.89	1	0.97	11.36	490
CCPI	At most 1	0.01	3.73	9.16	0.01	3.73	9.16		(1.16)	(3.36)a	
OIL	None	0.15	61.90a	20.26	0.15	57.29a	15.89	1	3.00	-11.57	-391
CCPI	At most 1	0.01	4.60	9.16	0.01	4.60	9.16		(3.74)a	(-3.53)a	
S&S	None	0.14	60.78a	20.26	0.14	55.63a	15.89	1	3.40	-20.04	-1212
CCPI	At most 1	0.01	5.14	9.16	0.01	5.14	9.16		(2.33)a	(-3.38)a	
SRV	None	0.14	61.49a	20.26	0.14	54.87a	15.89	1	0.92	11.25	691
CCPI	At most 1	0.01	6.61	9.16	0.01	6.619	9.16		(1.29)	(3.85)a	
TRD	None	0.14	59.28a	20.26	0.14	55.74a	15.89	1	0.27	16.73	1112
CCPI	At most 1	0.01	3.53	9.16	0.01	3.53	9.16		(0.25)	(3.87)a	

Notes: a, b and c denote rejection of the hypothesis at the 1%, 5% and 10% significant level
CE(s) refers to cointegration equation(s)
t-statistics are in parenthesis.

In summary, Johansen cointegration procedure results revealed that there is long run relationship between stock market and returns and inflation in Sri Lanka. On the other hand, Granger Causality test results find that there is no causality between the market and sector returns, and inflation in Sri Lanka. The result of vector error correction method (VECM) through error correction term (ECT) reflects that it takes a long time to come to equilibrium, as ECT term is very small and does not have the expected negative sign9.

[9] VECM results are not provided to conserve space, anyone, who needs the results of VECM may contact the author through the author's email address.

5.6 Summary

Empirical results under both OLS and instrumental variable estimates find no evidence supporting the presence of one-to-one relationship between stock market and sector returns with inflation in Sri Lanka, and the estimations suffers from non-normality of error term and Heteroskedasticity problem, serial correlation problem to some extent, while the R-square is very minimal. Therefore, OLS and instrumental variable estimates are not reliable estimators of the relationship between stock market and sector returns and inflation in Sri Lanka. On the other hand, cointegration procedure results failed to reject that there is evidence to prove no relationship between stock market and sector returns, and inflation in Sri Lanka.

This difference in results may be due to the following reasons. However, the reasoning must be read with cautious, as the below given factors need further investigation to substantiate them. First, CSE is a thin market compared to other emerging and developed stock markets. Second, free float of listed companies in the bourse is also lower compared to developed markets. Three, market capitalisation of CSE is very less, i.e., 40% of Gross Domestic Product at the end of 2013. Four, very few local and foreign investors participate in the CSE. Five, high level of mis-pricing is found in the market. These factors may have influenced the short term return from the stock market, which may have resulted in non-existence of the aforementioned relationship under OLS and instrumental variable estimates. On the other hand, the inefficiencies may have net off during the long run; as a result Johansen cointegration procedure would have found long run relationship between stock market and sector returns, and inflation in Sri Lanka.

6. Conclusion

This paper finds no evidence supporting the relationship between stock market and sector returns, and inflation under OLS and instrumental variable estimates in Sri Lanka. This finding contradicts with the findings under Johansen cointegration procedure, which shows that there is long term relationship between stock market and sector returns and inflation in Sri Lanka. Accordingly, it is concluded that under OLS and instrumental variable estimates, that there is no relationship between stock market and sector returns, and inflation in Sri Lanka, while Johansen cointegration procedure found a long run relationship between the variables. This result reveals that the relationship between stock market and sector returns and inflation is method dependant, i.e., different methods of analysis provide different results with same data. These divergent results may be due to the fact that (i) OLS and instrumental variable estimates used first difference of the stock market and sector indices and CCPI, which have lower long term memory as noted by Anari & Kolari (2001), (ii) Fisher hypothesis is a long run phenomenon, thus, the finding is consistent with such inference, and (iii) as mentioned in paragraph 5.4, market inefficiencies in the short run may have been nullified in the long run.

In conclusion, evidence was found that (i) there is no relationship between stock market and sector returns, and inflation under OLS and instrumental variable estimates, where as there is a relation ship between the variables under Johansen cointegration procedure (ii) real rate of interest is not constant under OLS and instrumental variable estimates, on the other hand Real rate of interest is constant under Johansen cointegration procedure, (iii) stock market and sector returns are not good hedges against inflation under OLS and instrumental variable estimates and stock returns are good hedge against inflation under Johansen cointegration procedure, and (iv) the relationship between stock market and sector returns, and inflation is method dependent.

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Paper No. 37

Does Regulatory Arbitrage Induce Presence of Foreign Banks in India?

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Abstract

Presence of heterogeneous banking systems across countries provides opportunities to cross border banks to indulge in activities of regulatory arbitrage. This paper attempts to investigate whether regulatory arbitrage induce presence of foreign banks in India. Using relevant country level data on various aspects of banking regulations, we conduct a series of panel regressions to examine the effect of gap in cross-country banking regulations on foreign banks' presence in India. Our results seem to indicate regulatory arbitrage as significantly determining foreign banks' presence in India, after controlling for other factors (e.g., income level of home country, bilateral economic relationship, socio-economic commonality, geographic proximities etc.) between India and the sample of countries included in the study.

Key Words: Regulatory Arbitrage, Foreign banks, Indian banking

JEL Classification: G14, G21, G28

Introduction

Banking regulations play an important role in achieving financial sector policy objectives. As the rationale shaping banking regulations differ across countries, regulatory systems around the globe become heterogeneous. Compliance to regulations is costly. The presence of heterogeneous regulatory systems across countries provides opportunities to cross border banks to minimize their regulatory cost, by taking advantage of regulation gap. Practices through which cross border banks can take advantage of cross-country regulatory differences to reduce their overall regulatory cost are known as *regulatory arbitrage* activities (Cárdenas et al., 2003). Regulatory arbitrage activities include strategies like introduction of innovative financial products that are partially controlled by the existing regulations or relocation of affiliates in jurisdictions with less stringent regulatory frame work.

Literature has found that banks generate considerable amount of their income by managing cross-country gaps in regulatory taxes, capital requirements, deposit insurance premiums and other prudential requirements (Cumming 1987; Pavel and Phillis 1987; Jones, 2000; Dong et al., 2011 and Hauston et al., 2012). In this context, from the perspective of the banks it is argued that in certain circumstances regulatory arbitrage is important for a sustainable banking business. According to Pavel and Phillis (1987) and Jones (2000), regulatory arbitrage techniques enable banks to enhance their liquidity conditions, provide opportunities of risk diversification and help them to survive the competition in financial service industry. Thus, indicating that regulatory arbitrage may be an important factor encouraging banks to establish presence in different countries.

In general, regulatory arbitrage evolve in response to difference in accounting standards, and due to differences in economies of scale and scope between bank affiliates operating in different countries. These differences may encourage banks with headquarters in heavily regulated countries to position their affiliates in host countries with loosely regulated markets. In addition to

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the above, regulatory systems that permit use of innovative financial products also enables large, sophisticated banks to erode the regulatory cost (Cumming; 1987, Berger and Udell; 1993, Jones; 2000 and Dong; 2011). The most prevalent types of financial innovations comprise of risk repackaging techniques like securitization and credit derivatives. 1 According to Cumming (1987) and Jones (2000) such risk repackaging techniques are driven by large divergences in notions and measures embodied in the regulatory standards. This implies that arbitrage activities may find its way in all areas of banking regulations (such as capital requirements, supervisory standards, entry and participation norms, information disclosures etc.), where ever regulatory systems present opportunities to benefit from the divergence.

In this field, a number of case studies have explored different aspects of regulatory arbitrage in banking sector. Cumming (1987) and Pavel and Phillis (1987) examine regulatory arbitrage achieved by securitization methods. Jones (2000) illustrates arbitrage techniques used by banks to erode risk based capital requirements. Similarly, Jones and Kolatch (1999) and Carbo-Valverde et al. (2009) explain arbitrage opportunities created due to divergence in deposit insurance policies in different jurisdictions. Overall, findings of these studies are consistent with the view that cross border banks benefit from arbitrage activities.

Among the theoretical and statistical studies, Morrison and White (2009) carried out a theoretical investigation in which they analysed the costs and benefits of coordinated multinational bank regulation as against the cost and benefits of diverse multinational regulations. They found that cross border banks take advantage of regulatory gaps across countries and that bank capital tend to flow from heavily regulated markets to less regulated markets. Motivated by the same issue, recent studies by Hauston et al. (2012) and Dong et al. (2011) empirically test the relation between multinational banks' cross border expansion and cross-country gap in banking regulations. Hauston et al. (2012) investigated the relation of regulation differences between home and host country with bank capital flows for a panel of 26 home countries and 120 host countries. Dong et al. (2011) used data of 2,000 international bank mergers and acquisitions (M&A) between 1990 and 2007 to analyse the effects of banking regulations on banks' cross-border M&A. Results of both these studies support the theoretical claims made by Morrison and White (2009) and show that banks have strong incentives to expand into countries with diverse regulations in order to gain from the regulatory gap between countries.

In light of the above literature, this paper attempts to empirically examine whether regulatory arbitrage induces presence of foreign banks in India. Our empirical methodology involves estimation of a series of panel regressions to examine how the presence of foreign banks in India is impacted by varying bank regulatory stringency across jurisdictions. In this framework, effect of regulatory arbitrage is examined on foreign banks' decision to enter and expand in the Indian banking sector. The regressions are carried out using relevant country level data during the sample periods 2000, 2001, 2005 and 2010. To carry out our empirical investigation we have taken a sample of 37 countries which are economically linked with India through trade and FDI. This sample is used to test the significance of regulatory arbitrage on entry decision of foreign banks in India. Thereafter, a subsample of 23 countries is used to examine the effects of regulatory arbitrage on expansion of foreign banks in India. This subsample is selected by identifying home countries of foreign banks present in India during our sample periods.

[1] Jones (2000) refer to securitization and credit derivatives as *cosmetic methods* that artificially lower the regulatory cost without any corresponding increase in bank's capacity to absorb its actual economic risk. According to Cumming (1987), securitization is the process of restructuring illiquid assets of a bank through financial engineering into securities for sale and purchase in financial markets. Jones (2000) illustrates credit derivatives as financial instruments that unbundle and repackage banking risks. Such an instrument covers a disproportionate amount of an asset's true underlying risk due to which it qualifies as a lower risk-weighted asset that can be sold to the third party. For examples on securitization methods and functioning of credit derivatives refer to Cumming (1987) and Jones (2000).

As the literature suggests, possibilities of regulatory arbitrage arise in different areas of banking regulations (Jones; 2000, Morrison and White; 2009 and Dong; 2011). To be in line with this observation, we compile a wide range of data on various aspects of banking regulations for all the countries included in the study. On the basis of this information, we have constructed a Banking Regulation Gap Index (BRGI) by combining the gap between banking regulations in each country and India. This index is used as a comprehensive measure of banking regulation gap and study the joint effect of the different regulation gaps on entry and expansion of foreign banks in India. Thus, BRGI is our main explanatory variable which attempts to capture the regulatory arbitrage opportunities available to banks that enter in the Indian banking sector.

In our analysis we control for a number of macroeconomic and geo-political factors that may provide alternative explanations for foreign banks' presence in India. After controlling for the impact of these factors, we find that foreign banks' decision to enter the Indian banking sector is not explained by the difference in Indian and home country's banking regulations. In this case, other factors like bilateral FDI, colonial similarities, common language and geographical proximities are found to be significantly affecting foreign banks' entry in India. However, as far as expansion of foreign banks' business is concerned, regulatory gap is found to be significantly and positively effecting expansion of foreign banks in India, ceteris paribus. These results, lead us to conclude that in terms of foreign banks' expansion, regulatory arbitrage does seem to induce presence of foreign banks in India.

The remainder of the paper is as follows. Section 2 briefly describes foreign banks regulation in India. Section 3 discusses the data sources and the empirical model employed for investigation of our research question. Section 4 presents an exploratory analysis on the linkages between regulatory arbitrage and foreign banks' presence India. Results and implications are discussed in Section 5, followed by conclusions in Section 6.

2. Foreign Banks Regulation in India

As part of its phased liberalization of the banking sector, the Indian government undertook WTO (GATS) agreement in 1994 to issue 5 branch licenses to existing and new foreign banks every year. This limit was later increased to 12 branch licenses a year with the signing of another WTO agreement in 1997. Thereafter in 2005, the Reserve Bank of India (RBI) released a "Road Map" for further liberalizing the entry of foreign banks in Indian banking system. However, this road map was put on hold on account of the unprecedented global financial crisis that took place in 2007. In RBI (2011), the RBI laid out a detailed framework for foreign banks' entry in India. In a more recent discussion paper, RBI has finalized a framework for wholly owned subsidiary (WOS) mode of entry (RBI 2013). 2 Currently, all foreign banks in India are in form of branches. Thus, further formalization of entry regulations of foreign banks' WOS displays clear preference of RBI for the WOS mode. Within this policy framework, WOS of foreign banks are given near national treatment wherein they can establish presence in Tier 1 to Tier 6 centres of India without prior approval from RBI, except for certain sensitive areas where entry is subject to reporting the location. However, branches of foreign banks are permitted to establish presence only in Tier 1 and Tier 2 centres of India subject to prior approval from RBI and fulfilment of other regulatory guidelines specific to foreign banks.3

In India, foreign banks (WOS and branches) are defined as foreign owned and controlled companies carrying banking business in India. In terms of ownership, this definition refers to banking companies in India where more than 50% of capital is owned by non- residents. While,

[2] For details, see RBI (2011) and RBI (2013).

[3]Tier 1 and Tier 2 centres are centres with population of 50,000 and above as per 2001 Census of India. For further details see, Master Circular DBOD. No. BL.BC.8/22.01.001/2010-11 dated July 1, 2010, RBI, Mumbai.

with respect to control, it refers to voting power in companies' management and decision making, and shareholders' rights held by non-residents.

The entry guidelines as formulated by RBI requires foreign banks to comply with regulations related to minimum paid-up capital requirement, capital adequacy ratio, priority sector lending and other prudential norms. The initial minimum paid-up capital requirement for foreign bank branches is Rs 25 million and Rs 5000 million for WOS of foreign banks. Further, WOSs are required to maintain minimum capital adequacy ratio of 10% of risk weighted asset while for the branches the ratio is 9%. Foreign banks like domestic banks are required to extend priority sector lending in certain percentage of their net bank credit. This percentage stands as 32% of net bank credit for foreign bank branches and 40% of adjusted net bank credit for WOS (RBI 2011 and 2013).

Other supervisory guidelines allow foreign banks having global banking business, having less complex structures, providing for adequate disclosure norms in their home country and those headquartered in countries with international standards of supervisory arrangements to establish presence either as branches or WOS. For foreign banks that do not satisfy the above guidelines are restricted to enter only as WOS. Policies formulated by RBI also regulates the capital market activities of foreign banks in India. Under the guidelines prescribing foreign banks' access to rupee resources in India, WOS of foreign banks are permitted to raise capital in India through issue of non-equity capital instruments. However, branches of foreign banks are prohibited access to domestic capital markets. The deposit insurance policy of India also covers foreign banks functioning in India. Regulation on protection of bank deposits payable in India are formulated by Deposit Insurance and Credit Guarantee Corporation (DICGC, GoI). As per these regulations, foreign banks are required to be registered by DICGC and pay deposit insurance premiums.

3. Empirical Methodology and Data

In this section, we discuss the empirical methodology and data sources of this study. Primarily, we want to investigate whether differences in bank regulations influence foreign banks' presence in Indian banking sector, after controlling for other factors (e.g., income level of home country, bilateral economic relationship, socio-economic commonality, geographic proximities and quality of governance between India and each country included in the analysis). The empirical methodology involves estimating two sets of panel regressions. First, a binary variable regression examines the significance of cross-country difference in banking regulations on foreign banks' decision to enter the Indian banking sector. This regression is carried out using a sample of 37 countries with which India has some economic relation in terms of trade or FDI. The question being addressed here is that given a set of 37 countries that have trade relations with India, what induces some to set up banks in India. The second set of regressions examine the effects of regulatory arbitrage on foreign banks' expansion in Indian banking sector. Here, our dependent variable captures the expansion of 63 foreign banks headquartered in 23 countries in terms of their participation in Indian banking sector. We use two indicators to measure the participation of these foreign banks in India, after aggregating them as per their home country - the asset share of foreign banks from jth home country in total assets of foreign banks in India and office share of foreign banks from jth home country in total offices of foreign banks in India.[4] These regressions are estimated using relevant country level data during the sample periods: 2000, 2001, 2005 and 2010. Data on 37 countries having bilateral economic relations with India is retrieved from Handbook of Statistics on Indian Economy made available by RBI. Thereafter, identification of foreign banks' home country is done by the author from the websites of foreign banks. Data on total number of foreign bank offices and total assets of foreign banks in India is obtained from Profile of Banks annually published by RBI.

[4] Table 1 presents the list of foreign banks present in India categorized by their country of origin.

Further, to account for the joint effect of difference in various banking regulations between each country and India, we develop a Banking Regulation Gap Index (BRGI). BRGI is constructed using the methodology of Principal Component Analysis (PCA). Construction of this index involves estimation of gaps in policies related to different aspects of banking regulations practiced in India and each country. Thus, larger the gap, greater is the regulatory difference and higher is the possibility of regulatory arbitrage for banks originating from the countries included in this study. In this framework, we have assembled information on nine aspects of banking regulation viz., (1) compliance to legal submissions required to obtain a bank licence, (2) statutory capital requirements, (3) liquidity ratio, (4) share of single ownership, (5) limits on banks' capital market participation, (6) strength of external auditing, (7) presence of an explicit depositor insurance scheme, (8) provisioning for non-performing assets and (9) information disclosure of risk management procedures required to be taken up by the banks in respective countries. Data on seven of these indicators has been retrieved from Barth, Caprio and Levine (2004, 2006, 2008 and 2011) Survey on Bank Regulation, Supervision and Monitoring made available by the World Bank. Data on two indicators, namely: statutory capital requirements and liquidity ratio is collected by the author from the websites of the central banks of each country. A detail description of the construction of BRGI is presented in Appendix I.

The panel regression equations that we estimate are given below:

Our first premise that foreign banks' decision to enter the Indian banking sector is determined by the variations in banking regulations in India and in their home jurisdiction, ceteris paribus is examined in regression I.

Regression I:

$$ENTRY_{j,t} = \beta_0 + \beta_1 BRGI_{j,t} + \beta_2 Z_{j,t} + \epsilon_{j,t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where,

$ENTRY_{j,t}$: is a binary outcome variable capturing the decision of foreign banks of jth home country to enter the Indian banking sector at time t. $\mathrm{BRGI}_{j,t}$ is the Banking Regulation Gap Index, $\mathrm{Z}_{j,t}$ is a vector of other control variables and $\epsilon_{j,t}$ is the error term for j=1, ..., n panel of countries at time period t = 1,....,n.

In regression I, we estimate foreign banks' entry choice probability by fitting a logit model to our panel data. Our dependent variable- ENTRY is a binary choice variable which takes value one if jth country is home to one or more than one foreign bank with presence in India and zero otherwise. The choice probabilities are defined as a function of Banking Regulation Gap Index ($\mathrm{BRGI}_{j,t}$) and a vector of control variables ($\mathrm{Z}_{j,t}$) influencing the entry decision of foreign banks in India. We write the choice probability as:

Probability of foreign banks from jth country choosing to enter India at time t:

$$\mathbf{Pr}(\boldsymbol{ENTRY_{j,t}} = \mathbf{1}) = \mathbf{F}(\mathbf{BRGI_{j,t}}, \mathbf{Z_{j,t}})$$

The logit model takes $\mathrm{F}(\mathrm{BRGI}_{j,t}, \mathrm{Z}_{j,t})$ as a logistic cumulative distribution function. In this case, the probability of foreign banks originating from jth home country choosing to enter India given the banking regulation gap and other control variables becomes:

$$\mathbf{Pr}(\boldsymbol{ENTRY}_{j,t} = \mathbf{1}) = \mathbf{F}(\mathbf{BRGI_{j,t}}, \mathbf{Z_{j,t}}) = \frac{\mathbf{e}^{\beta_0+\beta_1 \mathbf{BRGI_{j,t}}+ \beta_2 \mathbf{Z_{j,t}}}}{\mathbf{1} + \mathbf{e}^{\beta_0+\beta_1 \mathbf{BRGI_{j,t}}+ \beta_2 \mathbf{Z_{j,t}}}} = \frac{\mathbf{1}}{\mathbf{1} + \mathbf{e}^{-(\beta_0+\beta_1 \mathbf{BRGI_{j,t}}+ \beta_2 \mathbf{Z_{j,t}})}}$$

We will discuss the explanatory variables shortly.

Regression II and III below examine our second premise that foreign banks' expansion in Indian banking sector is determined by cross-country differences in banking regulations, ceteris paribus.

Regression II:

$$\ln(1 + s.Offices_{j,t}) = \beta_0 + \beta_1 BRGI_{j,t} + \beta_2 Z_{j,t} + \epsilon_{j,t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Regression III:

$$\ln(1 + s.Assets)_{j,t} = \beta_0 + \beta_1 BRGI_{j,t} + \beta_2 Z_{j,t} + \epsilon_{j,t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where,

$\ln(1 + s.Offices_{j,t})$: is logarithmic of one plus share of offices of foreign banks originating from jth home country in total offices of foreign banks in India at time t. $\ln(1 + s.Assets)_{j,t}$: is logarithmic of one plus share of assets of foreign banks affiliating from jth home country in total assets of foreign banks in India at time t. Thus, the dependent variables in equation 2 and 3 are country level variables estimating the share of offices and assets of foreign banks in India grouped as per their country of origin at time t.

Explanatory variables are discussed as below:

$BRGI_{j,t}$: Banking Regulation Gap Index is our main explanatory variable. It measures the differences in stringency of banking regulations that frame entry and operation of banks in jth home country and in India at time t. This index measures the differences in bank regulatory environment between each country and India. If cross-country gap in banking regulations influence foreign banks' decision to establish presence in India then β_1 should be positive. Thus, indicating that regulatory arbitrage is a significant factor inducing presence of foreign banks in India.

$Z_{j,t}$: is a vector of control variables included in the regressions to control for macroeconomic factors that may affect decision of foreign banks originating from jth country to establish presence in India at time t. The reason to include the control variables is to exclude alternative explanations while testing our hypothesis of regulatory arbitrage inducing presence of foreign banks in India. The control variables included in the study are as following:

$GGI_{j,t}$: Governance Gap Index is another index measuring the gap in quality of governance between jth home country and India at time t. The index is included as a control variable to capture cross-country differences in governance standards or institutional facilities that may influence the decision of foreign banks to establish presence in India. The index is constructed using the methodology of principal component analysis (PCA). GGI is based on four indicators reflecting the gap in different aspects of institutional environment existing in each country and India. Data on these indicators has been retrieved from Kaufmann, Kraay and Mastruzzi (2010), Survey of Worldwide Governance Indicators published by the World Bank. Details description on construction of GGI is presented in Appendix I.

$\ln(\mathrm{PCI})_{j,t}$: The logarithmic of per capita gross domestic product (GDP) of jth home country of foreign banks with presence in India at time t. This variable controls for the level of economic

development in the countries. Data on GDP per capita is extracted from World Development Indicators data base published by World Bank.

$\ln(\text{TOTAL TRADE})_{j,t}$, $\ln(\text{FDI})_{j,t}$ and $\ln(\text{FII})_{j,t}$: are logarithmic of bilateral total trade, bilateral foreign direct investment (FDI) and bilateral foreign institutional investment (FII) flows from jth home country to India at time t. As conventional in the literature, bilateral total trade is defined as the sum of the value of imports and the value of exports of goods and services of each country with India. The variable FDI denotes the value of net inflow of FDI from each country to India and FII denotes the value of net inflow of portfolio investment from each country in India. Overall, these three variables examine the level of economic relationship in terms of trade openness and financial market integration between India and the countries included in the study. In other words, these variables aim to control for the impact of cross-country economic linkages on foreign banks' presence in India. Data on the variables of economic integration are collected form the following sources: (i) World Integrated Trade Solution (WITS) data base is used to retrieve data on bilateral exports and imports from source countries to India. (ii) Data on bilateral FDI flows is extracted from SIA News Letter made available by Department of Policy and Planning (DIPP), GoI and (iii) data on bilateral FII flows is collected from Coordinated Portfolio Investment Survey (CPIS) published by International Monetary Fund (IMF).

$\text{COMMONALITY}_{j,t}$: is a dummy variable estimated using a group of commonality variables viz., common borders, common language and common colonial past. The variable takes value one if a home country share same language, border or colonial past with India and zero otherwise. These variables are selected on theoretical grounds mainly to account for geographic proximities and cultural and linguistic commonalities between India and foreign banks' home countries. Information on these variables is collected from CIA World Factbook (2010).

4. Regulatory Arbitrage and Foreign banks in India: an Exploratory Analysis

This section aims to formulate tentative inferences on linkages between regulatory arbitrage and presence of foreign banks in India. We attempt this by exploring the data on foreign banks' participation in Indian banking sector vis-à-vis the BRGI computed in section 3 of this paper.

Table 1 presents a list of 63 foreign banks that were present in India during the period 2000-2012, along with their average asset share in total assets of foreign banks in India. On the basis of the country in which these banks are headquartered, we have identified 23 countries as home countries of the foreign banks. In terms of the income levels, these 23 countries are reported under three categories: high income countries (Australia, Bahrain, Belgium, Canada, France, Germany, Japan, Netherlands, Oman, Singapore, South Korea, Switzerland, United Kingdom, United Arab Emirates, United States of America), middle income countries (China, Indonesia, Mauritius, Russia, South Africa, Sri Lanka, Thailand) and low income countries (Bangladesh). As illustrated in Table 1, during the period 2000-2012, Indian banking sector largely comprised of foreign banks that originate from high income countries such as France (7 banks), Japan (7 banks), United States of America (7 banks from U.S.A) and United Kingdom (5 banks from U.K). In terms of the average asset share, three foreign banks held significant share of total foreign banks' assets in India during the sample period, namely: Citibank (approximately 21 per cent), Standard Charter (approximately 20 per cent) and Hong Kong and Shanghai Bank Corp. (HSBC, approximately 18 per cent).

Further using the list of home countries, we categories the home countries by region, viz., Europe, North America, Asia, Africa and Australia. Figure 1, illustrates average asset share of foreign banks' in total foreign bank assets in India during 2000- 2012, aggregated by the region of their home

country. It is interesting to note that foreign banks from 7 European countries, on an average, held 61 per cent of total foreign bank assets in India while foreign banks from 2 Northern American countries held 30 per cent share in total assets foreign banks in India. Moreover, banks that originate from Asian countries together held 7 per cent share in total foreign bank assets and Australian banks accounted for 2 per cent share in total foreign bank assets. Similarly, in terms of number of offices (Figure 2), a comparison of number of foreign bank offices in the year 2000 and 2012 show that the foreign banks that established majority of offices in India originated from countries of Europe and Northern America followed by Asian countries. While, foreign banks belonging to African and Australian region established relatively less number of offices in India. Overall, the above description suggests that Indian banking sector has been an attractive destination for banks originating from high income countries of Europe and Northern America.

In an attempt to explore the relationship between regulatory arbitrage and presence of foreign banks in India, we plot the asset share of foreign banks in India aggregated by their country of origin vis-à-vis the BRGI for the year 2010. Figure 3 presents a scatter plot that categories the group of 23 home countries into four segments. The first segment (down left) shows countries with which India has small gap in banking regulations and low presence of foreign banks headquartered in these country (7 countries). Similarly, we have other segments showing countries with which India has small banking regulation gap and large presence of foreign banks (2 countries), large gap in banking regulations and large presence of foreign banks (6 countries), large gap in banking regulations and low presence of foreign banks (8 countries). The figure clearly illustrates that countries where banking regulations are diverse from India are also home to foreign banks that held significant share in total foreign bank assets in India. As evident in the figure, banks from U.K and U.S.A held largest share in total foreign bank assets of India in 2010 and these were also the countries where banking regulations are different from India. In the same segment there are countries like Germany, France, Japan and Switzerland that are also home countries of foreign banks that held significant share in total asset of foreign banks in India. Considering the income levels these are high income countries where bank regulatory stringencies are relatively diverse from that in India.

Collectively, these observations provide tentative evidence that difference in banking regulations between India and the home countries may be an important factor driving foreign banks' presence in India. Thus, if regulation arbitrage is indeed a significant factor motivating cross border expansion of banks, then going by the observations in Figure 3, banks from countries like Indonesia, Russia, China and South Africa can be expected to increase their presence in India.

5. Results and Implications

We present the main results of our analysis in Table 2 for the two samples. One sample includes all the countries for which we have constructed our dataset (37 countries), whereas the second sample includes only home countries of the foreign banks present in India (23 countries) during our sample period 2000, 2001, 2005, 2010. Beginning with the sample of 37 countries, Regression I reports the coefficients of equation (1) using binary variable ENTRY as the dependent variable. Regression II reports the coefficients of equation (2) where the dependent variable is logarithmic of one plus office share of foreign banks from jth country in India by total offices of foreign banks in India(1+s.Office). Finally, Regression III presents the coefficients of equation (3) using logarithmic of one plus asset share of foreign banks from jth country in India by total assets of foreign banks in India (1+s.Assets) as the dependent variable. A Hausman specification test chooses Fixed Effects over Random Effects for estimation of equation (2) and (3). However, due to inability of finding convergence with Fixed Effects, equation (1) is estimated using Random Effects. The adjusted R square for the three regressions is 0.93, 0.90 and 0.91, respectively, indicating that the regressions explain most of the variation in foreign banks' entry and expansion in India.

In the first column of Table 2, effect of BRGI (bank regulatory difference between each country and India) on ENTRY is found to be insignificant. This result show that foreign banks choice of entering into India is not induced by the difference in banking regulations between their home jurisdiction and India. Thus, regulatory arbitrage does not seem to determine decision of foreign banks to enter India. However, among the control variables, effect of ln(FDI) on foreign banks decision to enter India is positive and statistically significant at 10%. This positive association seems to indicate that in terms of bilateral FDI, economic relationship between home countries' of foreign banks and India is an important factor determining entry of foreign banks in India. The effect of another control variable, COMMONALITY is found to be negative and significant at 5%. This result indicates that foreign banks entry in India is not driven by geographical proximities, linguistic and colonial similarities. Though this result is counterintuitive, it seems to be true in case of India. In section 4, we observed that a substantial share of foreign bank assets in India is held by banks that originate from countries of European and North American region. Because banks from neighbouring Asian countries have average participation in Indian banking system, negative association of COMMONALITY with ENTRY seem to fit the case of India. The effect of GGI and ln(PCI) are found to be insignificant. This shows that the income levels and gap in governance quality does not play a significant role in determining foreign banks' entry in Indian banking sector.

Second and third column of Table 2 shows the estimated results obtained for the sample of 23 countries. The results of these columns show the impact of our main explanatory variable and control variables on expansion of foreign banks in India. Here, effect of BRGI is found to be positive and significant at 5% in regression I and significant at 10% in regression II. More specifically, this positive association indicates that difference in bank regulatory stringencies between home countries and India significantly effects foreign banks' expansion in India. Interestingly, none of the control variables are found to be significant in both the regressions. Unlike the results obtained for the sample of 37 countries, expansion of foreign banking business in India does not seem to be determined by the socio-economic factors. Thus, these results seem to indicate that opportunity of regulation arbitrage is an important factor driving expansion of foreign banks' business activities in India.

6. Conclusion

In this paper we attempt to empirically examine the relationship between regulatory arbitrage and presence of foreign banks in India. In this attempt we have constructed an index of banking regulation gap (BRGI) to capture the joint effect of differences between various banking regulations existing in India and in the sample of countries included in this study. This index is used as comprehensive measure to examine the effect of regulatory arbitrage on entry and expansion of foreign banks in India. In the section on the exploratory analysis we made an initial indication that foreign banks in India majorly originate from high income OECD countries where banking regulation are comparatively diverse from that existing in India. Since developed countries follow stringent regulations, banks from these countries are expected to expand their business activities in India in order to benefit from the regulatory difference. Supporting this observation our results seem to find evidence of regulatory arbitrage as positively and significantly impacting the expansion of foreign banks in India. This result is in line with earlier studies like Hauston et al (2012), and Herrero and Peria (2007) who found bank capital flows to be driven by stringencies of banking sector regulations across countries. However, as far as entry decision of foreign banks is concerned, regulatory arbitrage does not seem to affect their choice to enter the Indian banking sector. In this case, economic relationship in terms of bilateral FDI is found to an important factor inducing entry of foreign banks in India. Also, geographical proximities, linguistic and colonial similarities were found to have a negative association with foreign banks' entry in India. This may

be owing to the fact that large number of foreign banks in India originate from high income countries of Europe and North America where social settings are different from India.

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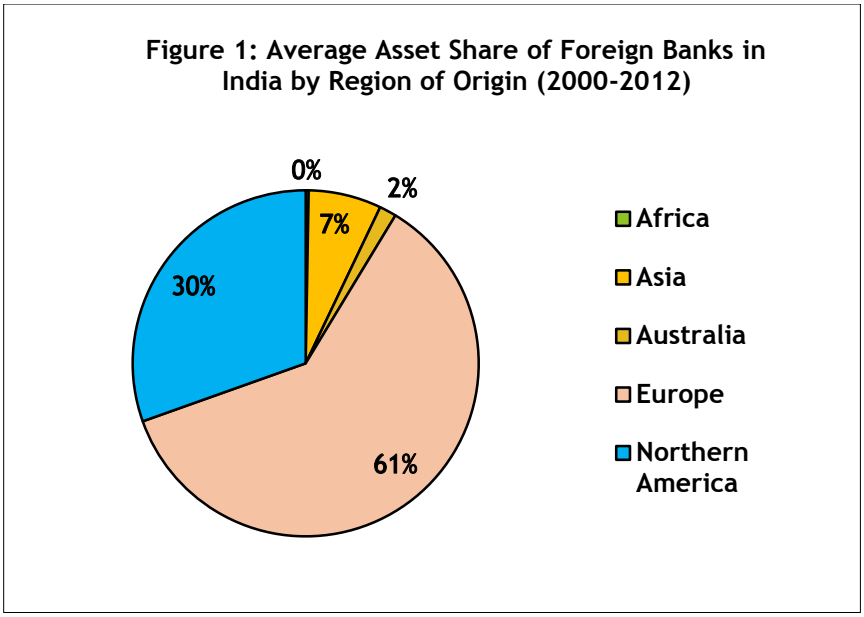
Table 1: Average Asset Share of Foreign Banks in Total Foreign Bank Assets (2000 to 2012)

	Country of Origin	Income Group	Foreign Banks	Average Asset Share (2000-2012)
1	Australia	High	Australia and New Zealand Banking Group	0.04
		Income	Commonwealth Bank of Australia	0.01
			Grindlays Bank	0.92
2	Bahrain	High Income	Bank of Bahrain & Kuwait	0.34
3	Bangladesh	Low	Arab Bangladesh Bank	0.04
		Income	Sonali Bank	0.02
4	Belgium	High	KBC Bank	0.07
		Income	Antwrep Diamond Bank	0.19
5	Canada	High	Bank of Nova Scotia	1.92
		Income	Toronto Dominion Bank	0.02
6	China	Middle Income	Chinatrust Commercial Bank Industrial and Commercial Bank of China	0.09 0.01
7	France	High	Banque Nationale de Paris	0.18
		Income	BNP Paribas	2.21
			Calyon Bank	0.57
			Credit Agricole Bank	0.34
			Credit Agricole Indosuez	0.29
			Credit Lyonnais	0.44
			Societe Generale	0.64
8	Germany	High	Commerzbank	0.10
		Income	Deutsche Bank	5.79
			Dresdner Bank	0.05
9	Indonesia	Middle Income	Bank International Indonesia	0.05
10	Japan	High	Bank of Tokyo Mitsubishi	1.07
		Income	Mizuho Corporate Bank (Erstwhile The Fuji Bank)	0.39
			Sakura Bank	0.10
			Sanwa Bank	0.04
			Sumitomo Bank	0.17
			The Fuji Bank	0.05
			UFJ Bank	0.10
11	Mauritius	Middle Income	State Bank of Mauritius	0.27
12	Netherlands	High	ABN AMRO Bank	6.83
		Income	International Netherland Bank	0.11
			Rabobank International	0.01
13	Oman	High	Bank Muscat International	0.06

	Country of Origin	Income Group	Foreign Banks	Average Asset Share (2000-2012)
		Income	Oman International Bank	0.29
14	Russia	Middle Income	JSC VTB Bank	0.01
15	Singapore	High	DBS Bank Ltd	2.08
		Income	Development Bank of Singapore	0.06
			Overseas Chinese Bank	0.01
16	South Africa	Middle Income	First Rand Bank	0.03
17	South Korea	High	Cho Hung Bank	0.09
		Income	Shinhan Bank	0.13
18	Sri Lanka	Middle Income	Bank of Ceylon	0.10
19	Switzerland	High	Credit Suisse AG	0.03
		Income	UBSAG	0.22
20	Thailand	Middle	Krung Thai Bank	0.04
		Income	Siam Commercial Bank	0.02
			The Siam Commercial Bank	0.02
21	United	High	Barclays Bank	2.14
	Kingdom	Income	Hongkong and Shanghai Bank	18.32
			Royal Bank of Scotland (Erstwhile ABN AMRO Bank)	1.07
			Standard Chartered Bank	20.19
			Standard Chartered Grindlays Bank (Erstwhile Grindlays bank)	2.53
22	United Arab	High	Abu-Dhabi Commercial Bank	0.77
	Emirates	Income	Mashreq Bank	0.18
23	United States	High	American Express Bank	1.53
	of America	Income	American Express Banking Corp.	0.10
			Bank of America	3.49
			Chase Manhattan Bank	0.05
			Citi bank	21.34
			JP Morgan Chase Bank (Erstwhile Morgan Guaranty Trust)	1.55
			Morgan Guaranty Trust	0.06

Source: Statistical Tables Relating to Banks in India (RBI) and World Bank Classification of Countries (2012)



Source: Profile of Banks (RBI). Note: 7 European countries held 61 per cent of total foreign bank assets while foreign banks from 2 Northern American countries held 30 per cent share in total assets foreign banks in India. 11 banks form Asian countries held 7 per cent share in total foreign bank assets and banks from Australia accounted for 2 per cent share in total foreign bank assets for the period 2000-2012.

Figure 3: Asset Share of Foreign Banks in India vs Banking Regulation Gap Index (23 Countries)

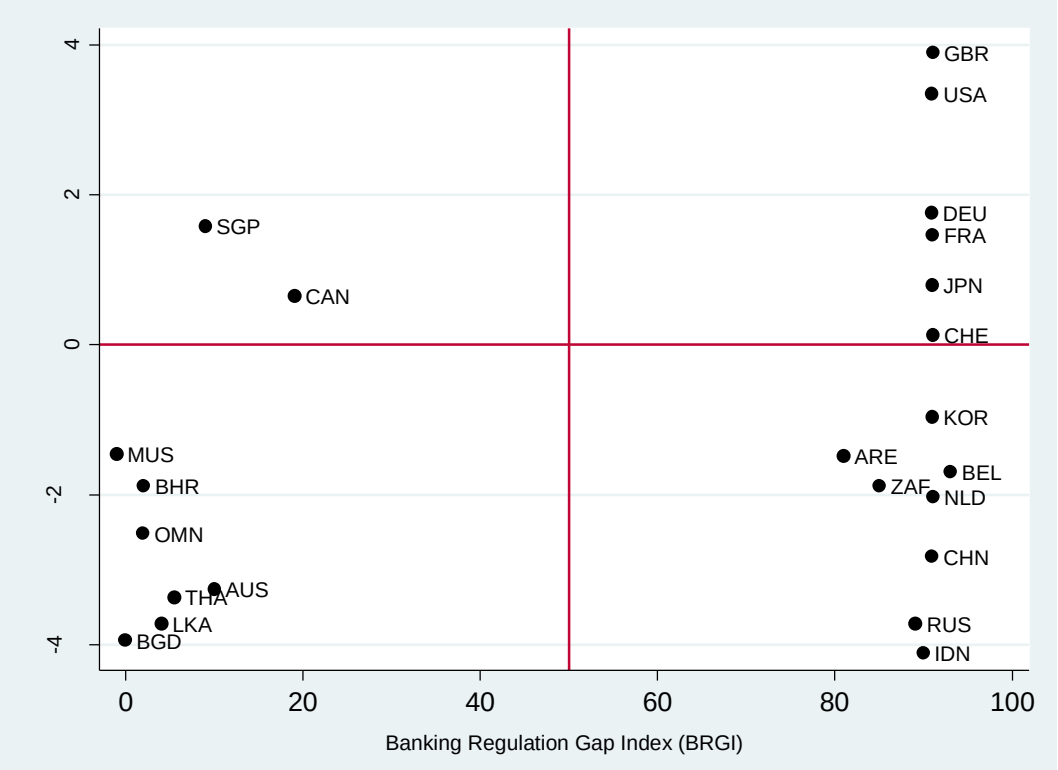


Table 2: Foreign Banks Presence in India and Regulatory Arbitrage

37 Countries		23 Home Countries	
	Regression I	Regression II	Regression III
Dependent Variable	ENTRY	ln(1+s.Offices)	ln(1+s.Assets)
Constant	5.18291	0.165059	1.900903
	(0.578)	(0.924)	(0.112)
BRGI	-0.00047	0.00363**	0.001501*
	(0.807)	(0.005)	(0.084)
IQGI	0.658647	0.05045	0.031591
	(0.388)	(0.77)	(0.79)
ln(PCGDP)	-0.60873	0.066073	-0.12714
	(0.627)	(0.746)	(0.366)
ln(1+TOTAL TRADE)	0.111012	0.031977	0.008277
	(0.797)	(0.404)	(0.753)
ln(FDI)	0.54400*	0.016953	0.002777
	(0.055)	(0.619)	(0.906)
ln(FII)	0.125366	-0.12629	-0.04673
	(0.548)	(0.577)	(0.764)
COMMONALITY	-7.46159**	dropped	dropped

37 Countries		23 Home Countries	
	Regression I	Regression II	Regression III
	(0.005)		
Observations	148	92	92
Hausman Test	RANDOM	FIXED	FIXED
Prob>chi2		0.0375	0.0017
Adjusted R2	0.93	0.90	0.91

Appendix I

A.I: Methodology of Principal Component Analysis (PCA) for construction of Banking Regulation Gap Index (BRGI) and Governance Gap Index (GGI)

To compute Banking Regulation Gap Index (BRGI) and Governance Gap Index (GGI), we use the statistical technique of Principal Component Analysis (PCA). Before applying PCA, we formulate of a number of indicators to quantitatively measure different aspects of banking regulations and governance capabilities for our sample of countries. Then we calculate regulatory and governance gaps by taking difference between the values of the indicators of each country with India. The gaps are estimated as below:

Let $x_1 \dots\dots\dots\dots x_k$ be k indicators. Cross-country gap in these indicators is estimated as $Gap_i = x_{jth\ country,t} - x_{India,t}$ for $i = 1 \dots\dots k$ in time t.

Now using PCA, we define BRGI as the first principle component of gap between banking regulation indicators of each country and India. Similarly, GGI is defined as the first principle component of gap between governance quality indicators of each country and India. We write the first principle component as:

$$PC_1 = \alpha_{11}\, Gap_1 + \dots\dots\dots\dots\dots + \alpha_{1k}\, Gap_K \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (A.1)$$

Where, α's are the elements of the eigenvectors of covariance matrix corresponding to first eigenvalue.

The principal components (PC's) in equation A.1 are estimated as linear combination of a set of variables (Gaps in our case) with coefficients being the elements of the eigenvector of covariance matrix corresponding to its eigenvalue. Generally, studies use PCA as a dimension reduction technique by incorporating only those components that explain maximum variation in the data. The usual criteria employed to account for maximum variation is to include principal components of correlation-covariance matrix corresponding to largest eigenvalues. As a rule of thumb, authors like Chatfield and Collins (1992); Everitt and Dunn (2001) suggest inclusion of principal components corresponding to eigenvalues that are greater than one. For estimation of principal components we adopt this criterion.

Using the above methodology, the following discussion illustrates the indicators and rationale for including them in constructing the indices.

A.II: Banking Regulation Gap Index (BRGI)

BRGI is constructed on the basis on nine indicators of banking regulations, namely: legal submissions required for obtaining bank license, statutory capital requirements, liquidity ratio, limits on banks' capital market participation, share of single ownership, presence of an explicit depositor insurance scheme, provisioning for non-performing assets, strength of external auditing, and information disclosure requirements. Information on these indicators is collected for the period 2000, 2001, 2005 and 2010. Here, data on two indicators- statutory capital requirements and liquidity ratio is collected by the author from the websites of the central banks of each country. Data on the remaining seven is compiled from the four worldwide surveys conducted by Barth, Caprio and Levine (2004, 2006, 2008 and 2011). Appendix Table 1 presents the survey questions included in estimation of the indicators along with their data sources. Banking regulation indicators are discussed as below:

Legal Submissions Required for Obtaining Bank License: Our first indicator, legal submissions examines the administrative arrangements required to be fulfilled by an applicant bank for procurement of a bank license. As illustrated in Appendix Table 1, this indicator comes from summing the responses to eight questions related to bank's operational structure, business strategy, credit policies, hierarchy of decision making bodies and financial strength of the bank. The responses reported in yes/no format are quantified by assigning value one to yes and zero to no. Accordingly, the indicator ranges between 0-8, where higher value indicates greater stringency in the procedure of issuing bank licence in a country.

Statutory Capital Requirements: There are two indicators to measure regulations on statutory capital requirements: minimum start-up capital (expressed in U.S dollars, million) and capital adequacy ratio (in percentage). Regulators impose statutory capital requirements to ensure that banks are able to absorb the losses and retain stability in adverse conditions. Minimum start-up capital is the amount of paid up capital required to be put down by an applicant bank at the time of entry in a country. It shows the preliminary cost of setting up banking business in a particular jurisdiction. Thus, a higher initial capital requirement is indicative of higher cost of establishing banking business in a country. Across countries, banking sector policies pursued by the regulator gets reflected in the differentiated capital requirements imposed on domestic banks and foreign banks. For instance, countries that encourage foreign participation in their banking sector place foreign banks at par with the domestic banks and impose uniform initial capital requirements on both. However, countries that try to prevent domination by foreign banks impose higher initial capital requirement on foreign banks. To incorporate this regulatory difference between home and host country, we compare initial capital requirement imposed on domestic banks in each country with initial capital requirements on foreign banks in India. If the minimum start-up capital for banks in a country is greater than that imposed in India, then it would be less expensive for banks to establish business in India. Thus, due to this difference, foreign banks would prefer to open offices in India rather than expanding in their own jurisdiction.

The second indicator of statutory capital requirements is capital adequacy ratio. This indicator is defined as minimum capital to risk weighted asset ratio (in percentage), as set by the supervisory authority of a country. The total risk weighted assets takes into account credit risk, market risk and operational risk. A high capital adequacy ratio restricts banks to take excessive risk and ensures that banks hold sufficient reserves to absorb potential losses. Thus, in terms of management of banks' risks, complying with higher capital adequacy is indicative of stringent regulatory system in a country.

Liquidity Ratio (in percentage): Liquidity ratio measures statutorily enforced reserve ratio in a country. Definition of liquidity ratio varies across countries, as some may define it as ratio of short-term assets to short-term liabilities, while others may impose it as the ratio of short-term assets to total assets. Broadly, it indicates the proportion of cash or other liquid assets that banks in a country are required to hold in their balance sheet or with the central bank. The purpose of

maintaining this ratio is to ensure that a bank have adequate balance to fund its operations under all circumstances. From the point of view of banks, compliance to high liquidity ratio implies fewer funds left for lending and investments which ultimately affect their returns. In other words, it restricts the operational freedom of a bank in a country. Thus, higher percentage of liquidity ratio is indicative of stringent banking regulations in a country.

Further, we include two indicators to account for the share of ownership in banks and permissible activities of the banks in a country. viz., ownership and capital market participation. The range of activities in which banks are allowed to engage, and share of ownership that shareholders can acquire, are important because they are likely to affect banks entry and expansion decisions in a jurisdiction.

Share of Single Ownership: is an indicator that measures the maximum percentage of bank's equity that can be owned by a single owner. In other words, it shows the maximum permissible share of ownership allowed to be held by a single shareholder in a bank. The term "single owner" includes groups or families/individuals acting in a coordinated fashion. Usually, ownership of banks by large corporate groups and business families is discouraged by the regulators to minimise the risk of misuse of the leveraged funds and restrict the control of banks by a single owner. Thus, lower is the percentage share of single ownership more restrictive is the regulation.

Capital Market Participation: The indicator of restrictiveness on capital market participation examines banks' permissible limits to participate in securities activities (underwriting, dealing, and brokerage services and mutual funds), insurance activities (selling all kinds of insurance and acting as an agent), real estate activities (investment, development, and management) and owning nonfinancial firms (asset finance company, loan company, investment/infrastructure company, and micro finance institution). The extent to which banks can engage in these activates is measured by assigning each activity a value from 0 to 3 on the basis of the following four criteria's:

Unrestricted: If regulations in a country allow full range of these activities to be directly conducted by the banks, then it takes value 3.

Permitted: If banks can engage in full range of these activities, but some of these activities are allowed to be conducted only via affiliates (e.g. subsidiaries, or a common holding company or parent), then it takes value 2.

Restricted: If less than the full range of activities can be conducted by the banks or through its affiliates, then it takes value 1.

Prohibited: If banks are not permitted to engage in any aspect of the given activity, then it takes value 0.

Summation of the values assigned to each activity quantifies the overall restrictiveness on capital market participation by banks in a country. Hence, larger the overall value, less restrictive is the regulations on activities in which banks can engage.

Depositor Insurance Scheme: The indicator of depositor insurance to examine whether the regulator of a country has established an explicit deposit protection scheme, where in, the rules regarding its coverage, funding, and procedure are well defined and enforced as a law. It reflects regulators' policy towards protecting the savings of the depositors. This indicator ranges for 0 to 1, with 0 indicating absence of polices on protection to depositors. From the point of view of the banks, complying with deposit insurance policies implies submission of premiums on the basis of the total deposits collected by them. Thus, existence of deposit insurance schemes that require banks to pay higher premium and impose penalties on uninsured banks increases the stringency of banking regulations of a country.

Next, we include two indicators to measure the strength of external audit and the stringency of classifying loans as non-performing, namely: strength of external auditing and provisioning for non-performing assets (NPA's).

Strength of External Auditing: As shown in Appendix Table 1, the effectiveness of the external audit of the banks is developed by summing up the responses of the six questions related to the autonomy of external auditors. It measures the supervisory power of the external auditors in functioning of banks in a country. The value of this indicator ranges from 0 to 7, where higher value of the indicator is indicative of better strength of the external audit.

Provisioning for Non-Performing Assets: examines whether the regulations makes banks accountable for the non-performing assets. Provisioning requires banks to report the quality of their assets (loans) by classifying them under certain categories (e.g., substandard, doubtful, loss) and accordingly setting aside money for assets that do not generate income for the banks. We measure this indicator on scale of 1to 0, where the indicator takes value 1, if it is mandatory for banks to provision for NPAs and 0, if banks are not required to provision for NPAs.

Lastly, the indicator of information disclosure requirement is included to capture the public information disclosure standard practised in a country.

Information Disclosure Requirements: These comprise of laws that require banks to publish their risk management procedures or annual financial statements, as well as, regulations on submission of final accounts to the supervisor or credit rating agencies. Disclosure of information enforces transparency and accountability in the banking system. As shown in Appendix Table 1, this indicator is estimated by summing up the responses on two questions reported in yes/no format, where yes is assigned value 1 and no is assigned value 0. Accordingly, the indicator ranges from 0 to 2. Where, higher value indicates that regulations of a country makes it mandatory for banks to reveal relevant information about their functioning.

Overall, these indicators attempt to evaluate bank regulatory stringencies existing in each country included in our study. For foreign banks seeking entry and expansion in India, cost of complying with regulations varies due to divergence between banking regulations in their home country and India. This divergence in regulations (calculate as the gaps between the values of the regulatory indicators of each country with India) is indicative of the arbitrage opportunity for banks originating from these countries. In estimation, we combine these gaps by using the method of principal components as described in appendix section A.I. Appendix Table 2 presents the results of PCA based on covariance matrix. It reports the eigenvalues, proportion of variation explained by them and the cumulative proportion of variation accounted for by them for all the years. As reported in Appendix Table 2, the first eigenvalue is greater than one and explains the maximum variation in the data (100 per cent) for all the years. This observation guides us to consider the elements of first eigenvector (α's) as coefficients in estimation of the principal component. Appendix Table 3 gives the components of first eigenvector for all the years. Thus, we refer to the first principal component of gap between banking regulation indicators of each country with India as Banking Regulation Gap Index. The first principal component are estimated using sample of 37 countries for all the year. Weights obtained in estimation of BRGI for 37 countries are also retained for the subset of 23 countries.

In the following section we describe the construction of governance gap index.

A.III: Governance Gap Index

We compute the governance gap index to evaluate the difference in quality of institutional environment between India and each countries in our sample. This index is constructed by using four indicators: voice and accountability, political stability, government effectiveness and control of corruption. Data on these indicators is retrieved from Kaufmann, Kraay and Mastruzzi (2010), Survey of Worldwide Governance Indicators published by the World Bank for the periods 2000, 2001, 2005 and 2010. According to the description provided by Kaufmann et al (2010), voice and accountability indicates the extent to which a country's citizens are able to exercise their fundamental rights like freedom of expression, participate in selecting their government, and existence of free media. Political stability reflects the likelihood that the government will be destabilized or overthrown by unconstitutional means like politically-motivated violence and terrorism. Government effectiveness measures the quality of public services and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Lastly, control of corruption indicates the extent to which public power is exercised for private gain, including both petty and grand forms of corruption. Kaufmann et al (2010), have computed these indicators by using the method of unobserved component model (UCM).5 Estimated values of the indicators obtained through this method varies from -2.5 to 2.5, where higher value indicates strong governance performance. In estimation of our governance gap index, we change the scale of the indicators by adding value 2.5 to the each estimated value, so that indicators range from 0 to 5. Then, we compute the gaps by comparing the new values of the indicators obtained for each country with those of India. Here, a large gap is indicative of greater differences in quality of governance between India and each countries in our sample. To construct the index, we combine the values of these gap by using the method of principal component. Appendix Table 4 and 5, presents results of PCA as explained in appendix section A.I.

Appendix Table 4, reports the eigenvalues, proportion of variation explained by them and the cumulative proportion of variation accounted for by them for all the years. As observed from the Appendix Table 4, first eigenvalue is greater than one and explains maximum variation in the data (more than 80 per cent) in all the years. Accordingly, we consider the elements of the first eigenvector (α's) as coefficients to estimate the linear equation of the principal component. Appendix Table 5 gives components of the first eigenvector corresponding to the first eigenvalue for all the years. Thus, we refer to the first principal component of gap between governance quality indicators of each country with India as Governance Gap Index. The first principal components are estimated using sample of 37 countries for all the years and same weights are retained for the subset of 23 countries.

Appendix Table 1: List of Indicators, Survey Questions and Data Source

No.	Indicator	Survey Questions	Data Source
1	Legal Submissions (ranges from 0-8)	Which of the following are legally required to be submitted before issuance of the banking license?	Barth, Caprio and Levine (2004, 2006, 2008 and 2011)
		Draft by-laws? Intended organization chart? Financial projections for first three years?	

[5] For details on the method of unobserved component model refer to Kaufmann et al (2010).

No.	Indicator	Survey Questions	Data Source
		Financial information on main potential shareholders? Background/experience of future directors? Background/experience of future managers? Sources of funds to be disbursed in the capitalization of new bank? Market differentiation intended for the new bank?	
2	Statutory Capital		collected from websites of central banks of countries considered in the study
	Minimum start-up Capital (USD mill)	What is the minimum capital entry requirement?	
	Capital Adequacy (%)	What is the minimum capital-asset ratio requirement?	
3	Liquidity ratio (%)	What is the minimum liquidity requirement?	collected from websites of central banks of countries considered in the study
4	Ownership	What is the percentage of maximum capital that can be owned by single owner?	Barth, Caprio and Levine (2004, 2006, 2008 and 2011)
5	Capital Market Participation	1. Can banks engage in securities activities?	Barth, Caprio and Levine (2004, 2006, 2008 and 2011)
		2. Can banks engage in insurance activities?	
		3. Can banks engage in real estate activities?	
		4. Can banks engage in owning Nonfinancial Firms activities?	
		(4 aspects of market participation restrictiveness-Securities, Insurance, Real estate and bank ownership of nonfinancial firms captured by 3= unrestricted, 2=permitted, 1= restricted, 0= prohibited)	
6	External Audit Requirements (ranges from 0-7)	Is an external audit compulsory? Are auditors licensed or certified? Is auditor's report given to supervisory agency? Can supervisors meet external auditors to discuss report without bank approval?	Barth, Caprio and Levine (2004, 2006, 2008 and 2011)

No.	Indicator	Survey Questions	Data Source
		Are auditors legally required to report misconduct by managers/directors to supervisory agency? Can legal action against external auditors be taken by supervisor for negligence? Can supervisors force banks to change internal organizational structure?	
7	Depositor Protection Scheme (ranges from 0-1)	Is there an explicit deposit insurance protection system for commercial banks?	Barth, Caprio and Levine (2004, 2006, 2008 and 2011)
8	Provisioning (ranges from 0-1)	Is there a formal definition of "non-performing loan"?	Barth, Caprio and Levine (2004, 2006, 2008 and 2011)
9	Information Disclosure (ranges from 0-2)	Must banks disclose risk management procedures to public? Do regulations require credit ratings for commercial banks?	Barth, Caprio and Levine (2004, 2006, 2008 and 2011)

Appendix Table 2 : Eigen Values(λ) and Proportion of Variation explained by Successive Principal Components(BRGI, 37countries)

	Eigen value (variance of PC)	Proportion of variance accounted	Cumulative proportion of variance accounted
2000			
Comp1	6.1996	1	1
Comp2	0.175	0	0
Comp3	0.5598	0	0
Comp4	0.0645	0	0
Comp5	0.111	0	0
Comp6	0	0	0
Comp 7	0	0	0
Comp 8	0	0	0
Comp 9	0	0	0
Comp10	0	0	0
2001			
Comp1	6.33503	1	1
Comp2	0.165	0	0
Comp3	0.263	0	0
Comp4	0.02415	0	0

	Eigen value (variance of PC)	Proportion of variance accounted	Cumulative proportion of variance accounted
Comp5	0	0	0
Comp6	0	0	0
Comp 7	0	0	0
Comp 8	0	0	0
Comp 9	0	0	0
Comp10	0	0	0
2005			
Comp1	5.820	1	1
Comp2	0.581	0	0
Comp3	0.2965	0	0
Comp4	0.0587	0	0
Comp5	0	0	0
Comp6	0	0	0
Comp 7	0	0	0
Comp 8	0	0	0
Comp 9	0	0	0
Comp10	0	0	0
2010			
Comp1	6.4059	1	1
Comp2	0.674	0	0
Comp3	0.4217	0	0
Comp4	0.0853	0	0
Comp5	0	0	0
Comp6	0	0	0
Comp 7	0	0	0
Comp 8	0	0	0
Comp 9	0	0	0
Comp10	0	0	0

Appendix Table 3: Eigen vectors (α) corresponding to Eigen values greater than 1 (BRGI, 37 countries)

2000	2001	2005	2010
comp1	comp1	comp1	comp1
0	0	0	0
1	1	1	1
-0.0006	0.0003	0.0003	0.0002
0	0	0	0
-0.00032	0	0	0
0	0	0	0
0.054	0.0001	0.0001	0.0001
0	0.0045	0.0375	0.0085
-0.0642	-0.0034	-0.0045	-0.0582
0.0273	-0.0056	-0.0034	-0.0034

Appendix Table 4 : Eigen Values(λ) and Proportion of Variation explained by Successive Principal Components(GGI, 37countries)

	Eigen value (variance of PC)	Proportion of variance accounted	Cumulative proportion of variance accounted
2000			
Comp1	3.68673	0.8542	0.8542
Comp2	0.375724	0.0871	0.9413
Comp3	0.201339	0.0466	0.9879
Comp4	0.052219	0.0121	1
2001			
Comp1	3.49754	0.8368	0.8368
Comp2	0.395498	0.0946	0.9314
Comp3	0.234114	0.056	0.9874
Comp4	0.052724	0.0126	1
2005			
Comp1	3.67237	0.8365	0.8365
Comp2	0.498775	0.1136	0.9502
Comp3	0.179455	0.0409	0.991
Comp4	0.039306	0.009	1
2010			
Comp1	3.56237	0.8381	0.8381
Comp2	0.427884	0.1007	0.9388
Comp3	0.212333	0.05	0.9887
Comp4	0.047937	0.0113	1

Appendix Table 5: Eigen vectors (α) corresponding to Eigen values greater than 1 (GGI, 37 countries)

2000	2001	2005	2010
comp1	comp1	comp1	comp1
0.4489	0.4506	0.4686	0.4422
0.4881	0.4587	0.4552	0.4875
0.504	0.5018	0.5121	0.4959
0.5534	0.5786	0.5577	0.5665

Paper No. 38

Revisiting the Gravity Model of Remittances: Implications for Bangladesh

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Abstract

The gravity model has been applied to explain cross-country flows of trade, FDI, migration, and remittances and has provided valuable insights on the factors that matter in determining these flows. Keeping this in view, we revisit the gravity model of remittances looking for implications of the model in explaining remittance inflows to Bangladesh. In this study, we apply panel data analysis to yearly data over 2002-2013 period extending the model to capture the effect of unemployment in migrant destinations, particularly, the middle-east countries. This is because, the recent crackdowns on migrant workers in the middle-east countries and the subsequent slowdown in migration and remittances growth alerted policymakers of remittance-dependent South Asian countries including Bangladesh. We, therefore, estimate an extended gravity model. The estimated model yields important policy implications regarding unemployment rate, GDP gap, and credit by the financial system in addition to conventional gravity model such as GDP per capita, distance, migrant stock and foreign exchange. Rate. In particular, we observe that higher unemployment rate in migrant destination countries relative to Bangladesh has negative effect on remittance inflows. The results of the study might be useful for reflecting upon effective migration and remittance policy responses for countries that depend on remittances for favorable current account balance, FX reserve accumulation, and poverty reduction.

JEL classification: F22, F24, J61, J71, O11, O24, C23

Key words (3-5 words): Migration, Remittance Flows, Gravity Model, Migration Policies, Panel Data Models

I. Introduction

Recent changes in migration policies in the middle-east and the subsequent slide in the growth of remittances to South Asia has alerted concerned policymakers. This is not surprising given the growing importance remittance inflows have assumed for their positive roles in maintaining current account balance, comfortable foreign exchange reserve, stable foreign exchange rate, and

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providing life-line to millions of people through employment, consumption-smoothening, and investment opportunities. In fact, external sector in many most countries of South Asia such as Nepal, Bangladesh, and Pakistan will be rendered vulnerable in the absence of sustained remittance inflows.

Since sustainable inflows of remittances and their occasional lapses play such importance in economic stability of South Asia countries, a comprehensive understanding the underlying factors is vital. Literature abounds on the microeconomic and macroeconomic determinants of remittances. However, remittances are a result of both economic and non-economic factors like migration, trade, and foreign direct investment, just to mention a few.

Unfortunately, comprehensive studies that incorporate both theoretical and empirical studies are limited in number. Among comprehensive studies as attempts to understand the underlying factors, the gravity model has been accepted among researchers for its ability to yield satisfactory results. The gravity has been applied to explain cross-country flows of trade, FDI, migration, and remittances and has provided valuable insights on the factors that matter in determining these flows.

The current study applies the gravity model to examine the major determinants of remittance flows to Bangladesh. Although a number of studies investigated the determinants of remittance flows to Bangladesh, it is important to check whether the remittance flow dynamic still holds relevant for policy makers. Our study uses most up-to-date panel data and tests the gravity model using a variety of specifications and see if the estimates are consistent and robust. We also attempt to augment the gravity model to test the influence of a number of macroeconomic variables, namely, unemployment rate and price level among important determinants of remittances.

The rest of the paper is organized as follows. The next section surveys relevant literature (Section II). Based on literature survey and data availability, we attempt to develop the model, data set, and methodology (Section III). Then we estimate and report our results (Section IV). Finally, we conclude, and discuss some policy implications (Section IV).

II. Literature Review

Due to the growing importance of remittances for many countries, the existing body of literature on the determinants of remittances is growing in terms of the variety of data coverage, methodology, and approaches. There have been both theoretical and empirical, microeconomic and macroeconomic studies on remittances that are highlighting different aspects of the determinants of remittances. In this paper, we will mostly be limited to explore, develop, and then apply a gravity model of remittances only to explain the factors influencing remittances to Bangladesh.

The application of Newton's gravity model in economics traces back to Tinbergen's (1962) pioneering paper to explain the determinants of international trade flows. Like Newton's gravity model (which explains the force of gravitation between two bodies in the universe based on the mass of the two bodies and the distance between them), the gravity model of trade also tried to explain the determinants of trade based on the size of GDP between two economies and the geographical distance between them.

Since his pioneering work, many researcher examined flows of international trade, migration, foreign direct investment, remittances by using the gravity model. Fortunately, despite having no theoretical basis in economics, the gravity model could be successfully applied to empirical analysis of these macroeconomic variables and produced useful results.

Anderson (1979) attempted to develop a theoretical model of traded and non-traded goods based on the gravity model in which a country optimizes its social utility function under similar traded-goods preference, tax and transport cost structures.

Bergstrand (1985) empirically tested a different variant of the gravity model that incorporated international product substitutability and demonstrated that the gravity equation may be derived as reduced form of a partial equilibrium system that belongs to the general equilibrium model of nationally differentiated goods.

The gravity model of remittances is an important extension to this literature trying to examine the determinants of remittances. Most studies on the determinants of remittances highlighted either microeconomic or macroeconomic determinants of remittances. A number of studies also attempted straightforward atheoretical replication of the Gravity model in the tradition of the gravity model of trade though gravity models of trade are already grounded in economic theories. We have not seen the application of economic theory-based gravity model of remittances in South Asian context though there are some atheoretical studies.

Drawing upon insights from Sjaastad (1962), Wadycki (1973), Greenwood (1975), Schultz (1982),and Borjas (1987, 1989), a study by Karemera et al. (2000) developed and examined a labor-theory based gravity model of international migration to North America using panel data analysis. The labor-theory based gravity model of migration by Karemera et al. (2000) was compatible with the analysis of international migrant flows revealing that in addition to population and income variables, political variables were also important determinants of migration.

In contrast, Lueth and Ruiz-Arranz (2006) examined an atheoretical gravity model of remittances by using a panel dataset of bilateral remittance flows for selected countries over the 1979-2004 period and found that a few gravity variables were able to explain remittance flows although their finding did not show complete conformity with predictions by other studies on a number of variables. The study found significant impacts of the gravity variables such as the size of GDP and the distance across countries although it found mixed evidence on the motives to remit, altruism or investment.

Our paper develops and applies a gravity model of remittances similar to Karemera et el. (2000) attempting to consider some economic reasoning for the variables in addition to conventional gravity variables compared to atheoretical application of the gravity model in Lueth and Ruiz-Arranz (2006) and Ahmed and Martinez-Zarzoso (2014).

Ahmed and Martinez-Zarzoso, 2014) applied a gravity model using replacing distance with transaction costs. The study found that economic performance of the migrant's home country has significant effect on remittances. The study also found that migrants tend to send more remittances during political instability which supports the countercyclical and altruistic motive to remit.

Mahapatra and Ratha (2010) highlighted three factors in determining the flow of remittances, namely, stock of migrants in different migrant-destination countries, the incomes in the migrant sending countries, and income in the migrant sending countries. Ratha and Shaw (2007), Freund and Spataforta (2008), Lueth and Ruiz-Arranz (2008), Sing et al. (2009) cited in Mahapatra and Ratha (2010) identifies the size of emigrant stock as the most important determinant of remittances. Unfortunately, the stock of emigrants is neither recorded nor estimated in Bangladesh since no records on returnee migrants are maintained although the flow of emigrant population is available.

Sayan (2006) and World Bank (2005) found that remittances are counter-cyclical in poor countries like Bangladesh and India (which support altruistic motive) whereas these flows are pro-cyclical in middle-income countries.

Nighat and Balgrami (1993) investigated the determinants to Pakistan and found both altruism and self-interest as migrants' motives for sending remittances to Pakistan. The study also suggested that to increase remittance inflows the country should send more unskilled workers as they tend to remit more than skilled workers.

Our paper contributes to the existing literature of the gravity model of remittances in the following ways. First, we develop a gravity model that is closely aligned with economic theory in examining remittance flows. Second, we attempt to identify a number of variables that were not examined in the literature so far to investigate the factors affecting the flow of remittances. Third, we attempt to estimate migration stock, one of the most important determinants of remittances, from available stock data that are sporadic by nature but we combined it with migrant flow data and average number of years migrants tend to stay in the destination countries.

III. Data and Methodology

The Gravity Model

We drive the gravity model of remittances following the arguments of Karemera et al (2000) that were based on a system of supply and demand proposed by Wadycki (1973), Greenwood (1975), Schultz(1982), and Borjas (1987,1989).

Our benchmark gravity model of remittances is as follows:

$$lrem_{ji} = \beta_0 + \beta_1 \lg pc_j + \beta_2 lmig\_stk_j + \beta_3 ldist_{ji} + \beta_3 fxr_{ji}; i = 1, j = 1, 2, ..., N$$

where all the variables are expressed in natural logarithm and the time subscript t is dropped for convenience. $lr\,e\,m_{ij}$ stands for remittance flows country from country i to country j, $\lg pc_j$ is the per capita Gross Domestic Product of country j (destination country) relative to Bangladesh, $lmig\_stk_j$ is the number of migrants working in country j from Bangladesh, $ldist_{ij}$ is the flight distance between the major airports of country j and Bangladesh, fxr_{ij} is the exchange rate between country j and j (Bangladesh). The β s are parameters to be estimated.

Apart from these conventional gravity variables, a number of variables may also influence remittance flows. We incorporate these variables in our extended gravity model although data availability has limited our choice in this regard. Therefore, to overcome potential omitted variable bias, heteroscedasticy and serial correlation problems, we intend use appropriate panel data analysis methods. Variables that may affect remittance flows between two countries range from economic to demographic to political. We examine the gravity model incorporating these variables that may explain the flows of remittances.

Our extended gravity model of remittances be expressed as follows:

$$lrem_{ji} = \beta_0 + \beta_1 \lg pc_j + \beta_2 lmig\_stk_j + \beta_3 ldist_{ji} + \beta_4 fxr_{ji}$$
$$+\beta_5 relp_j + \beta_6 relu_j + \beta_7 relc_j + \beta_8 opg_j + \beta_9 relr_j; i = 1, j = 1, 2, ..., N$$

Where variables in addition to those described above are, respectively, price levels, unemployment rate, credit by the financial sector, output gap as a percentage of GDP, and rank of governance in destination country (j) relative to Bangladesh (i).

Data

We use yearly remittance inflows to Bangladesh from 13 migrant destination countries (the dependent variable in the model) over the period 2001-2013. Together remittance inflows from these countries account about three quarters of total remittance inflows to Bangladesh. We started with 18 countries that account for nearly 97.5% of total remittance flows to Bangladesh but had to limit our sample to 13 countries for which we could prepare a panel dataset.

Table 3.1: Variable and Data Sources

Variables	Data Sources
Remittance Flows to Bangladesh from Migrant Destinations)	Economic Trends, Bangladesh Bank
GDP per capita relative to Bangladesh)	World Development Indicators, 2014
Air Distance from Bangladesh	http://www.distancesfrom.com
Migrant Stock	Author's estimation
Foreign Exchange Rate	World Development Indicators, 2014
Consumer Price Index	World Development Indicators, 2014
Unemployment rate	World Development Indicators, 2014
Credit by financial sector relative to Bangladesh	World Development Indicators, 2014
Output gap as percentage of GDP	Author's estimation
Governance ranking	The Worldwide Governance Indicators, 2014 Update

In order to find which variables work as gravity variables in determining remittance inflows to Bangladesh from these migrant destination countries, we include a number other important economic, demographic, and geographic variables that the literature on the gravity model of remittances suggested. In addition, we also considered a proxy for distance, namely, the cost of sending remittances but we could not find such data before 2008 and had to drop it. All of these independent variables including the dependent used in the model are described in Table 3.1.

For example, in the basic gravity model of remittances we examine the between the flow of remittances and the following variables: the size of GDP in migrant destination countries and the remittance-receiving countries, and the distance between destination and home countries. It is assumed that countries with higher per capita GDP level will pull migrant workers away from countries with lower per capita GDP; and on the other hand, the higher the distance between two countries is, the lower is likely to be the level of remittance flows between the two countries.

The economic reason for higher per capita GDP leading to higher remittances is that a country with higher per capita GDP offers more employment opportunities than one with lower per capita GDP. On the other hand, higher distance between the two countries means that travel costs for migrants is higher. Thus higher per capita GDP is expected to be positively related to remittances whereas higher distance is inversely related to remittances.

Methodology

Our paper tests a number of panel data analysis methods on the balanced panel data set for investigating the determinants of remittances using the gravity model. In particular, we would

apply pooled OLS, fixed effects (FE), random effects (RE), and RE GLS regression with AR(1) disturbances models. We would also check robustness of the model using a number of alternative specifications.

The Pooled OLS model suffers from unobserved heterogeneity bias (Hsiao, 2008) whereas Panel FE and RE models fix the issue by changing specifications of the regression model. FE introduces dummy variables for cross-sections while RE incorporates the unobserved heterogeneity in the error term. It is important to identify the better model between these two which is conventionally accomplished by Hausman test.

We also examine GLS-RE effects AR(1) model to capture possible autoregressive nature of the variables and check if estimated results tally with theoretical predictions.

IV. Findings

As we mentioned above, we estimated a benchmark gravity model and an extended gravity model of remittances applying a number of panel regression techniques. In our benchmark model, population-averaged GEE (i.e., generalized estimating equation which includes a number of estimation techniques including fixed and random effects models) showed that coefficients of the log of GDP per capita (lgpc), the log of the stock of Bangladeshi migrants in destination countries (lmig_stk), and the foreign exchange rate of destination countries with Bangladesh (fxr) are significant at 5% while the distance between the destination countries and Bangladesh (ldist) is significant at 5% (Table 4.1 below).

An increase of 1% in per capita GDP of destination countries is associated with 2.19% in remittance flows to Bangladesh from the destination countries.

Similarly, 1% increase in migrant stock leads to 0.34% increase in remittance flows from destination countries. The relative contribution of GDP per capita and migrant stock may be debated but we are not able to justify it in this paper.

As we expect from theory, the coefficient of the log of distance (ldist) appears to be of correct sign and is significant at 5% level. Other coefficients in the benchmark model are also of correct sign and are significant at 1% level, supporting the gravity model.

Unlike the cross-country study of Lueth and Ruiz-Arranz (2008) in which common language or common border might play important roles, we think these factors are not relevant in our gravity model of remittance inflows to Bangladesh because no destination countries of Bangladeshi migrants share these attributes with Bangladesh.

We also applied GLS RE and FE models to our benchmark model and found all these coefficients significant although slightly varying significance levels (between 1% and 5%). Our results support the gravity model in explaining remittance inflows to Bangladesh although it contrasts results from Ahmed and Martinez-Zarzoso (2014) regarding distance in his application the gravity model to remittances to Pakistan.

In our extended model, we included a number of important gravity variables in addition to those in the benchmark model such as the CPI, unemployment rate, output gap, credit by financial system, and relative governance performance of destination country relative to Bangladesh (Table 4.2). Except for relative CPI and governance, estimates from the fixed Effects (FE) model find the rest of the coefficients significant at either 1% or 5% level. We find similar results from RE, RE GLS AR(1), and FGLS two-stage models.

Table 4.1 Regression Results of the Benchmark Gravity Model

Dependent Variable: lrem (=Log of Remittance Flows to Bangladesh from Migrant Destinations)	
	GEE population-averaged model
lgpc (=Log of GDP per capita relative to Bangladesh)	2.18998 *** (.3459143)
ldist (=Log of Distance from Bangladesh)	-3.282608 ** (1.390358)
lmig_stk(=Log of Migrant Stock)	.3354213 *** (.0712264)
fxr (=Foreign Exchange Rate)	-.1303717 *** (.0365652)
Number of observations	156

* Significant at 10% **significant at 5%, *** significant at 1%. Standard errors in parentheses.

Table 4.2 Regression Results of the Extended Gravity Model

Dependent Variable: lrem (=Log of Remittance Flows to Bangladesh from Migrant Destinations)				
	Fixed Effects Model	Random Effects Model	Random Effects-GLS - AR(1) Model-2step	Cross-sectional time-series FGLS-panel-specific AR(1)
lgpc (=Log of GDP per capita relative to Bangladesh)	2.249501*** (.4213524)	1.675744*** .3871907	8716123** (.3562374)	.5749855*** (.038286)
ldist (=Log of Distance from Bangladesh)	-5.208215*** (2.392928)	-1.367117 (1.072718)	-.3862625 (.8355344)	-.5233692*** (.1366081)
lmig_stk(=Log of Migrant Stock)	.354238 *** (.0758555)	.2617433*** (.0690529)	.1433674* (.0735467)	.0719653*** (.0100787)
fxr (=Foreign Exchange Rate)	-.1350012*** (.046249)	(-.129812) *** (.0302779)	-.1128296*** .0253098	-.101892*** (.0018322)
relp (=CPI relative to Bangladesh)	-.0460901 (.0670983)	-.0550146*** (.0706668)	-.0383546 (.054268)	-.0219626*** (.0052189)
relu (=Unemployment rate relative to Bangladesh)	-.3455336*** (.1460253)	-.3495615*** (.1304109)	-.4608235*** (.111597)	-.4933527*** (.017754)
relc (=Credit by financial sector relative to Bangladesh)	.3145647*** (.1119585)	.1147973 (.0783835)	.0381348 (.0673611)	.0278813** (.0111727)

opg (Output gap as % of GDP relative to Bangladesh)	-.0014097*** (.0005995)	-.0017257*** (.0006394)	-.0009055* (.0004966)	-.0008712*** (.0000762)
relr(Governance ranking relative to Bangladesh)	-.0073555 (.0115135)	-.0123471 (.0122089)	.0006432 (.0097726)	-.0028209* (.0017038)
Number of observations	156	156	156	156
R-squared	within = 0.4992 betn. = 0.2662 overall = 0.2666	within = 0.4737 betn.= 0.3707 overall = 0.3646	within = 0.4098, between = 0.5064 overall = 0.4540	Est. covar. = 91 Est. Autocorr.=13 Est. Coeff.=10

* Significant at 10% **significant at 5%, *** significant at 1%. Standard errors in parentheses.

We conducted Hausman test to choose between RE and FE models. Since our model failed to satisfy the asymptotic assumptions of Hausman test even after rescaling the variables, we switched to two-stage Random Effects-GLS -AR(1) and Cross-sectional time-series FGLS- panel-specific AR(1) models.

Estimates from two-step Random Effects-GLS -AR(1) model yielded varying level of significance: the foreign exchange rate and relative unemployment rate are significant at 1% level of significance while GDP per capita is significant at 5%. Migrant stock and output gap are significant at 10% lending support to the positive role of migrant in inducing remittance inflows. On the other hand, the negative role of output volatility of destination countries on remittance flows to Bangladesh which contrasts with altruism motive suggested in literature. Finally, distance, relative credit and governance ranking are insignificant implying that remittance flows are not significantly affected by any of these variables.

It is natural to assume and test cross-sectional heteroscedasticity and autoregression as they are more likely in such panel data. So we also estimate a cross-sectional FGLS (panel-specific, AR(1)time-series) model. The estimates display stronger significance levels for coefficients that we got in the two-step Random Effects-GLS -AR(1) model as can be seen in the table.

In our extended gravity model, we find governance ranking of destination countries to be mostly insignificant which is not surprising given that majority of the destination countries are middle-eastern countries. However, we find mixed evidence in case of price level, output gap, and credit by the financial system in destination countries relative to Bangladesh.

In general, our study finds evidence in favor of most of the gravity variables that are traditionally considered and in a number of additional gravity variables that we introduced based on economic reasoning.

V. Conclusion

In this study we attempted to investigate whether the gravity model of remittances can explain remittance flows to Bangladesh. We examined traditional gravity variables such as migrant stock, distance, GDP per capita, and foreign exchange rate and found support evidence in favor the gravity model although at varying significance levels. We also introduced a number of variables such as price level, unemployment rate, credit by the financial system, output volatility, and

governance ranking in destination countries relative to Bangladesh. Our extended gravity model supports the important role of price level, unemployment, credit, and output gap on remittances although governance ranking appeared to be insignificant.

Our findings suggest that remittances are affected by both supply and demand for migrant labor as predicted by the gravity model. The economic conditions in destination countries appears to matter in hiring migrant workers as displayed in significant coefficients of unemployment rates and output volatility in those countries. Rising unemployment in migrant destinations, particularly in the middle-east, may shrink employment (if not for household workers who are paid very low wages!) and wages and hence remittances in future. External economic shocks may transmit through migration and remittance channels to Bangladesh and destabilize macroeconomic stability from a disproportionate dependence on overseas employment and remittances for the external sector stability of Bangladesh. However, a more in-depth analysis is required for making conclusive remarks on the link between unemployment in the destination countries and that in Bangladesh.

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Appendices

Appendices A.1 through A.6 lists output from Stata/MP 13.1 regressions

Appendix A.1

GEE population-averaged model — Number of obs = 156

Group variable: pid — Number of groups = 13

Link: identity — Obs per group: min = 12

Family: — Gaussian avg = 12

Correlation: — exchangeable max = 12

Wald chi2(4) = 96.98

Scale parameter: — 1.030127 Prob > chi2 = 0.0000

lrem	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lmigst	.3354213	.0712264	4.71	0.000	.1958201	.4750226
lgpc	2.18998	.3459143	6.33	0.000	1.512	2.867959
ldist	-3.282608	1.390358	-2.36	0.018	-6.007659	-.5575559
fxr	-.1303717	.0365652	-3.57	0.000	-.2020383	-.0587052
_cons	12.04837	5.029472	2.40	0.017	2.190782	21.90595

Appendix A.2

Random-effects GLS regression — Number of obs = 156

Group variable: pid — Number of groups = 13

R-sq: within = 0.4737 — Obs per group: min = 12

between = 0.3707 — avg = 12.0

overall = 0.3646 — max = 12

Wald chi2(9) = 108.86

corr(u_i, X) = 0 (assumed) — Prob > chi2 = 0.0000

```
------------------------------------------------------------------------------
        lrem |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lmigst |   .2617433   .0690529     3.79   0.000     .1264021    .3970845
        lgpc |   1.675744   .3871907     4.33   0.000      .916864    2.434624
       ldist |  -1.367117   1.072718    -1.27   0.203    -3.469605    .7353719
         fxr |   -.129812   .0302779    -4.29   0.000    -.1891556   -.0704685
        relp |  -.0550146   .0706668    -0.78   0.436     -.193519    .0834898
        relu |  -.3495615   .1304109    -2.68   0.007    -.6051622   -.0939607
        relc |   .1147973   .0783835     1.46   0.143    -.0388315    .2684262
         opg |  -.0017257   .0006394    -2.70   0.007     -.002979   -.0004724
        relr |  -.0123471   .0122089    -1.01   0.312    -.0362761     .011582
       _cons |   6.134361   3.772513     1.63   0.104    -1.259629    13.52835
-------------+----------------------------------------------------------------
     sigma_u |  .52523443
     sigma_e |   .3994072
         rho |  .63360795   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Appendix A.3

Fixed-effects (within) regression Number of obs = 156

Group variable: pid Number of groups = 13

R-sq: within = 0.4992 Obs per group: min = 12

between = 0.2662 avg = 12.0

overall = 0.2666 max = 12

F(9,134) = 14.84

corr(u_i, Xb) = -0.7935 Prob > F = 0.0000

---

lrem	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lmigst	.354238	.0758555	4.67	0.000	.204209	.5042669
lgpc	2.249501	.4213524	5.34	0.000	1.41614	3.082863
ldist	-5.208215	2.392928	-2.18	0.031	-9.94101	-.4754201
fxr	-.1350012	.046249	-2.92	0.004	-.2264736	-.0435287
relp	-.0460901	.0670983	-0.69	0.493	-.178799	.0866187
relu	-.3455336	.1460253	-2.37	0.019	-.6343463	-.056721
relc	.3145647	.1119585	2.81	0.006	.0931303	.5359991
opg	-.0014097	.0005995	-2.35	0.020	-.0025954	-.0002239
relr	-.0073555	.0115135	-0.64	0.524	-.0301272	.0154162
_cons	18.93006	8.650447	2.19	0.030	1.820978	36.03913

---

sigma_u	1.2699174
sigma_e	.3994072
rho	.90998496 (fraction of variance due to u_i)

F test that all u_i=0: F(12, 134) = 21.16 Prob > F = 0.0000

Appendix A.4

Random-effects ML regression Number of obs = 156

Group variable: pid Number of groups = 13

Random effects u_i ~ Gaussian Obs per group: min = 12

avg = 12.0

max = 12

LR chi2(9) = 92.61

Log likelihood = -102.1009 Prob > chi2 = 0.0000

lrem	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lmigst	.3113741	.0691207	4.50	0.000	.1759	.4468482
lgpc	2.023371	.3947305	5.13	0.000	1.249714	2.797029
ldist	-2.497057	1.477604	-1.69	0.091	-5.393108	.3989941
fxr	-.1420772	.0354653	-4.01	0.000	-.211588	-.0725665
relp	-.0521994	.0650067	-0.80	0.422	-.1796102	.0752113
relu	-.3057937	.1295425	-2.36	0.018	-.5596924	-.051895
relc	.2065077	.0952414	2.17	0.030	.0198381	.3931774
opg	-.0015715	.0005853	-2.68	0.007	-.0027188	-.0004243
relr	-.0096389	.0112008	-0.86	0.389	-.0315921	.0123143
cons	9.562825	5.231192	1.83	0.068	-.6901228	19.81577
/sigma_u	.9124591	.213967			.5762501	1.444827
/sigma_e	.3909199	.0235175			.3474402	.4398408
rho	.8449174	.0649671			.6846336	.9393158

Likelihood-ratio test of sigma_u=0: chibar2(01)= 94.25 Prob>=chibar2 = 0.000

Appendix A.5

RE GLS regression with AR(1) disturbances Number of obs = 156

Group variable: pid Number of groups = 13

R-sq: within = 0.4098 Obs per group: min = 12

between = 0.5064 avg = 12.0

overall = 0.4540 max = 12

Wald chi2(10) = 73.32

corr(u_i, Xb) = 0 (assumed) Prob > chi2 = 0.0000

---

lrem | Coef. Std. Err. z P>|z| [95% Conf. Interval]

---+---

lmigst | .1433674 .0735467 1.95 0.051 -.0007816 .2875164

lgpc | .8716123 .3562374 2.45 0.014 .1733998 1.569825

ldist | -.3862625 .8355344 -0.46 0.644 -2.02388 1.251355

fxr | -.1128296 .0253098 -4.46 0.000 -.1624358 -.0632233

relp | -.0383546 .054268 -0.71 0.480 -.1447179 .0680087

relu | -.4608235 .111597 -4.13 0.000 -.6795496 -.2420973

relc | .0381348 .0673611 0.57 0.571 -.0938906 .1701602

opg | -.0009055 .0004966 -1.82 0.068 -.0018788 .0000677

relr | .0006432 .0097726 0.07 0.948 -.0185106 .0197971

cons | 3.835601 2.911972 1.32 0.188 -1.871758 9.542961

---+---

rho_ar | .47299571 (estimated autocorrelation coefficient)

sigma_u | .39449041

sigma_e | .36238789

rho_fov | .54233821 (fraction of variance due to u_i)

theta | .57514906

Appendix A.6

Stata 13.1 Code: xtgls lrem lmigst lgpc ldist fxr relp relu relc opg relr, panels(correlated) corr(psar1) rhotype(tscorr)

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares

Panels: heteroskedastic with cross-sectional correlation

Correlation: panel-specific AR(1)

Estimated covariances	=	91	Number of obs	=	156
Estimated autocorrelations	=	13	Number of groups	=	13
Estimated coefficients	=	10	Time periods	=	12
			Wald chi2(9)	=	7431.48
			Prob > chi2	=	0.0000

lrem	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lmigst	.0719653	.0100787	7.14	0.000	.0522114	.0917192
lgpc	.5749855	.038286	15.02	0.000	.4999463	.6500246
ldist	-.5233692	.1366081	-3.83	0.000	-.7911162	-.2556223
fxr	-.101892	.0018322	-55.61	0.000	-.1054831	-.098301
relp	-.0219626	.0052189	-4.21	0.000	-.0321915	-.0117336
relu	-.4933527	.017754	-27.79	0.000	-.5281498	-.4585555
relc	.0278813	.0111727	2.50	0.013	.0059831	.0497794
opg	-.0008712	.0000762	-11.43	0.000	-.0010205	-.0007218
relr	-.0028209	.0017038	-1.66	0.098	-.0061602	.0005185
_cons	4.853463	.4386971	11.06	0.000	3.993632	5.713293

Note: When the number of periods is greater than or equal to the number of panels, results are based on a generalized inverse of a singular matrix.

Appendix B.1

Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
lmigst	156	4.233333	1.105045	1.28	6.21
lgpc	156	.7441819	.2886328	0	1.282169
ldist	156	3.644521	.1535503	3.384353	3.904878
fxr	156	1.418154	4.462091	.005	21.612
relp	156	.3892756	.5935999	-2.94	2.345
relu	156	1.329936	1.111706	.06	5.88
relc	156	1.741346	1.641144	-1.87	6.33
opg	156	-.7507692	57.54931	-487.54	248.44
relr	156	7.138077	3.490727	1.13	20.11

Paper No. 39

Temporary Migration, Remittance and Technological Adaptation in Nepalese Agriculture

Naveen Adhikari*

Abstract

Exodus of labor and influx of remittance has been a major characteristic of Nepalese Economy. Being among highest remittance recipient countries -accounting about one forth of country's GDP, its role on poverty reduction and macroeconomic balance has been evidenced and acknowledged. The migrants, however, are not only remitting money back to their home but also bringing better knowledge and skills. Few cases of commercial farming have been starting documented in Nepal. Nevertheless, the productive use of remittance- when large chunk is said to be used in consumption (79 %) is a central debate in the country. Using New Economics of Labor Migration framework, this study examines the nexus between labor migration, remittance and agricultural adaptation in Nepal using third round of Nepal Standard Living Survey (NLSS) data. In particular, this paper has examined the role of remittance on technological adoption -use of chemical fertilizer and ownership of agricultural assets/equipments. Using two stage Probit model for correcting endogeneity and simultaneity for self-selection biases, our findings reveal that labor migration has positive impact on use of chemical fertilizer and ownership of assets/equipments while remittance is significant on affecting use of chemical fertilizer only. In particular, the likelihood of using chemical fertilizer increases by 0.0519 and 0.103 following an additional migrant member and a rupee remitted to a household. The case for ownership of assets that generally require higher scale investment has not been impacted by the influx of remittance. That means, remittance coming along with knowledge has positively contributed to partially ease financial constraints at household level yet has not been able to finance a high investment requiring farming assets. Therefore, we conclude that remittance and labor migration has been partially easing the household constraints on financing their farm inputs and assets specially on low expenditure required inputs and technology, yet has not been fully offsetting the resource constraints.

JEL classification: D13, F 22, Q12, Q16

Key words (3-5 words): Migration, Remittance, Technological Adaptation

1. Background

Temporary labor migration and money they remit back to their home countries has been a characteristic of developing world (Rehain, 2014) and contribution of remittance in particular on various facets of economy is also significant(World Bank, 2012). With no exception, remittance has been the life line of the small open economy like Nepal which alone share about 28 percent of GDP, marginally less than that of agriculture sector (32 %) that shelters about 66 % of the population. While migration and subsequently remittance has been instrumental for their development in many developing worlds, there is still large debate whether this should promote in view of large mind and muscle drain from the countries. This paper aims to contribute to this debate considering the case of technological adoption as a result of migration and remittance.

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Economic theory suggests that the effect of migration on agricultural yield could be quite complex in the context where agricultural sector is largely for subsistence and disguised employment is persistent. Stark (1991) hypothesized that migrants play the role of financial intermediaries, enabling rural households to overcome credit and risk constraints on their ability to achieve the transition from familial to commercial production. This hypothesis has been tested by Rozrllie et. al (1999) and evidence has been documented where remittance plays crucial role on easing constraints posed by credit-constraints (Taylor and Yunez-Naudel ; 1999; Taylor 1987; and Martin; 2001).

Since the First World War, Nepali youth have continually migrated to foreign countries in search of better employment opportunities, high wage and livelihood. The growth of migration rapidly accelerated in the last two decades after Nepal underwent policy changes conducive to opening up and liberalizing the economy. With few employment opportunities on manufacturing and industries sector accompanied by low agricultural productivity in rural area, the trend migration out of country is ever increasing (MoF, 2011). Persistent and widespread socio-economic inequality and decade long conflict were the fueling factor for both internal as well as external migration (Adhikari, 2010).

Along with ever increasing labor migration out of country, the influx of remittance has helped households on smoothening consumption. Out of total remittances, 79 percent is spent on daily consumption followed by loan repayment (7 percent), household property (5 percent) and education (3 percent) (CBS, 2011). This pattern indicates that there is a considerable implication on the livelihood of people as a major portion of remittances is spent on consumption. Merely 2.4 percent is spent on capital formation (CBS, 2011). Besides, contributing for poverty reduction, it has helped on maintaining external macroeconomic stability in last decade (NRB, 2011). In 2004, remittances constituted 14.2 percent of GDP and escalated to around 25 percent in 2009/10. In terms of amount, around NPR 359.55 billion (USD 4.41 billion) has been received from formal channel in 2010/11. This data reveals that the dependence of Nepal's economy on remittances has been increasing over the years and this trend looks set to continue for some time to come. Given limited earning from tourism and export, it indicates that the growth of domestic sectors that earn foreign exchange is not as pronounced and encouraging as remittance (NRB, 2011; MoF, 2010/11).

While influx of remittance has helped economy and households in many ways, it has started to show its effect on agriculture sector too. The Nepalese Agriculture sector is suffering in recent decade from shortage of labor especially on the small scale and traditional farming. The agriculture sector is indeed amidst transition- on its way to transformation from traditional to modern sector (Ghimire, 2012). Both good and bad news sets the contours of agriculture sector in Nepal. Nepal Living Standard Survey (NLSS) shows that a large proportion of labor has left the agriculture sector and labor migration is possibly the most pertinent reasons (CBS, 2011). Given that manufacturing sector is shrinking and expanding service sector requires skilled labor, it would be of no surprise to believe that labor migration has been the reason for labor's withdrawal from the agriculture sector. Interestingly, there has been the occupational shift within the agriculture sector itself. Expanded foreign employment and newly emerged sectors such as grocery, tea shop, vehicle repair, stationery, beauty parlor, private school, poultry farming and fresh house and construction which are being pushed up by the inflow of remittance are providing better options to youths as compared to farm (Ghimire, 2012). As good stories, few returnees have started commercial farming with better financial resources and skill, knowledge at hand. The rural households, where it is feasible, are using tractors for ploughing in view either shortage of labor or too excessive wage of the available labor.

As such, Nepalese agriculture suffers from numbers of problems- shortage of inputs and other infrastructure in one hand while policy focus, government investment and lack of institutions on

the other. Lack of irrigation facility, access to inputs and credit, use of chemical fertilizers and improved seeds are the problems faced in terms of inputs (Karna, 2004). Likewise, adoption of technology, financial resources availability for agricultural inputs and capital are constraints characterizing Nepalese agricultural sector. As a result, agricultural productivity remains poorest in the South Asia (Pyakuryal, 2010).

In this context the primary question that this paper aims to answer is whether agriculture productivity has been linked with labor migration? has remittance helped on accessing the technology and improved seeds?.

2. Review of Literature

While the external labor migration and flow of remittance has been an event for long, examining its impact on various facets of economy is a recent phenomenon. The labor migration issues has been well documented in literature of development economics by Lewis (1954) and Harris and Todaro (1970). Whereas these authors take a neo-classical case of wage differential as the factors responsible for migration, the New Economics of Labor Migration (NELM) recognize migration as risk diversification strategy adopted by household and remittance being the instruments to cope with such strategy.

Lewis(1954) argue that a developing economy is characterized by dual sector with presence of both a traditional subsistence agriculture sector and a modern capitalist sector and a surplus labor from can be withdrawn from subsistence sector to modern sector contributing to the increased production and productivity of the economy. The empirical paper of Schultz in India and Marbo in Egyptian economy showed that that withdrawal of labor from the agriculture does not necessarily increase the average and marginal production. Harris and Todaro (1970) has used some microeconomic fundamentals to explain the rural-urban migration. The fundamental working of the model is that the migration decision is based on expected income differentials between rural and urban areas rather than just wage differentials. This explains basic economic rational that migration takes place from rural to urban area is expected urban income exceeds that of rural. Rural to urban migration causes overcrowding and unemployment in cities as migration rates exceed urban job creation rates, with many people ending up in unproductive or underproductive employment in the informal sector.

While both of these theories explain the basic economic rational as the cause of migration, the new labor economic theory suggests a multiple factors. Indeed, the neoclassical explanations are typically based on assumption that each migrant rational human being choosing optimum combination of wage rates, job security, and costs of travel-wage differentials being the crux of all. Therefore, differentials on wages and employment conditions between countries and on migrant costs, individual decision to maximize income induces the migration and international movement does not occur in absence of differences in earnings/and or employment rates between states (Bates; 1990). However, the new economics of migration theory suggest that wage differential can't be sole factor to explain migration. It also focuses that migration decision are not made on individual basis but on larger basis considering families or households. They not only migrate to maximize expected income but also to minimize the risks that could arise from sudden drop in income or production. New economic theory assumes that wage differentials is not a necessary condition for migration to occur, households may have strong incentives to diversity risks through transnational movement even in the absence of wage differentials (Harbison, 1981). However, the migration decision is still not seen as a strategic family decision; the paper only acknowledges that families can influence the individual migrants' decision, e.g. through the demographic structure. When looking at migration from a gender perspective, family structure can influence the migration decisions of women in particular. As Morokvasic (1984) points out, women migrate not only because of economic motives, but also to get married, due to social constraints,

low rights and lack of protection against domestic violence. Sandell (1977) and Mincer (1978) on the other hand view migration as a family decision. The family as a whole migrates if their net gain is positive. If only one partner finds a (better) job at the destination, the family only migrates if gains of one family member internalize the losses of the other family member. The family migration decision is thus in essence an aggregation of individual migration utilities. Bigsten (1988) also considers migration a household decision in which a family allocates labour to the urban or rural sector depending on the marginal products of combined wages.

The theoretical foundation for this route of migration is discussed on paper by Stark (1991) and hypothesized that migrants play the role of financial intermediaries enabling the rural households to overcome credit and risk constraints on theory ability to achieve the transition from familial to commercial production. The NELM is the only migration theory that explicitly links the migration decision to the impacts of migration, with remittances being this link (Taylor & Fletcher, 2001). According to the NELM a household maximizes joint income, status and minimizes risks. All three aspects contribute to the migration decision of the household. It is also important to note that this stress on relative income unlike absolute income solely explained by the wage differential. The migration takes place not only because for potential higher incomes but also that relative income so as to avoid the relative deprivation. The another major contribution of NELM is the recognition of risks as cause of migration. These risks are mainly linked to capital market failures in the source areas, other than labour market failures already analyzed by other authors. Household try to overcome market failures in their environment, for example missing or incomplete credit and insurance markets. If public social protection is also limited, the household has no means to smooth consumption in difficult times or to make investments. As will be argued below, migration is a way of overcoming these market failures (Hagen-Zanker, 2008).

For the reasons, as proposed by NELM, one of the important link of migration is the remittance. When a large population of low income countries depends upon the agriculture, the labor migration can be largely attributed the diversify risk from crop failure or any unexpected failures. When remittance the channeled to agriculture, it has long term effect too. The labor migration helps on remittance inflow which in turn makes more financial resources available to households. Besides, smoothening consumption by rural households due to remittance, the resources can be used to finance the expenditure on agricultural inputs and assets. The household undertakes migration of some of its members with expectation that, remittances will finance their agricultural investments (Quinn, 2009).It is argued that rural agriculture sector is constrained by lack of access to credit, technology and improved seeds which could be overcome by the inflow of remittance. The literature of New Labor Economics (Stark, 1991; Stark and Bloom, 1985; Taylor, 1992), migration is not a result of a decision taken by one single individual but a collective decision at the household level, which adopts it as a response to precarious environmental conditions and when there is an incomplete or lack of labor, credit and insurance markets. In particular, the migration at the household's level is undertaken to face the insufficiency and/or the instability of income to reduce poverty. The literature proposes that migration and remittances may increase agricultural technology use by reducing household risk and credit constraint (Quinn, 2009).

The empirical review on linkage between remittance and agriculture is limited yet growing. Rozelle et. at. (1999) found the direct effect of migration on yields is significant and negative. They found a fall in yields by 461 mu per hector for an when an each member leaves the farm. However, the study also suggests that the negative short run effect from less family labor is indeed partly compensated by access to capital through increased remittances. An additional yuan remitted increases the yield by 0.44 jin per mu. Therefore, this paper tests and support the NELM theory that the labor migration could decrease the agriculture production in short run while it may be compensated through access to capital in long run.

On similar study by Zahonogo (2011) for the Burkina Faso found similar results. Following same methodology and hypothesis for testing as by Rozelle (1999) found a decrease in agriculture production by 0.098 with an additional labor migrants. He argue that it's obvious when the labor market is not perfect and rural sector does not become capable of hiring a labors. The remittances have a positive though insignificant effect on agricultural productivity. This has been able to partly compensate the short run loss. In another study by World Bank (2008) in Chilli, the number of working force has a positive influence on agricultural production.

The study by Brawu (2007) has examined the seasonal migration in Vietnam and its impact on input demands. Since access to technology can be largely assessed by access to input, this papers examine the effect on input demands unlike Rozelle (1999) and Zahonogo (2011). He founds that migration and remittance has small effect on the agriculture sector. The use of total fertilizer indeed varied negatively with both rice and non-rice production. As a result, it does not seem that migration is helping households overcome constraints on high value production such that presumably found a positive coefficient on fertilizer demand for the crops other than rice.

Mendola (2005) has examined the interrelationship between determinants of migration, conceived as a family strategy and the potential impact of having a migrant household member on people left behind. The study finds that richer and large holder households are more likely to participate in cost high return migration and employ modern technologies thereby achieving higher productivity. Poorer households, on the other hand, are not able to overcome entry costs of moving abroad and fall back on migration with low entry costs and lower returns (i.e. domestic migration), the latter does not help them to achieve production enhancements and may act as poverty trap lock household into persistent poverty.

The survey of literature reveals that there is large theoretical literature available for explain the linkage between labor migration, remittance and agricultural productivity specially from new economics of labor migrations. However, a little evidence is documented empirically to support refute the hypothesis forwarded by the theoretical literature.

3. Methods and Data

3.1 Theoretical Framework

While most of hypothesis aims at testing the insurance role of migration to overcome the credit constraints, this paper also allows to examine anther channel of impact through the knowledge that migrant worker acquired in working country abroad (Figure 1). Nevertheless, following Rozelle et. al. (1999), we too start consider a housheolds/farmer with usual production function.

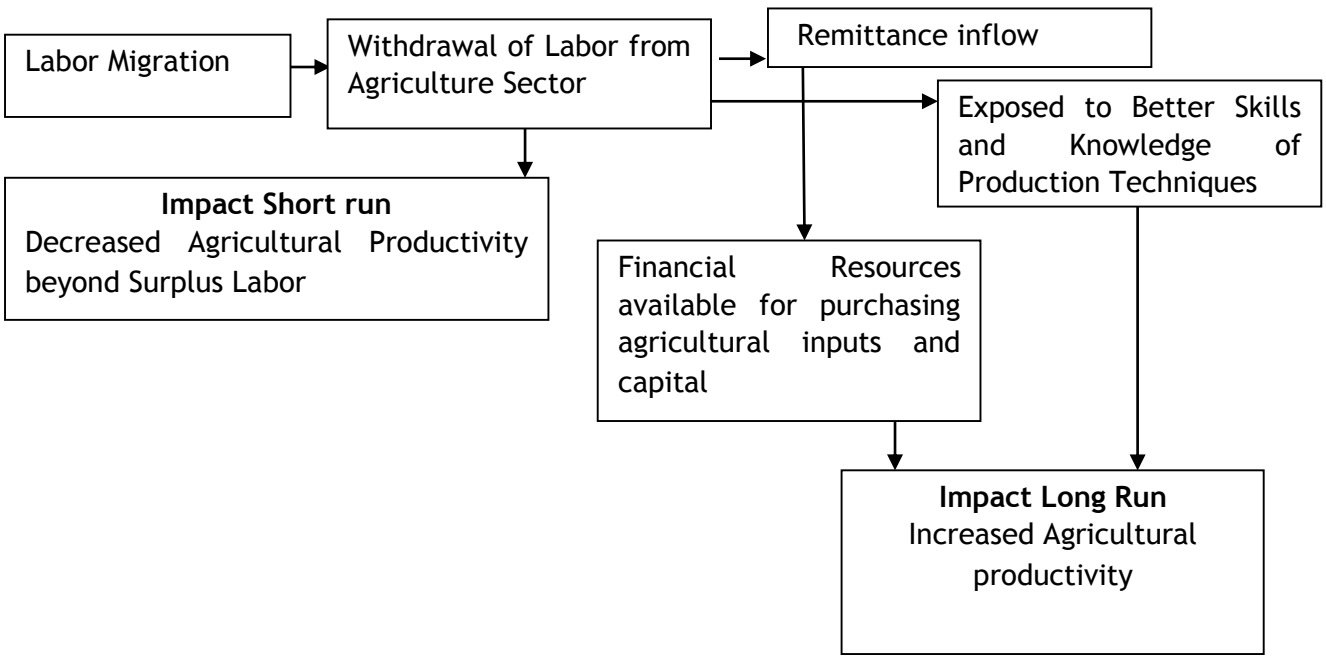
We consider that a typical household has the production technology revealed as $Q=f_i (T,Z_y)$, where T is the fixed resources of the household including both human and non-human capital and Z_y is set of household charetericis (eg experience, knowledge) that affect output. Now, household faces trade off between investing between high yield (modern) or low yield (traditional technology). In case of perfect market labor and credit market, the household could have chosen the output level that maximizes the yield. However, in a rural setting where markets are imperfect, the household are bound to choose the low yield technology, therefore producing a constrained output. Let household is choosing a particular technology say T_1, then the production function would be $Q_1^c=f_1 (T_1,Z_y)$. Here it is reasonable to believe an imperfect rural agricultural input market due to both labor and credit market. Labor market is imperfect as in event of shortage of labor (due to migration), no substitute is available at same premium. Also, credit market, as often, is also imperfect due to absence of formal financial intermediaries and presence of traditional money lenders. Accordingly, the farmer is assumed to produce below sub optimal level and produces a constrained output level Q_1^c.

Now, if a household is adopting a technology T_1, it would be mean that cost of technology c(T_1) would be such that c(T_1)≤K,c^' (T_1)>0 , where k would represent the household's available credit or cash to invest in this technology. New economics of labor migration consider that family migrants (M) could contribute on relaxing the credit constraints through remittances R or by allaying risk constraint through remittances or a willingness to remit in the event that household suffer income loss. Therefore, household's available financial resources (K) would be the function of both migration and remittance. That is, NELM argument is that K=g(R,M). By relaxing the resource constraints under given the shape of production technology, the households may opt for higher output. This would also mean alternations to the input combination. It is also important to note that the knowledge that migrants acquire abroad could shape production technology and could accordingly have impact.

Therefore, with usual producer's yield maximizing, the demand for input could accordingly be derived on reduced form as

I_i=ø_i (R,M,Z_y)..... (1), I is the demand for ith input with price of inputs are normalized to one.

Figure 1: Conceptual Framework for impact of Labor Migration and Remittance on Agricultural Productivity



Source: Tuladhar et. al. (2014)

3.2 Empirical Strategy

The interest of the paper is to estimate equation (1) as discussed under theoretical framework. As discussed, the migration and remittance may induce and help household on adopting better farming technologies as suggested on NELM hypothesis and framework. The migrant may be better aware about the benefits from adopting technology and hence induce household tend to adopt such technologies. Likewise, the remittance may ease the financial and credit constraints at household level, which in turn allow household to spend on purchase of productivity enhancing technologies. Since technological adoption may be complex, we have assessed it through two sets of indicator- use of chemical fertilizer and ownership of farming assets. In particular, we have examined whether household has purchased Urea, DAP and Complex as reported in the NLSS to

estimate the effect of migration on use of chemical fertilizer. The dependent variable therefore is a dummy representing 'yes' if household is observed to purchase either of fertilizer mentioned above. Likewise, second set variable include the ownership of farming assets that helps on increasing agricultural productivity. The equipments under examination are cart, generator/diesel engine storage bin, plough, thresher, tractor, trolley and water pump. Again, in second set of question, we have examined the effect of migration and remittance on ownership of farming assets, which is again a dummy variable (1 if household owns either of machines/assets).

Since the dependent variables in case of demand for input and use of technology are dichotomous- that is whether or not household uses any chemical fertilizer or own agricultural machines; we have used the standard probit regression equations to examine the impact of remittances.

Consider that a household is observed to use chemical fertilizer or own agricultural equipments/machines then the standard dummy dependent equation can then be specified as:

$$〖Y_ij〗^*=α+∂_0 M+∂_1 R+ Σ▒〖β_(ij) Z_ij 〗+Σ▒γ_ij H_ij \quad \text{..... (2)}$$

Where Yij* (ith household on jth primary sampling unit) is a latent variable such that Y*>0 if Y=1 and Y*≤0 otherwise. M is migration variable while R is the remittance. Zij is vector representing household level characteristics including and Hij is the variables typically enter while estimating the demand equation.

$$F(∅)= α+∂_0 M+∂_1 R+ Σ▒〖β_(ij) Z_ij 〗+Σ▒γ_ij H_ij \quad \text{..... (3)}$$, where F() is the cumulative density function.

While equation (2) can be estimated to examine the impact, it is important to note that migration and remittance process is not random and so is adoption of chemical fertilizer or machines. This lead to endogeity problem in the estimating equation (3). It is not only the case of non-random, rather there are simultaneity issues as migration and remittances are linked with a type of structural equation. Use of instrumental variable is the strategy suggested in econometric literature to overcome these problems. Accordingly, to overcome this problem we use 2 stage probit model with instrumental variable to overcome these issues.

3.3 Data

The data used in this research are from Nepal Living Standard Survey (NLSS). NLSS follows globally adopted framework and methodology developed by World Bank. Central Bureau of Statistics (CBS), National Planning Commission, Government of Nepal has been carrying out Nepal Living Standards Survey (NLSS) since first time in 1995/96. The second round of the NLSS was conducted in 2003/04. The Nepal Living Standards Survey 2010/11 (NLSS-III) is the third round of the survey conducted by the CBS as a follow up of the previous two rounds. All the three surveys followed the Living Standards Measurement Survey (LSMS) methodology developed by the World Bank. While panel data could be desirable to examine inter temporal changes and specially looking on impact, this paper uses cross section data of NLSS III in view of unavailability of panel data. This cross section survey, NLSS-III enumerated 7,020 households, of which 5,988 households are from the cross-section sample and the remaining 1,032 are from the panel sample. The NLSS provides useful information on number of variables. The particular sections providing information about labor migration, remittance and agriculture is indeed provided on section Chapter VIII and IX of the NLSS questionnaire.

4. Results and Discussion

Our descriptive statistics reveals use of fertilizer and ownership of farming assets in favor of household with at least one migrant worker (Table 1). Table 1 shows that about 51 percent of

migrant household are found to purchase urea as compared to about 44 percent for that of non migrating household in case of Urea. The results are similar to DAP with about 36 percent of household with migrant worker purchasing it against just 30 percent of household with no-migration. Surprisingly, however, the results are opposite in case of use of complex fertilizer, which could possibly because only a few number of households reported to use it. It is also not common across household as Urea and DAP. The results are similar in case of owning the farming machines, equipments and assets. It is found the plough and storage bin being owned by a large proportion of the household. Among these, storage bin is found to be owned by about 28 percent of household with migrant as compared to 23 percent of non-migrant household. While only a few households were found to own cart, thresher and water pump, the findings are still in favor of migrating household. Surprisingly, ownership of generator, tractor and trolley is found more among households with no migrants. This could be possibly because these need huge investment and only a household with higher income could afford that. In turn, a household with exceptionally high income may need no migration.

Table 1: Relationship between Migration and Input Demand

Variables	Migrated Household (%)	Non Migrated Household (%)
Use of Chemical Fertilizer		
Urea	50.90	44.30
DAP	36.70	30.30
Complex	1.79	2.39
Ownership of Machinery Equipments		
Cart	2.61	2.51
Generator	0.16	0.31
Storage bin	27.90	22.99
Plough	39.59	32.68
Thresher	0.98	0.80
Tractor	0.38	0.84
Trolley	0.27	0.53
Water Pump	5.22	4.43

Source: NLSS III- 2010/11

Though the descriptive statistics reveals the use and ownership in favor of migrating households, the use of chemical fertilizer and ownership of assets might have been affected by number of variables. Therefore, the control of other possible explanatory variable is imperative. Therefore, we ran logistic regression on examining whether temporary migration has been significant ondetermining the use of fertilizer and ownership of farming assets.

We use instrumental variable technique to examine correct for that. Due to availability of the methodologies on econometric literature, we use two stage Probit model with continuous endogenous variables. In our case, the number of migrant worker is endogenous and is instrumented with proportion of the migrant worker in given primary sampling unit.

Our result also supports what our results above concluded on partial effect model. That means, labor migration is important on determining both of the dependent variables but remittance is important on determining the use of chemical fertilizer only (Table 4.4). It can be seen that labor migration is positive and significant in both cases indicating that there is high probability for the use and own of both-chemical fertilizer and farming assets/equipments. The coefficient of remittance is indeed not uniform across our model. It is positive and significant in case of use of fertilizer indicating the remittance has contributed on purchase and use of fertilizer. However, it is found negative yet insignificant on determining the ownership of assets. This could be possibly

because the assets require more money than chemical fertilizer therefore remittance may not be sufficient enough for household in view of other priorities like consumption expenditure or repayment of the loans.

In case of Model (1), the other variable found significant are total annual consumption expenditure is found negatively significant. The education and sex dummy of household head is also negative and insignificant. So is the age of the household head. Interestingly, it is found the number of children family members (<15 years) are negatively significant indicating that having more children at home decreases the likelihood of application of chemical fertilizer. However, having more old members at home (> 60 years) result on higher probabilities for use of fertilizer.

The number of livestock is positively associated with use of chemical fertilizer. While it can be anticipated that with higher number of livestock at household level produces more dung and hence substitute chemical fertilizer. As number of livestock is also the symbol of wealth in the society, the wealth or income effect could dominate the substitution effect. Land total again is negative associated with use of fertilizer but surprisingly irrigated land is not found significant. The agricultural yield (proxy by paddy in Kg) has positive and significant association with use of fertilizer. Indeed, higher yield gives both incentive and ability to purchase the inputs. Microeconomic theory, on its typical profit maximizing model while deriving input demand, also suggest that higher price of output is associated with higher demand for inputs.

Table 2. Impact of Labor Migration and Remittance on Input Demand (2 Stage Probit Model Results)

VARIABLES	Model (1) Use of Chemical Fertilizer	Model (2) Ownership of Assets
Number of Migrants	0.0519***	0.103***
Remittance Received	4.63e-07*	-3.92E-08
Household Size	0.00512	-0.0263
Nominal consumption Expenditure	-5.25e-06***	-7.54e-06***
Literate (1 if yes)	-0.0155	-0.282***
Sex of Household head (1 if male)	-0.00444	-0.187**
Age of HH head	0.0209*	0.0211
Square of Age	-0.000288***	-0.000322**
Number of Children (<15 yrs)	-0.0448*	0.0272
Number of elder (>60 years)	0.0864*	0.047
Number of Livestock	0.0193*	0.334***
Land owned (in Hector)	-0.102***	-0.0243
Proportion of Irrigated land	-0.161	-0.555***
Eastern Development Region	0.545***	0.435***
Central Development Region	1.048***	0.069
Western Development Region	0.716***	0.633***
Far Western Development	0.270***	0.561***
Mountain	-0.544***	0.238*
Hill	-0.457***	-0.144**
Paddy produced (in Kg)	0.000759***	0.000234***
Instruments for Migration		
Proportion of Migrants Population	50.95***	67.95***
Constant	-0.389	0.998**

Source: Computed from NLSS III Data

From Model (1), our results, as discussed on previous section, consistently show that geographical variations matters for the use of fertilizer. This fact is evident from the finding that all development regions and ecological belts dummies are found significant. With the reference development region FWDR, all rest of development regions namely EDR, CDR, WDR and MWDR are found positive and significant. This implies that all the regions compared to FWDR have high probability of using the chemical fertilizer. Likewise, as anticipated, both mountain and hill are found having lower likelihood of using fertilizer as compared to Terai.

In model (2) also numbers of variables are found significant. The annual consumption expenditure is found negative and significant on determining the ownership of the assets. The reasons, as explained above, could be the shift factor- household might choose to shift to manufacturing or service sector. The household size however is not found significant. So is in case of number of dependent family members in a house. The number of children (less than 15 years) and number of old (more than 60 years) are both found insignificant. Among variable capturing household head characteristics, the education and sex dummy are found negatively significant. This implies that a literate household is less likely to own assets as compared to household with illiterate household head. Likewise, a female headed household are more likely to own assets as compared to household with male head of the household. The age is insignificant yet positive while square of age is significant and negative. The sign indicates that probability of owning assets increasing with increase in age however at decreasing rate.

The number of livestock is positively and significantly associated with ownership of farming assets. As explained above, this could possibly because of complement relationship between livestock and assets. This is typical case for plough or cart which requires the use of ox or buffalos in Nepalese society. In contrary, a household with higher irrigated land has less likelihood of owning the assets. This indicates that farming assets and irrigation land are substituted with each other. In particular, it may be the case that household with larger irrigation land and hence higher productivity may not be compelled to use farming assets that are also instrumental on increasing productivity. The land total however is not found significant.

The geographical variations as revealed by development and ecological regions show significant variations on ownership of farming assets. With reference FWDR, all regions have higher probability of owning farming assets with an exception that central region is not statistically significant. In terms of ecological belts, the mountain region surprisingly is found have higher probability of owning equipments as compared to Terai. The hill in turn is less likely to own same as compared to Terai. It is also found the instrument used on both cases- that is proportion of migrant worker in primary sampling unit (PSU) is also found significant.

5. Conclusion

Labor migration and remittance has been central characteristics of Nepalese Economy. With about 25 percent of GDP being remittance, it's positive impact on economy is highly acknowledged. In particular, its impact on macroeconomic balance and poverty alleviation has been crucial. Undoubtly, remittance has been a contributing factor on reducing poverty as it helped on financing the consumption expenditure at the household level. However, there are still worries that remittance has not been used on productive sector- especially on capital formation. Therefore, in this paper, we tries to examine the impact of labor migration and remittance on technological adaptation through assessing impact on input demand. Findings from this study shows that there are differences on input demand –examined for case of chemical fertilizer and ownership of farming assets among the household with migrant members and their counter –part. That means, labor migration is positively associated with input demands. The ownership of agricultural assets and chemical fertilizer is found to be positively associated with migration number. With 2 stage instrumental variation technique, the findings shows that labor migration is important on

determining both of the dependent variables but remittance is important on determining the use of chemical fertilizer only. It can be seen that labor migration is positive and significant in both cases indicating that there is high probability for the use and own of both-chemical fertilizer and farming assets/equipments. The coefficient of remittance is indeed not uniform across our model. It is positive and significant in case of use of fertilizer indicating the remittance has contributed on purchase and use of fertilizer. However, it is found negative yet insignificant on determining the ownership of assets. This could be possibly because the assets require more money than chemical fertilizer therefore remittance may not be sufficient enough for household in view of other priorities like consumption expenditure or repayment of the loans. It is also found that labor migration has positive impact on agricultural input demand but not really through the channels of remittance. Remittance might have been used partially to overcome the constraints on purchase of chemical fertilizer but not the assets that require generally high financial resources.

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Paper No. 40

Impacts of foreign exchange auctions on the informal market rate in a developing country: A case study of Myanmar

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Abstract

Since the abolition of the official peg and the introduction of a managed float in April 2012, the Central Bank of Myanmar has operated the daily two-way auctions of foreign exchange to derive a market-based official exchange rate. Despite the reform of foreign exchange regime, informal trading of foreign exchange remains pervasive. Using daily informal exchange rate and auction data, this paper examines the impact of the auctions on the informal market rate. First, a VAR analysis shows that the official rate did not Granger-cause the informal rate. Second, GARCH models indicate that the auctions did not reduce the conditional variance of the informal rate returns. Overall, the impacts of the auctions on the informal exchange rate are quite modest.

Keywords: Myanmar; foreign exchange auctions; informal market rate; GARCH model
JEL classification: E65, F31, O24

1. Introduction

In April 2012, Myanmar abolished the official peg that had grossly overvalued the Myanmar kyat over two decades, and introduced a managed float. In the new regime, the Central Bank of Myanmar (CBM) has operated daily auctions of foreign exchange. The official exchange rate is now determined by the auctions. The auctions also play a role to meet the demand for foreign exchange in the market.

Despite the stark reform, the informal market for foreign exchange remains pervasive. The informal market has developed during the previous exchange rate regime. Private exporters and importers traded foreign exchange mutually at their negotiated prices. The practice of informal foreign exchange market continues the same as before the reform.

Furthermore, the foreign exchange auctions are expected to serve as an intervention instrument for the CBM to smooth fluctuations in the informal market rate (IMF 2013). However, the foreign exchange sales in the auctions conflict with another intermediate target of the CBM to strengthen the international reserves. In this regard, it is an important policy issue to ascertain the effectiveness of the auctions in smoothing fluctuations in exchange rate.

Drawing on the literature of official interventions in foreign exchange market, we evaluate the impacts, if any, of the auctions on the informal market rate. We measure the volatility of the informal exchange rate returns with generalized autoregressive conditional heteroskedasticity (GARCH) models, and evaluate the impact of auctions on the conditional variance of informal exchange rate return. Empirical studies on foreign exchange interventions in developing countries are rather scant due to the unavailability of high frequency data on official interventions. The data on the daily auctions and informal market exchange rate in Myanmar allow us to examine the

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impact of interventions on the informal exchange rate in the context of the underdeveloped financial market.

The remainder of the paper is organized as follows. Section 2 reviews the literature on foreign exchange interventions in developing countries. Section 3 outlines the foreign exchange market in Myanmar which consists of the official and informal markets. Sections 4 and 5 present empirical analyses by time series econometrics to evaluate the impacts of the auctions on the informal market. First, in Section 4, using Granger-causality tests in a bivariate vector autoregression (VAR) model of the informal and official rates, we examine whether the official rate exerted influences on the informal rate. Second, in Section 5, we evaluate the impacts of auctions on the volatility of informal rate returns using GARCH models. In Section 6, we summarize the analysis and conclude.

2. Foreign exchange intervention in developing countries

2.1. Foreign exchange auctions

According to the survey on foreign exchange market organization in developing and transition economies by the International Monetary Fund (IMF) in 2001, foreign exchange auctions are relatively common in these countries (Canales-Kriljenko 2004). Countries with foreign exchange auctions account for 34 percent of the 91 surveyed countries. Among these countries, the auctions are usually held complementarily with the interbank dealer market for foreign exchange: pure auction market structures whereby the central bank periodically auctions the surrendered foreign exchange are no longer so common as they were in the 1980s, documented by Quirk et al. (1987).

There are various patterns of auctions. In one case, the central bank purchases foreign exchange to strengthen its foreign reserves. In other case, the central bank supplies the foreign exchange whose sources are the foreign exchange receipts of the government.

There are also cases that the foreign exchange auctions serve as an intervention instrument for the central bank to smooth fluctuations in exchange rate. For instance, in Turkey, the central bank operates two-way auctions whereby the central bank calls for both bids and offers of foreign exchange (Tuna 2011).

2.2. Official interventions in foreign exchange market

Regarding official interventions in foreign exchange market, the empirical literature concentrates on developed countries like Australia, Germany and Japan. This is mainly due to the availability of high frequency data on interventions.

As for the channels through which interventions might work, the literature points out the portfolio balance effect and the signaling effect.6 As for the portfolio balance effect, intervention changes the balance of domestic- and foreign-currency-denominated assets, which induces the investors to adjust their portfolio, leading to a change in exchange rate as well. As for the signaling effect, the information contained in interventions modifies the expectations of the investors on future spot exchange rate, so that the current exchange rate is adjusted accordingly.

In the literature that empirically examines the effectiveness of foreign exchange interventions, one of common approaches is the GARCH model. In this approach, the volatility of the exchange rate returns is measured as the conditional variance of the GARCH model, and the impacts, if any, of interventions on the conditional variance of the exchange rate returns are evaluated econometrically. The results of the existing studies on the effectiveness of interventions in

[6] See Sarno and Taylor (2001) for a survey of the literature. They point out the international coordination as another channel.

developed countries are mixed. On the one hand, the studies that find the intervention effective include Kim et al. (2000) on Australia and Hoshikawa (2008) on Japan. In contrast, Baillie and Osterberg (1997) and Dominguez (1998) both on Germany and Japan, and Edison et al. (2006) on Australia find that interventions were associated with higher volatility of exchange rate returns, rather than reduction in volatility.

There is growing literature on foreign exchange interventions in developing countries. Canales-Kriljenko (2003) lists three structural factors that potentially differentiate the effectiveness of official interventions in developing countries from those in developed countries. First, official interventions are not always fully sterilized in developing countries whereas they are mostly fully sterilized in developed countries. Changes in money supply stemming from non-sterilized interventions would reinforce the effect of interventions. Second, in the face of shallow foreign exchange market, the relative size of interventions is larger in developing countries than in developed countries. Considering the first and second factors, the portfolio balance effect could be more pronounced in developing countries. Third, making use of reporting requirements, some central banks in developing countries might have information advantage on the foreign exchange market over the other market participants than do the central banks in developed countries. Overall, foreign exchange interventions in developing countries could be more effective than those in developed countries.

Empirical studies on foreign exchange interventions in developing countries are still in a nascent stage. According to the survey by Menkhoff (2013), the empirical studies of interventions in developing countries concentrate on four Latin American countries (Chile, Colombia, Mexico, and Peru), Czech Republic, Croatia and Turkey.7 Empirical results on the effectiveness of interventions are mixed. Broto (2013) and Menkhoff (2013) argue that the diverse institutional circumstances and policies in developing countries might account for the difference in effectiveness of interventions.

We contribute to this growing literature on the empirical analysis of foreign exchange interventions in developing countries by examining the impacts of auctions on the informal market exchange rate in Myanmar. Because of the lack of monetary policy instruments, interventions are not sterilized in this country.8 On the other hand, Myanmar has the pervasive informal market for foreign exchange. The case study of Myanmar would be a unique addition to this literature.

3. Structure of foreign exchange market in Myanmar

3.2. Official market

In April 2012, the CBM abolished the official peg of the Myanmar kyat and introduced a managed float. Prior to the reform, the Myanmar kyat had been officially pegged to the special drawing right (SDR) of the IMF at 8.50847 kyat per SDR; the official rate had never been adjusted for more than three decades. This official rate had been applied only to transactions in the public sector for fiscal accounting.

In the managed float regime, the CBM has operated the daily auctions of foreign exchange. Participants are authorized dealer banks. The CBM granted authorized dealer licenses to 11 local private banks in November 2011.9 The CBM calls sealed- bids and offers from the banks in daily auctions. The banks submit their price and quantity bids (offers) to the CBM. The bids and offers

[7] Empirical studies on developing countries not covered in Menkhoff (2013) include Shah et al. (2009) on Pakistan and Simwaka and Mkandawire (2012) on Malawi.
[8] The sole monetary policy instrument at present is deposit auctions which have been held only twice per month, whereas foreign exchange auctions are daily.
[9] In August 2012, three more banks obtained authorized dealer licenses.

must be fully covered by the deposits that the banks maintain in current accounts at the CBM. The CBM sets the cut-off price of US dollar in terms of the Myanmar kyat, and accepts the bids (offers) above (below) the cut-off rate. In the terminology of auction, it is discriminatory auction wherein bidders (offerors) are awarded at their bid (offer) prices.10

It has not been long since the official market for foreign exchange was instituted. Until October 2011, banks had not been permitted foreign exchange trading. Although the state banks had been undertaking international banking services such as current international payments and transfers, they did not sell or buy foreign exchange with customers; buyers and sellers of foreign exchange had to find the counterparties outside the banking sector (explained in more detail in the following subsection). In the reform process, the private banks that were newly granted authorized dealer licenses went ahead of the state banks with respect to money changer services in October 2011, and customer dealing of foreign exchange in August 2012. Later in August 2013, the CBM instituted the interbank market of foreign exchange among the banks. The introduction of the auctions was due to the shallow and underdeveloped official market.

The auctions serve the function for the CBM to obtain a market-based official exchange rate. The CBM announces to the public the cut-off rate of daily auctions as the official reference rate, and uses it to regulate exchange rates in the official wholesale and retail markets. The buying and selling rates at authorized dealer banks and money changers are restricted within the range of $\pm$ 0.8 per cent of the reference rate. The CBM renews the reference rate for every working day. The reference rate itself is discretely determined by the auctions, and there is no band on it.

The series of reforms has established the two-tier official foreign exchange market; the wholesale segment including the official auctions and the interbank market, and the retail segment including customer dealing of the banks and transactions at authorized money changers.11 The official market operates in parallel with the existing informal market for foreign exchange.

As for the sources of foreign exchange in the auctions, there is no systematic arrangement to transfer the foreign exchange receipts of the government such as export revenues of state enterprises to the CBM due to the obsolete foreign exchange budget system. Thus, the source of foreign exchange for the CBM is rather limited at present.12

The auctions would equip the CBM with an intervention instrument in the foreign exchange market. IMF (2013: 7) evaluates that the CBM has sought to smooth fluctuations in exchange rate without targeting a specific level or range. Figure 1 summarizes the records of the auctions for the period from April 2012 through September 2013, along with the trend of the official reference exchange rate and the prevalent informal rate. As shown in this figure, when the informal rate appreciated (depreciated) sharply, the CBM purchased (sold) dollar, implying the attempts by the CBM to adjust the informal market rate.

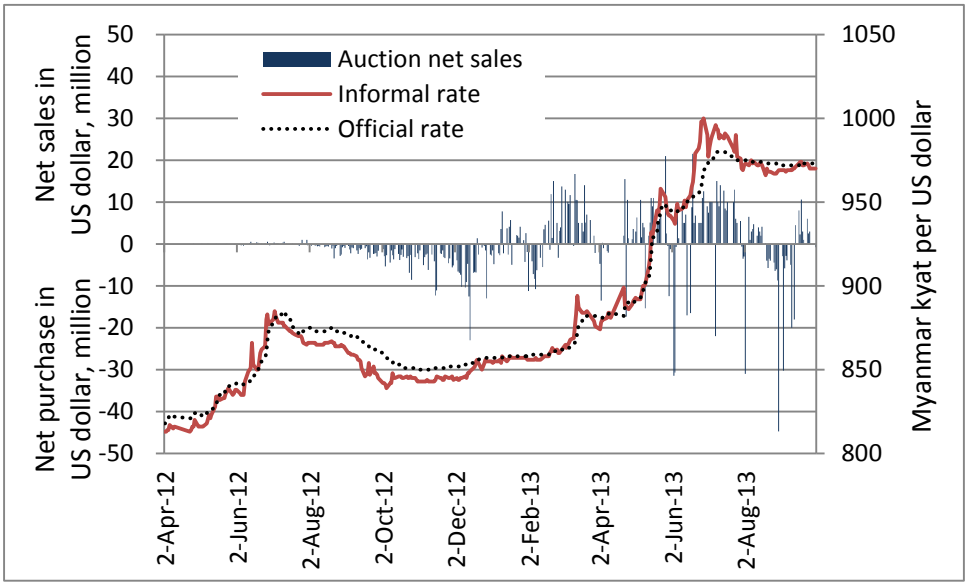
However, one of important costs of the auction is the outflows of the foreign reserves. As the auctions are two-way, they can lead to either accumulation or dissipation of foreign reserves. For example, in March 2013, the monthly sales and purchases of foreign exchange were USD 145.3 million and USD 5.5 million, respectively. The net outflow of USD 139.8 million amounted to 4.7

[10] For explanation of auction terminology, see Feldman and Mehra (1993).
[11] The CBM has also issued money changer licenses to non-bank firms since December 2012, but these money changers are not permitted to participate in the auctions.
[12] The transfer of the foreign exchange receipts of the government to the CBM is one of the reform agendas in Myanmar (IMF 2013).

percent of the foreign reserves.13 Thus, interventions to defend the Myanmar kyat against depreciation are not compatible with accumulation of the foreign reserves.

Figure 1. Auction net sales and level of exchange rates,

April 2012-September 2013



Sources: Central Bank of Myanmar and the informal market survey.

3.3 Informal market

Despite the foreign exchange policy reform, the informal transactions remain widespread, which is the legacy of the peculiar exchange rate regime in the past.14 In the previous fixed exchange rate regime, there had been no allocation of foreign exchange or surrender requirement on foreign exchange earners in the private sector (IMF 2012). The official exchange rate had been applied to the state sector only, and the entire transactions of foreign exchange in the private sector had been left to take own course in the informal market.

Under the previous fixed exchange rate regime, private exporters and importers traded foreign exchange competitively in the informal market. As for the proceeds from formal exports, the foreign exchange regulation restricted private exporters to depositing them at the state banks in foreign currency deposit (FCD) accounts. This was different from surrender requirement. On the contrary, the banks could not accept conversion of FCD into the Myanmar kyat or withdrawal in foreign currencies, whereas they tolerated domestic account transfers of FCD. Domestic account transfers facilitated private exporters to sell FCD to importers by transferring FCD to importers' accounts in exchange for side payments in Myanmar kyat. In this way, buyers and sellers traded FCD at the price they negotiated bilaterally. Sometimes brokers acted as middlemen and their quoted prices of FCD (i.e., informal exchange rates) were widely circulated in the private sector.15 It is worthwhile mentioning that informally traded FCD could be used for imports in the formal

[13] According to IMF (2014: 22), foreign reserves at the Central Bank as of the end of March 2013 were USD 3,062 million.

[14] Kubo (2014) provides a detailed account of Myanmar's foreign exchange market before and after the reforms.

[15] Major brokers disseminate their quotes by the short message service (SMS) of mobile phones.

channel. In addition to FCD, informally held foreign exchange such as proceeds from smuggling exports were traded in the informal market.

The practice of informal foreign exchange trading in the private sector remains largely the same even after the ongoing reform. While it is beyond the scope of this paper to estimate the turnover of the informal market, we can infer it in relation with the formal market turnover. Since August 2012, private exporters have had two choices for their disposal of export revenues, to the banks (official market) and to the informal market. Thus, a large disparity between the exports and the customer dealing of the banks would signal the informal market transactions between the private exporters and importers.

Table 1 summarizes the turnover of the official market for foreign exchange along with private exports and imports. We use the international trade of the private sector since the state sector is less likely to engage in informal currency trading under the rigid control by the state budget system.16 Due to data unavailability, we do comparison using the data for different periods for the international trade and the formal market turnover. The turnover of the central bank auctions includes both the sales and purchases of foreign exchange by the CBM. Similarly, the turnover of the customer dealing of the banks includes both the sales and purchases of foreign exchange by the banks. If all private exporters would have sold their export revenues to the banks, who would in turn have sold all of these to private importers, the ratio of the customer dealing to the private exports would be two. The actual ratio of customer dealing of the banks to the private exports is as low as 0.25. On the assumption that the banks accurately reported the amount of customer dealing, this low ratio implies considerable scale of informal trading of foreign exchange between private exporters and importers.

Table 1. Formal trading of foreign exchange and private sector international trade, January 2014 - December 2014

Monthly average US dollar, million			Ratio to private exports
Wholesale			
	Auction turnover 1/	165.3	0.38
	Interbank dealing turnover	17.5	0.04
Retail			
	Customer dealing turnover	110.2	0.25
	Private exports 2/	434.4	
	Private imports 2/	806.7	

Sources: Central Bank of Myanmar website; Selected Monthly Economic Indicators, Central Statistical Organization (CSO), Myanmar.

Notes:

1. Monthly average for January 2013-September 2013.

2. Monthly average for January 2013-December 2013.

[16] Kubo (2013) offers an account of the controls on foreign exchange in the state sector.

4. Relationship between the official and informal exchange rates

We examine the relationship between the Central Bank reference rate (official rate) and the prevalent informal market rate. If the auctions exert influences on the informal market, a rise in the reference rate would be accompanied by a rise in the informal market rate. We examine the relationship of the two rates by the Granger-causality test.

For the informal rate, we use the broker buying price of US dollar in the informal market at the closing of the market in the afternoon, disseminated by a private market information service company. 17 The official rate is the cut-off rate of the daily auctions which is announced to the public at around 10:00AM on the same day of the auctions. The official rate is posted on the website of the CBM.18 The sample period of daily exchange rates spans from April 2, 2012 to September 30, 2013. The total number of observations is 360. We use variables in logarithms, and denote the informal market rate and official rate as $\ln(BLK_t)$ and $\ln(CBM_t)$, respectively.

First, we check stationarity of the two time series with the Augmented Dickey-Fuller test. The test statistics indicate that both $\ln(BLK_t)$ and $\ln(CBM_t)$ are non-stationary in their level but stationary in their first difference at the 1% significance level. Thus, we judge they are I(1) variables. Second, we test if two variables are co-integrated in their level. The Maximum Eigenvalue test indicates that the null hypothesis of no co-integration cannot be rejected at the 5% significance level.19

Accordingly, we estimate the relationship of two exchange rates in a bivariate vector autoregression (VAR) model in their first difference as below;

$$\Delta\ln(CBM_t) = \alpha_1 + A_{11}(L)\Delta\ln(CBM_{t-1}) + A_{12}(L)\Delta\ln(BLK_{t-1}) + \varepsilon_{1t}, (1)$$

$$\Delta\ln(BLK_t) = \alpha_2 + A_{21}(L)\Delta\ln(CBM_{t-1}) + A_{22}(L)\Delta\ln(BLK_{t-1}) + \varepsilon_{2t}, (2)$$

where A_{ij} are the polynomials in the lag operator L. ε_{1t} and ε_{2t} are independently distributed disturbance terms. We test the null hypothesis that $A_{21}(L) = 0$. Rejecting the null hypothesis implies that the CBM could exert influences on the informal market rate.

As for the empirical model, the lag length is pared down to 3 from 20 by both the Akaike Information Criterion and Schwarz Information Criterion. Regarding the model diagnostics, the Lagrange multiplier tests indicate that the null hypothesis of no serial correlation of residuals up to the lag order of five cannot be rejected at least at the 10 percent significance level. Thus, it is appropriate to proceed to the Granger causality tests with this VAR model.

Table 2 summarizes the results of the Granger causality tests. The null hypothesis that Δln(CBM) does not Granger-cause Δln(BLK) cannot be rejected at the 10 percent significance level. On the other hand, the null hypothesis that Δln(BLK) does not Granger-cause Δln(CBM) can be rejected at the 1 percent significance level.

[17] e-Trade Myanmar Co. Ltd. (http://etrademyanmar.net/newetm/home)
[18] Central Bank of Myanmar (http://www.cbm.gov.mm/)
[19] For evaluation of co-integration relationship, we include 20 lags of Δ*lnCBM* and Δ*lnBLK*, where Δ refers to first difference.

Table 2: Granger causality between the official and informal rates

Null Hypothesis	**Δ *lnCBM* does not Granger-causes Δ*lnBLK***	**Δ *lnBLK* does not Granger-causes Δ*lnCBM***
Test Statistics ($\chi^2(3)$)	5.8326	107.6884
P-value that null hypothesis holds	0.1200	0.0000

Source: Author's calculation.

We can interpret the results in two ways. First, the CBM sought to follow the informal exchange rate rather than guiding it. It has been a policy target of the CBM to dissolve the multiple currency practices (MCP), and to align the official rate with the informal market rate, containing the gap between the informal and official exchange rate in the 2 percent range.20 If this is the case, we cannot judge precisely the ability of the CBM to influence the informal exchange rate.

Second, the CBM might not have the ability to influence the informal exchange rate. As shown in Figure 1, the gap between the official and informal market rates sometimes widened and persisted, implying attempts by the CBM to adjust the informal market rate. If so, the empirical result could be interpreted as an indication of the limited ability of the CBM to influence the informal market.

5. The effect of foreign exchange auctions on the volatility of the informal rate

5.1. Data

We evaluate the impact of the auctions on the volatility of the informal market rate return. When changes in the informal market rate return have a time-varying conditional variance structure of the errors, we can depict it by a GARCH model, and analyze the impacts of auctions on the conditional variance.

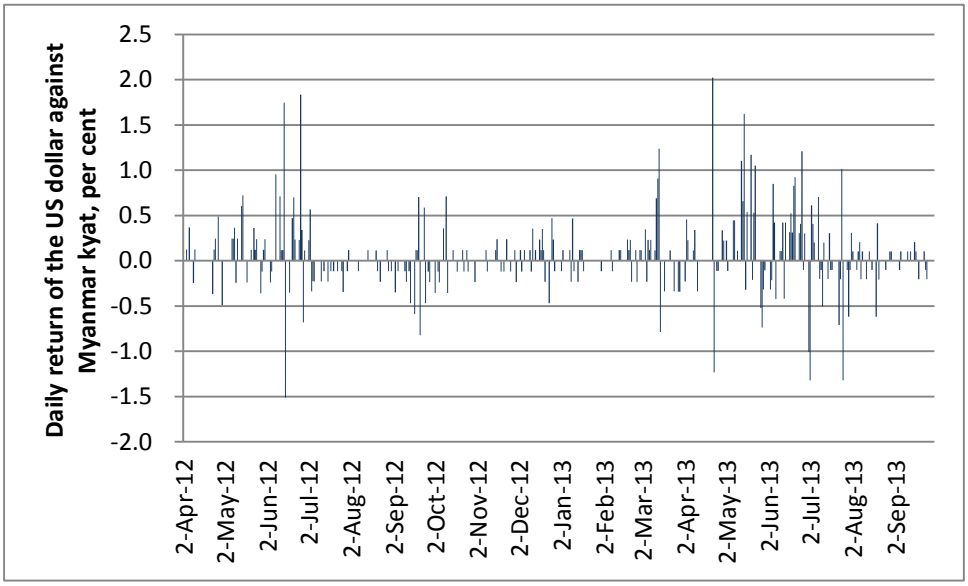
The variables we employ in this analysis are the informal market rate and the daily sales and purchase of foreign exchange by the CBM in the auctions. The CBM releases the results of daily auctions to the participating banks. The sample period spans from 2 April 2012 to 30 September 2013. As for the informal market rate, we define the daily return of the US dollar against Myanmar kyat as follows;

$$r_t \equiv 100 \times [\ln(BLK_t) - \ln(BLK_{t-1})], \qquad (3)$$

which is proximate to the percentage change in the informal market rate. A rise in r_t indicates depreciation of the kyat against the US dollar. Figure 2 depicts the daily return of the US dollar. As is common for financial variables, volatility clustering is observable, whereby large changes of the informal rate were followed by large changes, and small changes by small changes. The figure clearly indicates that the daily return of the informal market rate has a time-varying conditional variance structure of errors.

[20] If the auction rate differs from another prevalent market rate by 2 percent, it is regarded as MCP that require the approval from the IMF (Canales-Kriljenko 2004: 18).

Figure 2: Daily return of the US dollar against Myanmar kyat in informal market, April 2012-September 2013



Sources: Central Bank of Myanmar and the informal market survey.

Notes: The daily return is calculated as $100\text{x}[\ln(BLK_t) - \ln(BLK_{t-1})]$, where $\ln(BLK_t)$ is the informal rate on date *t* in logarithm.

Table 3 summarizes the descriptive statistics of the variables. As for the exchange rate return, the Ljung-Box Q-statistics for serial correlation reveal that the null hypothesis of no serial correlation of the squared standardized residuals up to 20 lags is rejected at 1 percent significance level. This suggests the presence of conditional heteroskedasticity of the exchange rate return and the suitability of a GARCH model.

Table 3: Descriptive statistics

	r_t **Exchange rate return**		I_t **Auction CBM net sales**	I_t^+ **Auction CBM sales**	$\lvert I_t^- \rvert$ **Auction CBM purchases**
Mean	0.0493		-0.2554	5.3754	3.8028
Maximum	2.0200		21.5000	21.5000	44.7500
Minimum	-1.5100		-44.7500	0.0100	0.0100
Std. Dev.	0.3906		7.2595	4.6742	6.4527
Observation	359		360	164	256
$Q(20)$	23.115				
$Q^2(20)$	88.245	***			

Source: Author's calculation.

Notes: $\text{Q}(20)$ and $Q^2(20)$ denote the Ljung-Box *Q*-statistic with 20 lags for the standardized residuals and squared standardized residuals. *** indicates that the null hypothesis of no serial correlations of the standardized residuals (squared standardized residuals) is rejected at 1 percent significance level.

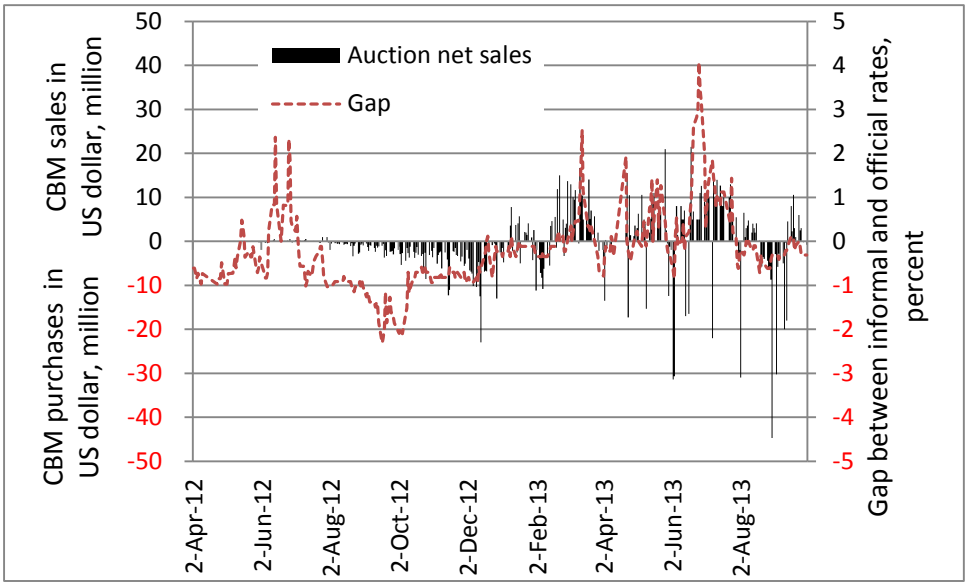
As for the records of auctions, we also report the disaggregated data the CBM's sales and purchases. Out of 360 working days, the CBM sold foreign exchange on 164 days and purchased on 256 days. On several days, the CBM accepted both bids and offers. The purchases of foreign exchange are more dispersed in size than the sales.

There are two types of banks participating in the auctions. First, they include private banks that arbitrage between the auctions and the informal market. When the informal market rate is higher than the official rate, arbitrager banks buy foreign exchange in the auctions and sell it to the customers. Similarly, when the informal rate is lower than the official rate, they buy from the customers and sell it to the CBM in the auctions. Second, the other participants are state banks that mostly sell foreign exchange in the auctions whenever they are in need of local currency liquidity. They may not be linked to the informal market.

The pattern of the foreign exchange sales and purchases by the CBM might reflect the heterogeneity of the banks in the auctions. Figure 3 contrasts the auction net sales with the gap between the informal and official rates. As expected from the arbitrage of the private banks, the CBM sales (purchases) concentrated on days wherein the official rate was lower (higher) than the informal rate. On the other hand, there were some lumpy purchases of foreign exchange by the CBM irrespective of the gap between the official and informal rates, which might be associated with the sales of foreign exchange by the state banks. In the following analysis, we take into account the asymmetric characteristics of sales and purchases of foreign exchange by the CBM.

Figure 3: Auction net sales and gap between informal and official rates,

April 2012 to September 2013



Sources: Central Bank of Myanmar and the informal market survey.

Note: The gap between the informal and official rates is calculated as$100\mathrm{x}\,[BLK_t - CBM_t]/CBM_t$.

5.2. Empirical model

We analyze the impact, if any, of the foreign exchange auctions on the informal market rate, using a GARCH model. Following Baillie and Bollerslev (1989), Dominguez (1998), and Edison et al. (2006) among others, we add the CBM's net sales of foreign exchange in the daily auctions both in the conditional mean and conditional variance equations. In particular, the specification of the baseline model is as follows;

$$r_t = \varphi_0 + \varphi_1 r_{t-1} + \varphi_2 I_t + \varepsilon_t, \quad (4)$$

$$\varepsilon_t | \Omega_{t-1} \sim \mathrm{t}(0, \nu, \sigma_t^2), \quad (5)$$

$$\sigma_t^2 = \delta_0 + \delta_1 |I_t| + \alpha \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2, \quad (6)$$

where r_t is the daily exchange return, I_t is the net sales of foreign exchange by the CBM, and $|I_t|$ is its absolute value. Equation (5) shows our assumption that the error terms have the conditional variance that has the Student's t density with mean zero, degree of freedom ν, and variance σ_t^2. In Equation (6), α and β represent the ARCH effect and GARCH effect, respectively. To cope with small number of observations, we estimate the integrated GARCH model that presumes a priori $\delta_0 = 0$ and $\alpha + \beta = 1$.

When incorporating the intervention variables into the conditional mean and variance equations, some studies such as Baillie and Osterberg (1997) and Broto (2013) used lagged intervention variables from the consideration about simultaneous bias. For the case of the foreign exchange auctions in Myanmar, the results of the auctions are announced to the market around 10:00AM. On the other hand, as for the data on the informal market rate, we use the closing price of the market in the afternoon. Therefore, endogeneity is a less concern compared with the cases of the above-mentioned studies.21

The parameters of interest are φ_2 which measures the impacts of foreign exchange auction on the level of the informal market rate, and δ_1 which measures the impact on the variance of the changes in the informal market rate. We expect $\varphi_2 < 0$ as CBM's net sales of foreign exchange would lead to appreciation of the Myanmar kyat vis-à-vis the US dollar. Regarding the volatility of the informal market rate, if the auctions as official intervention dampen the fluctuations in the informal market rate, the sign of δ_1 would be negative.

We also estimate an alternative specification of the baseline model, by replacing the net sales terms in Equations (4) and (6) with the terms for disaggregated sales and purchases of foreign exchange by the CBM as below;

$$r_t = \varphi_0 + \varphi_1 r_{t-1} + \varphi_3 I_t^+ + \varphi_4 I_t^- + \varepsilon_t, \quad (7)$$

$$\sigma_t^2 = \delta_2 I_t^+ + \delta_3 |I_t^-| + \alpha \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2. \quad (8)$$

If the CBM purchases of foreign exchange include the mechanical sales of foreign exchange by the state banks, they should be less associated with the behavior of informal market rate. On this alternative model, we perform Wald tests for the null hypothesis of the symmetric effects of CBM sales and purchases in the auctions, $H_0 : \varphi_2 = -\varphi_3$ and $\delta_2 = \delta_3$.

[21] We also estimated the GARCH models with lagged intervention variables, but they did not yield significantly different results from the ones presented in the main text.

5.3. Empirical results

Table 4 reports the results of estimates. Model 1 is without intervention (auctions) variables. Model 2 is the baseline model with the net sales of foreign exchange by the CBM in the conditional mean and conditional variance equations. Model 3 is the alternative specification replacing the CBM net sales with disaggregated sales and purchases. As for the diagnostics for standardized residuals, for all three models, the Ljung-Box Q-statistic tests for high-order serial correlation indicate that the null hypothesis of no serial correlation in squared standardized residuals cannot be rejected. These diagnostic tests indicate that the GARCH models correct the heteroskedasticity.

Table 4. Daily exchange rate return GARCH models: results for the conditional mean and conditional variance equations

	Model	(1)		(2)		(3)	
Mean Equation							
	Constant	0.0007		-0.0017		-0.0196	
		(0.9165)		(0.8486)		(0.0714)	
	r_{t-1}	-0.0440		-0.0413		-0.0787	
		(0.3501)		(0.4179)		(0.1203)	
	I_t			-0.0003			
				(0.8567)			
	I_t^+					0.0099	***
						(0.0022)	
	I_t^-					-0.0030	
						(0.1668)	
Variance Equation							
	ε_{t-1}^2	0.2277	***	0.2850	***	0.2861	***
		(0.0000)		(0.0000)		(0.0000)	
	σ_{t-1}^2	0.7723	***	0.7150	***	0.7139	***
		(0.0000)		(0.0000)		(0.0000)	
	$\lvert I_t \rvert$			0.0007	**		
				(0.0362)			
	I_t^+					0.0014	*
						(0.0795)	
	$\lvert I_t^- \rvert$					0.0004	
						(0.1523)	
Diagnostics for standardized residuals							
	Q(20)	24.0125		27.4547		22.5595	
		(0.2418)		(0.1229)		(0.3109)	
	$Q^2(20)$	13.7271		11.1993		10.0451	
		(0.8441)		(0.9409)		(0.9673)	
	Log likelihood	-52.1643		-42.9739		-37.0873	
Observations		358		358		358	

Notes: Numbers in brackets are p-values. $Q(20)$ and $Q^2(20)$ denote the Ljung-Box *Q*-statistic with 20 lags for the residuals and squared residuals. The p-value for *Q*-statistic is the probability that the null hypothesis of no serial correlations of the residuals (squared residuals) is accepted.

We now look into the impacts of the auctions on the conditional mean and variance of exchange rate change in the informal market. For Model 2, the coefficient on the CBM net sales in the conditional mean equation is negative but insignificant. The coefficient on the net sales in the conditional variance equation is positive and significant at 5 percent significance level. This implies that the CBM intervention was associated with higher volatility of the informal rate.

For Model 3 that differentiates the impacts of CBM sales and purchases of foreign exchange on the informal rate, the result does not indicate effectiveness of the interventions, either. In the conditional mean equation, the coefficient on the CBM sales is positive and significant at 1 percent significance level. This implies that the CBM sales of foreign exchange in the auction were associated with depreciation of the Myanmar kyat against the US dollar, rather than appreciation. The coefficient on the CBM purchases of foreign exchange is insignificant. In the conditional variance equation, both the coefficients on the sales and purchases are positive, whereas only the coefficient on the sales is significant at 10 percent significance level. Furthermore, the Wald test rejects the null hypothesis that the coefficients on sales and purchases are symmetric in the mean equation at 10 percent significance level, while it cannot reject the null hypothesis that the coefficients on I_t^+ and $|I_t^-|$ are the same at 10 percent significance level.

The overall results should not be interpreted as that the auctions raised the volatility of the informal market rate. On the contrary, the causality might run in the other way around that the CBM intervened more in the market when the informal market rate showed abrupt changes. In other words, we consider the CBM stance has been "leaning against the wind". Furthermore, while the CBM intervention in the foreign exchange market is positively associated with the higher conditional variance, its impact is quite modest. Such a result is similar to Edison et al. (2006).

Regardless of the modest impact of the auctions on the informal market rate, the cost of the auctions is not necessarily small. First, the CBM sales of foreign exchange sometimes led to considerable outflows of foreign reserves as shown in Section 3. Second, the auctions provide wind fall gains to the banks that arbitrage between the auctions and the informal market. As shown in Figure 3 in this section, the CBM sales (purchases) of foreign exchange largely concentrated on the days whereby the official rate was lower (higher) than the informal market rate.

Therefore, the foreign exchange auctions should be regarded as a transitory arrangement and the central bank should encourage shift to the interbank market.

6. Conclusion

Since the abolition of the official peg and the introduction of a managed float in April 2012, the Central Bank of Myanmar has operated the daily foreign exchange auctions. The auctions have three functions; providing the CBM a market-determined exchange rate apart from the informal rate, supplying or absorbing foreign exchange liquidity amid underdeveloped official market, and a policy instrument to intervene in the foreign exchange market.

Using the daily data of auctions and exchange rates for the period from April 2012 to September 2013, we analyze the impacts of the auctions on the informal market. First, the bivariate VAR of exchange rates indicates that the official rate did not Granger-cause the informal market rate, whereas the latter did the former. Second, the GARCH models incorporating the auction variables indicate that the CBM's net sales of the US dollar did not reduce the conditional variance of the informal rate returns.

The empirical results imply that the function of the auctions as a means of intervention was quite modest, whereas they incurred substantial costs on the CBM in terms of erosion of the official foreign reserves. The foreign exchange auctions should be recognized as a transitory arrangement until the interbank foreign exchange market is developed.

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Paper No. 41

Determinants of Lending Behavior of Nepalese Commercial Banks: An Empirical Analysis

Neelam Timsina

Abstract

Commercial banks constitute a major chunk of total assets in the banking system in Nepal and extension of credit is one of the major functions of banking institutions. If banks are not efficient in their lending behavior, it may not contribute to economic growth. On the other hand, their inefficient and imprudent banking practices may lead to riskier financial instability.

The main objective of the study is to test and confirm the effectiveness of the determinants of commercial bank lending behavior in Nepal by using time series Ordinary Least Square regression approach for empirical analysis. The model involves Nepalese commercial banks' private sector credit (pvct) as dependent variable and other variables such as their volume of deposits (dep), interest rate (Ir), stipulated cash reserve requirements ratio (crr), their liquidity ratio (lr), inflation (inf), exchange rate (exr), and gross domestic product (gdp) as independent variables for the period; 1975 – 2014. From the regression analysis, it was found that Gross Domestic Product and liquidity ratio of banks have the greatest impacts on their lending behavior. Granger Causality Test shows the evidence of unidirectional casual relationship from GDP to private sector credit. The study implies that GDP is the barometer of the economy and commercial banks should pay their attention to the overall macro economic situation of the country in general and their liquidity ratio in particular while taking lending decision.

Key Words: Commercial Banks, Lending Behavior, Economic Growth, Inflation, Deposits, Interest Rate

GEL Classification: E23, G21, E43, E64

1. Introduction

The role of credit is considered to be the key to economic growth and financial stability of the economy. Credit is the aggregate amount of funds provided by commercial banks to individuals, business organizations and government. Commercial banks perform the act of financial intermediation that collect money from the surplus sector in the form of deposits and lend it to various sectors of the economy. As Commercial banks constitute a major chunk of total assets in the banking system in Nepal and extension of credit is one of the major functions of banking institution, the study attempts to capture the determinants of lending behavior of commercial banks.

Credit usually represents the bulk of the institution's assets, while interest on the credit represents the major source of income. Loans involve a high degree of risk and have profound impact on the bank's profitability, liquidity and solvency. The quality of a bank's credit points to the soundness and stability of the bank and the risk borne by the depositors and creditors. Poor management of loan portfolio is the major cause of liquidity crises and bank's failures around the world. Although credit growth can spur investment and economic activity, an excessive growth in credit can impact the stability of the financial system by increasing prudential risks at the micro and macro levels (Igan and Pinheiro, 2011).

Lending behavior of bank generally depends on type of bank, the capital base, the deposit base, density of the deposit, interest rate, exchange rate, inflation, gross domestic product, investment portfolio, liquidity, monetary and fiscal phenomena, the credit guidelines issued from time to time by the regulatory authority and internal policies of the banks as well as other non-economic factors. There are supply side and demand side factors determining the banks' lending behavior. This study focuses on the supply side factors. For the banks to balance their main objectives of liquidity, profitability and solvency, credit must be handled efficiently. As credit constitutes a major chunk of bank's assets, the study of the determinants of lending behavior becomes necessary because commercial banks in Nepal need to understand how to manage these huge assets in terms of their loans and advances. From monetary transmission point of view also, the role of banks' loan and advances is crucial because monetary policy operates through banking performance, especially lending. Excess reserves of commercial banks are taken as an operating target of monetary policy in many countries. Central banks operate Cash Reserve Ratio (CRR), bank rate, as well as Open Market Operations (OMOs) to affect banks' lending capacity. Therefore, central banker as well as policy makers should have adequate and deep understanding about banks' lending behavior and its determinants.

The main objective of the study is to test and confirm the effectiveness of the determinants of commercial bank lending in Nepal. Banks cannot be efficient in their performance just by considering a few factors. It needs an integrated approach including factors related to macro economic situation (including GDP), deposit mobilization, regulator's requirements such as CRR, liquidity ratio, capital adequacy ratio (CAR), Single Obligor Limit (SOL), borrowers' behavior, moral hazard, adverse selection, international lending standards and other credit risk limit etc. If banks are not efficient in their lending behavior, it may not contribute to economic growth. On the other hand, their inefficient and imprudent banking practices may lead to riskier financial instability.

The study has applied time series ordinary least square regression approach to empirically achieve the objective of the study. The model involves Nepalese commercial banks' private sector credit (pvct) as dependent variable and other variables such as their volume of deposits (dep), interest rate (Ir), stipulated cash reserve requirements ratio (crr), their liquidity ratio (lr), inflation (inf), exchange rate (exr), and gross domestic product (gdp) as independent variable for the period; 1975 – 2014. The model hypothesizes that there is functional relationship between the dependent variable and the specified independent variables.

This study is based on the premise that assessment of the effectiveness of common determinants of lending behavior of commercial banks is prerequisite for any efforts of improving the lending behavior of banks, either it is from central bank, government side or from the bank side. Ultimately they can be linked properly. Many studies regarding banks' lending behavior have been carried out in developed countries; however most of those studies do not have any significance in Nepalese context and cannot be applied. This type of study have not been carried out before by any researcher and academic institute of Nepal and thus expected to be the milestone in Nepalese banking academic work.

The study is organized as follows. With this introductory part, the second section presents literature review. The third section highlights the situation of bank lending and its proposed determinants. The fourth section discusses the methodology of the study. The fifth section presents the results while the last section draws a conclusion of the study.

2. Literature Review

The literature has been reviewed to provide an overview of bank lending, lending behavior followed by an analysis of its determinants which directly or indirectly affect it.

Bank credit is the key to economic growth. According to Adedoyin and Sobodun (1991), "lending is undoubtedly the heart of banking business. Therefore, its administration requires considerable skill and dexterity on the part of the bank management". As banks are responsible to pay interest on deposits, it should of course earn handsome earnings by lending it in various sectors of the economy. In this sense, while lending with the objectives of generating appropriate, sustainable profit, maintaining liquidity and ensuring safety, banks require a high degree of practical policy formulation and application.

The major function of commercial banks is to provide credit. Loan and advances constitute the highest portion of the total assets of banks. It is the main source for generating profit. In the view of Nwankwo (2000), "credit constitutes the largest single income-earning asset in the portfolio of most banks. This explains why banks spend enormous resources to estimate, monitor and manage credit quality". Therefore the study of the determinants of banks credit behavior is very crucial for banks to make more sustainable, reputable profit from the credit portfolio.

John (1998) commented that, the ability of commercial banks to promote growth and development depends on the extent to which financial transactions are carried out with trust and confidence and least risk. It means that bank should operate banking transactions in safe and sound manner. If they are involved in insecure and unsound banking practices, they may lose public confidence and trust. In this situation, banks' sustainability and overall financial stability will be at risk.

Ezirim (2005) further stressed that "bank lending decisions generally are fraught with a great deal of risks, which calls for a great deal of caution and tact in this aspect of banking operations. The success of every lending activity to a great extent therefore, hinges on the part of the credit analysts to carry out good credit analysis, presentation, structuring and reporting." Major risk of the banking business lies in the credit function, as there is high possibility of default. Further, there is also regulatory risk. The eye of regulator and supervisor is on credit performance of banks as they deal with public money. Therefore, they should be very careful, clever and ethical in performing lending behavior.

Osayameh (1991), supported this view by stressing that "the days of armchair banking are over and that the increasing trend in bad debts and absence of basic business/corporate advisory services in most Nigerian commercial banks, shows An apparent lack of use of effective lending and credit administration techniques in these banks." It pointed out that, banking business is not so easy. It requires high degree of knowledge and advisory services with regard to the determinants of lending practices.

Chizea (1994) asserted that "there are certain aspects of fiscal and monetary policies which could affect the decision of the discerning and informed public to patronize the bank and the lending behavior of commercial banks. Paramount amongst these measures is what could be called the interest rate disincentive. Interest rates have been so low in the country that they are negative in real terms". Easy monetary and loose fiscal policy lead to an increase in inflation that reduces the purchasing power of money put in deposit accounts reduces. On the other hand, increase in interest rates would increase inflation rates which discourage the investment. Fiscal policy has also an impact on banks' lending behavior. Increase in government expenditure leads to the increase in bank lending, through its impact on deposits as well as capital expenditure. Government commitment to improve peace and security as well as to encourage the industry, commerce contributes to increase in bank lending. Moreover, tax incentives to banks encourage bank lending.

"Commercial banks are the most important savings mobilization and financial resources allocation institution. Eventually, those roles make them an important phenomenon in economic growth and development. In order for them to perform these roles, it must be realized that banks have the potential, scope and prospects of financial intermediation" (Olokoyo 2011). Therefore banks should

pay great attention on some basic principles of credit portfolio management such as liquidity, profitability, security, diversity, spread, marketability, purpose, need, national priority etc. In this light, it crucial for banks to assess the effectiveness of various determinants of the commercial bank lending behavior.

The determinants of lending behavior include: the Volume of deposits (Vd) their Investment portfolio (Ip), the presiding interest (lending) rate (Ir), Cash reserve requirement ratio (Rr), and Liquidity ratio (Lr) (Olokoyo 2011). Banks' lending is of course dependent on volume of deposits. Main source of fund for lending in banks is deposits. In Nepal, around 94 percent of sources of fund is mobilized from public and corporate deposits and remaining 6 percent from the shareholders equity. Therefore, deposits have great to play in lending operation in banks. Interest rate especially on lending poses significant impact on lending. Increase in interest rate causes reduction in loan demand and vice versa. Commercial banks have to keep certain percent of their deposit liabilities with central bank in cash form. This is called Cash Reserve Requirement (CRR).Cash in vault is also counted in this. Reserve requirement is one of the most well known and commonly used monetary instruments in the world. The main objective of CRR is to maintain banks' prudential liquidity to meet deposit withdrawal as well as to operate monetary policy efficiently. CRR is fixed by the central bank. In Nepal, CRR for commercial bank is 6 percent for 2014-15.

Ituwe (1983) asserted "A banks ability to grant further advances in checked by the availability of cash in its vault". It also pointed out CRR is the crucial determinant of bank lending.

Alger (1999) emphasized that, a bank should choose not to invest all its available funds in (typically long-term) loans; indeed, it should keep some of the funds in cash (or reserves at the central bank) and/or invest in marketable securities such as Treasury bills and bonds. Chandler (1980) claimed that "commercial banks must pay more attention to liquidity than many other types of financial institutions such as life insurance companies. This results from the high turnover of their debt liabilities. A large part of the gross out payments by a bank is met from current gross receipt of funds in the normal course of business." Liquidity is the main foundation of commercial banking. Commercial banks are just like custodian of public deposits. They have to return back that money upon depositors' request immediately. For that reason, it is necessary for banks to remain adequately liquid. Central bank/regulatory authority usually fixes the liquid assets/deposit ratio for this.

Besides the above mentioned variables, commercial bank lending is largely determined by the economic growth of the country. Economic growth is a positive change in the national income or the level of production of goods and services in a country over a certain period of time. Though private sector credit is said to have great impact on economic growth, several literatures found the positive impact of economic growth and development on bank lending. Some literatures found bidirectional causality between them and some others found unidirectional causality from economic growth to bank lending. Anyway, it can be said that economic growth is considered as one of the major determinants of bank credit. Oluitan, R.(2012) claimed that real output causes financial development, but not vice versa. Increase in gross domestic product means rise in agricultural, industrial, hydro electricity, infrastructure and several other economic activities which need increase in bank credit on the one hand. On the other hand, increase in national income leads to increase in deposits. Therefore economic growth impacts positively the bank credit. Odedokun (1989) finds the case of unidirectional causality from the real sector to the financial sector. Timsina, N. (2014) shows the evidence of unidirectional casual relationship from GDP to private sector credit.

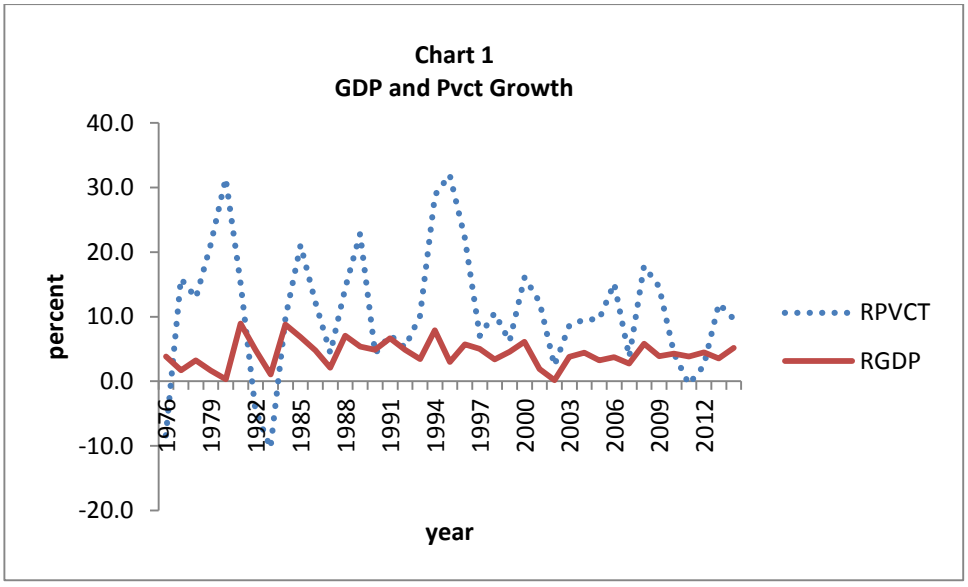
Inflation is another determinant of private sector credit of banks. There are various views expressed in the literature regarding thet impact of inflation on real private sector credit. Some authors argue that inflation has negative impact on bank credit where as some advocate in favor of positive impact of inflation. Increase in inflation leads to an increase in nominal interest rate and credit rationing by bank resulting a reduction in investment. Boid, Levine and Smith (2001) claimed that higher inflation implies less long-run financial activity. In economies with high inflation, intermediaries will lend less and allocate capital less effectively. Higher long-run inflation implies lower long-run levels of real activity and/or slower long-run growth rates. The evidence indicates that there is a significant, and economically important, negative relationship between inflation and both banking sector development. As inflation rises, the marginal impact of inflation on banking lending activity and stock market development diminishes rapidly. By studying around 100 countries from 1960 to 1990, Barrow (1995) published his findings that inflation and economic growth were negatively related—higher inflation was associated with lower economic growth.

But there is something strange about the effect of inflation on the banking sector. The effects depend upon important thresholds. Only when inflation rises above some critical level then rationing does occur. At very low rates of inflation, inflation does not cause credit rationing, reduction in investment. This implies that up to some threshold, higher inflation might actually lead to increased real economic activity.

4. Situation of Bank Lending and Its Determinants in Nepal

Economic Growth

Economic growth has great implication on monetary policy actions and bank lending behavior. As economic growth increases in the country remarkably, investment in industry, agriculture and service sector increases which leads to an increase in private sector credit. Chart 1 shows positive relationship between real GDP growth and private sector credit growth except some years.

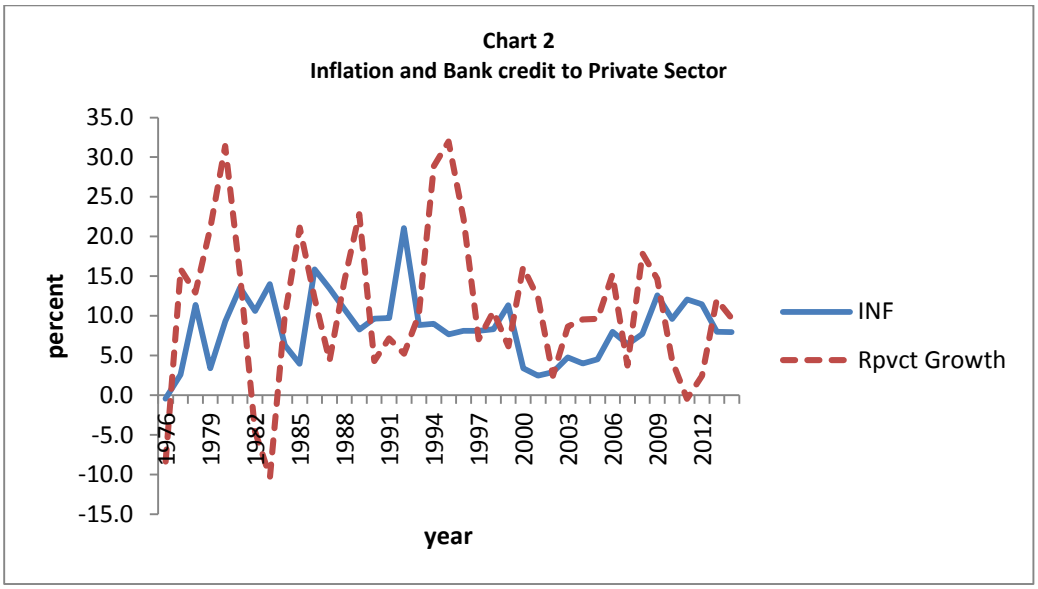


Source: Nepal Rastra Bank and author's calculation.

Inflation

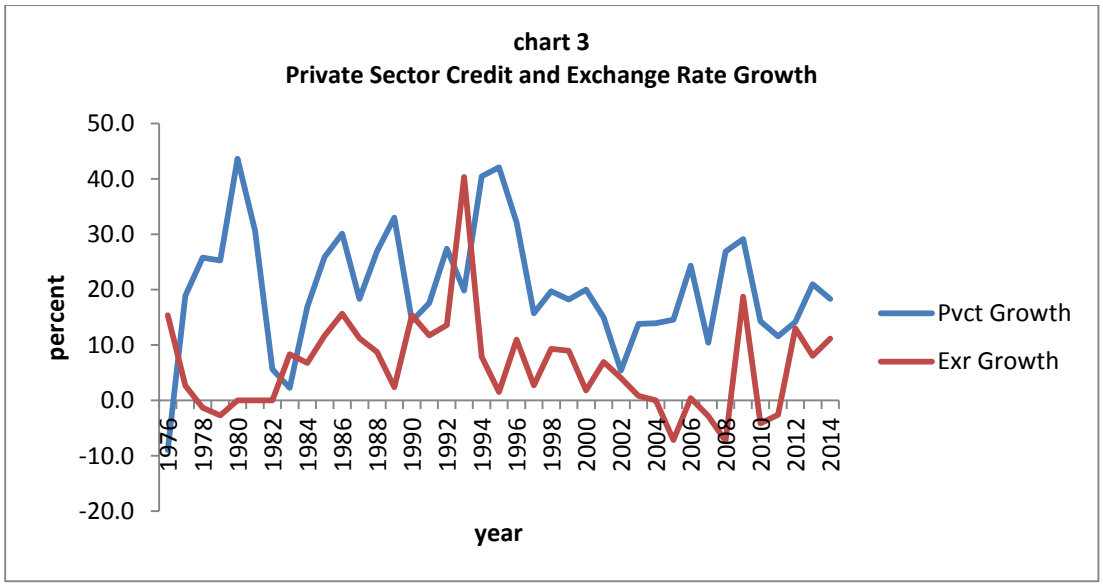
Inflation is another economic variable. Inflation is an increase in the general price level which is typically expressed as an annual percentage rate of change. Generally Inflation has negative impact on private sector credit and economic growth as postulated by theory (up to certain lower

rate of inflation, the impact may not be negative). In chart 2 the relationship between inflation and real private sector credit growth has been shown. Except some years, the relationship looks negative.



Source: Nepal Rastra Bank and author's calculation.

Exchange Rate



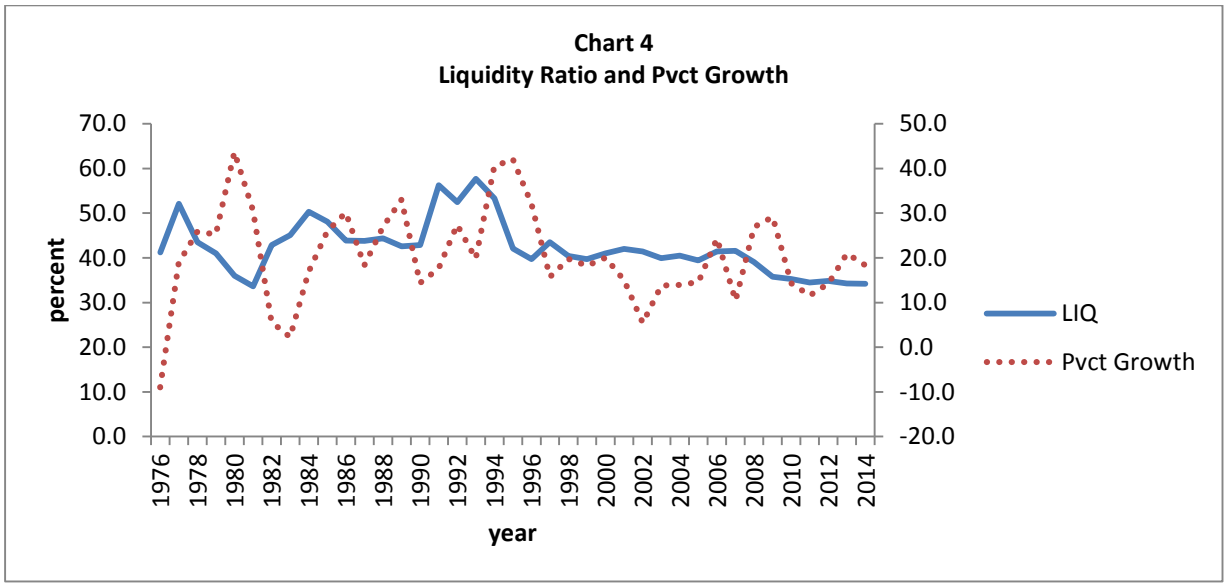
Source: Nepal Rastra Bank and author's calculation.

Exchange rate is considered as one of the determinants of banks' lending behavior. Increase in exchange rate means depreciation of Nepalese currency and exchange rate depreciation makes export demand higher and thereby production in the country. On the other hand, remittance inflows increase which results in increase in bank deposit and lending also. In Nepal, in 1975, exchange rate of Nepalese currency per US$ was Rs 10.6 which increased to Rs 88.6 in 2013 and to Rs 98.2 in 2014. On average, Nepalese currency was depreciated by 6.09 percent against the US$. Chart 3 shows that except some years, the relationship between exchange rate growth and private sector credit growth is positive.

Liquidity

Liquidity for a bank means the ability to meet its financial obligations as they come due. For this banks should be ready with adequate liquidity with them. Banks should be very careful in their assets liability management to become liquid forever. Liquidity is the base of confidence in the banking business and it has great implication on analyzing bank lending behavior towards monetary policy action. There is inverse relationship between bank liquidity and bank credit, as they have to hold certain portion of their reserves to meet the financial obligation and cannot lend up to this amount.

Major liquidity indicators for the bank are cash reserve ratio, current assets ratio, quick assets ratio, liquid assets to deposit ratio. However, in this study, liquid assets to deposit ratio is taken as the liquidity related indicator.

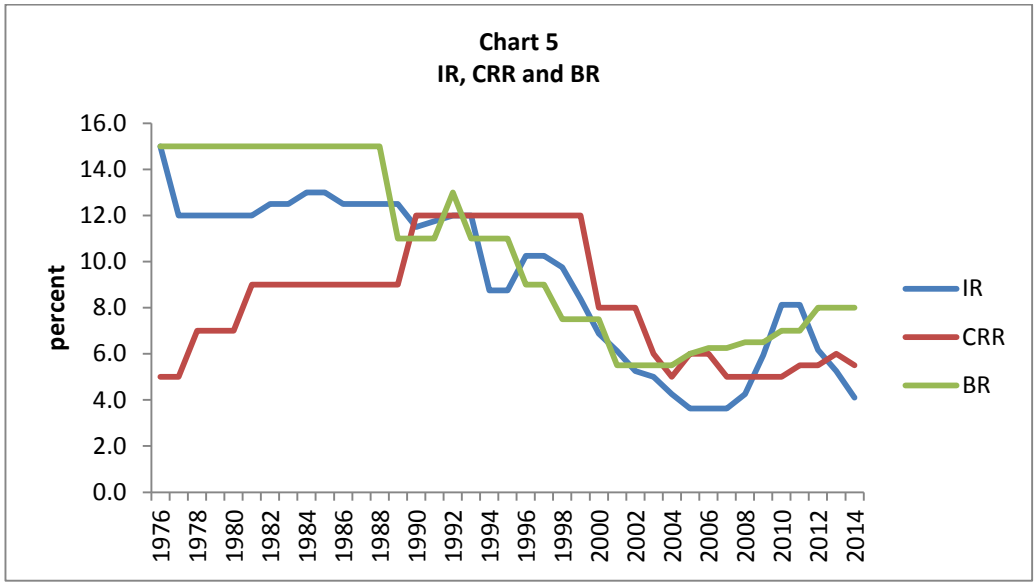


Source: Nepal Rastra Bank and author's calculation.

The chart shows that there is inverse relationship between liquidity ratio and private sector credit growth except some years.

Cash Reserve Ratio (CRR)

Cash reserve ratio is a monetary policy instrument which is fixed by the central bank to affect the loanable reserves of commercial banks and there by their lending behavior. CRR was 5 percent in 1975 which increased to 7 percent, 9 percent, 12 percent on 1978, 1981 and 1990 respectively. To support relax monetary policy stance to support growth, it decreased to 8 percent, 6 percent and 5 percent in 2000, 2003 and 2004 respectively. To mop up the excess liquidity of the banking sector and to contain the inflation, it increased to 6 percent in 2005. Conversely, to fight liquidity crunch, it declined to 5.5 percent in 2011. However, in 2013, liquidity situation of the banking sector became comfortable and it increased to 6 percent. In 2014, it again declined to 5.5 percent to encourage private sector credit. Therefore, it can be said that CRR is the reflection of commercial bank's excess liquidity position. But it is not changed by the central bank frequently. It is not short term measure. Sometimes, according to the nature of the excess liquidity, the central bank uses to adopt other measures of monetary policy to achieve its objectives.

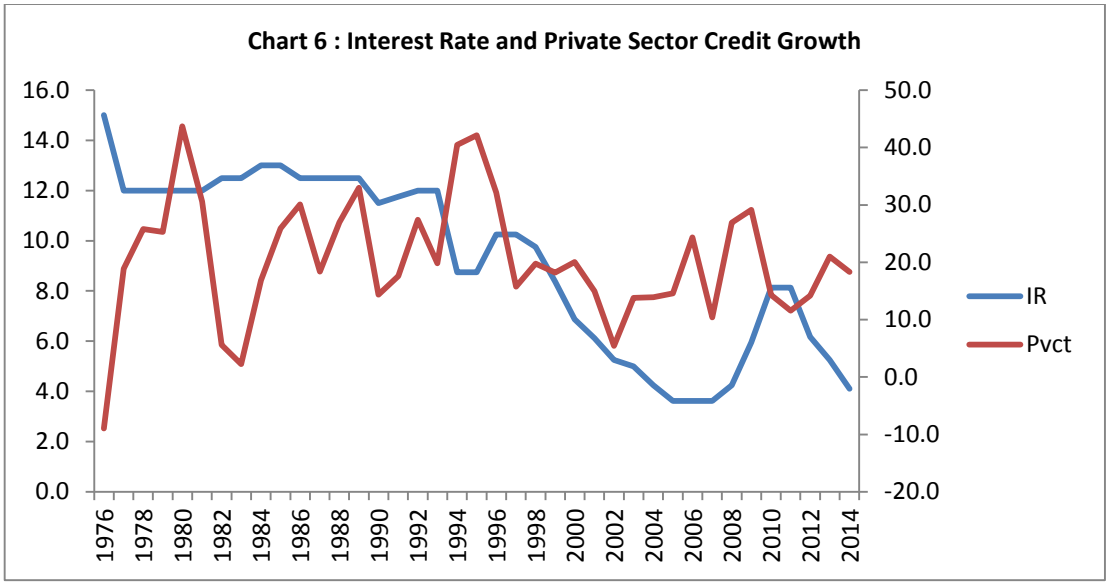


Source: Nepal Rastra Bank and author's calculation.

Saving Interest Rate (IR)

1 year saving interest rate is taken as the interest rate here in the study. Interest rate was determined by the central bank before the financial liberalization. Commercial banks had no autonomy to decide the interest rate at that period. After the financial liberalization commercial banks were given autonomy in this regard. 1 year saving interest rate depends upon the liquidity of the banking sector. It should depend upon the CRR and Bank Rate (BR) also. However, in reality CRR and BR are effective only if banks depend upon NRB to meet their fund needs. Therefore, IR does not seem to depend fully on the trend of CRR and BR in this figure. However, its after 1995 it seems to follow the trend of CRR and BR to some extent.

Saving interest rate was 15 percent in 1975. Gradually it declined. In 1980, it was 12 percent. In 1985, it was 13 percent. In 1995, it declined to 8.8 percent. In 2005, because of high liquidity in the banking sector, IR declined to 3.6 percent. As IR mostly depends on liquidity situation, as a result of liquidity crunch, interest rate increased to 8.1 percent in 2010 and 2011. Also the CRR increased to 5.5 percent in 2011 from 5 percent from 2010. In 2013, it increased to 6 percent. But in 2014, it declined to 5.5 percent. Also the IR declined to 4.1 percent in 2014. Therefore, IR more or less depends on the CRR. That means commercial banks' lending behavior more or less depends upon monetary policy instrument.

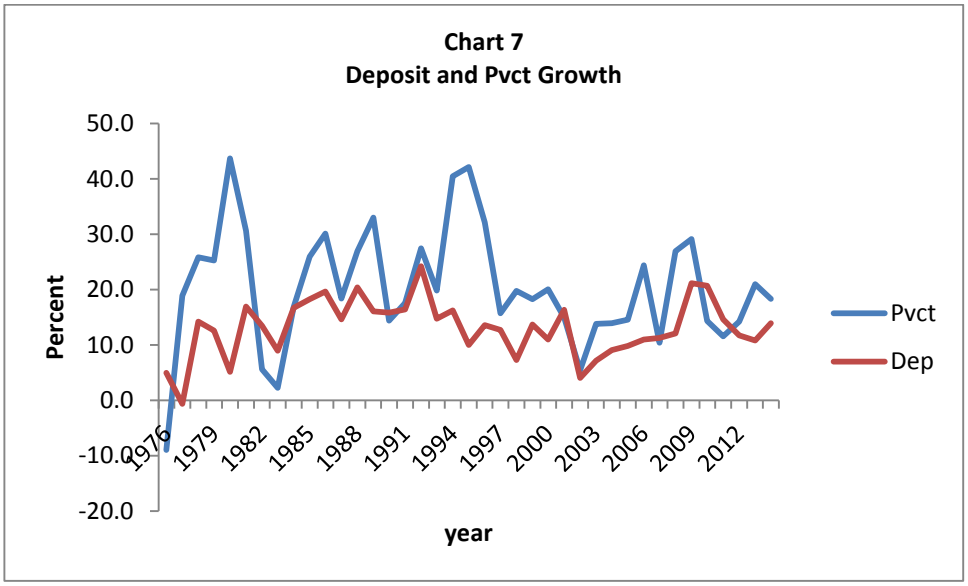


Source: Nepal Rastra Bank and author's calculation.

Generally there is inverse relationship between the private sector credit and interest rate. Chart 6 shows inverse relationship between those two variables only in some years.

Deposit

Commercial bank's deposit shows a fluctuating growth trend over the study period. In 1976 its growth rate was 36.7 percent which declines to 14.7 percent in 1980. In 1985 deposit increased by 20.7 percent while in 1990, it declined to 15.4 percent. In 1993, it increased to 30 percent while in 2000 it declined to 21.9 percent. In 2009, deposit growth was 30.5 percent. In 2012, deposit increased only by 3 percent. It rose by 16.9 percent in 2013. Growth of deposit mobilization depends mainly upon economic growth, interest rate, inflation, remittance inflows, currency in circulation etc.



Source: Nepal Rastra Bank and author's calculation.

Deposit is the foundation of the private sector credit. Chart 7 shows the positive relationship between them.

5. Research Methodology

Secondary data that captured the whole population of all commercial banks in Nepal for the period 1975 –2014 are used in the study. Secondary data are gathered from various sources such as Banking and Financial Statistics of NRB, Economic Survey (Ministry of Finance), Quarterly Economic Bulletin (NRB), Commercial Banks' individual website, Annual Bank Supervision Report (NRB), Quarterly Financial Indicators (NRB).

Empirical Model

The study has applied time series regression (ordinary least square) approach for the empirical measurement of the relationship between the private sector credit and each of the other explanatory variables that have been identified through literature and theory i.e. volume of deposits, interest rate, cash reserve requirement, liquidity ratio, exchange rate, inflation and gross domestic product. Other factors not explicitly included in the model are policy instruments for regulation of banks operation like government policy, monetary authorities' guidelines and past relationship with customers. These are captured by the error term in the model. Further, unit root test for stationary test and co-integration test for long run relationship have been performed.

The model is specified implicitly below:

Pvct = f (Dep, Rgdp, Liq, Ir, Crr, Inf, Exr, u)

Where u contains other variables not explicitly included in the model.

The explicit form of equation above is represented as follows:

rpvctt= α0 + α1Dept- α2Ir t- α3Crrt -α4Liqt + α5Exrt + α6Rgdp t - α7inf t + μ

Where:

rpvctt: Private Sector Credit at real term

Dept: Volume of Deposits

Rgdp t: Gross Domestic Product at real term

Irt: Interest Rate

Crrt: Cash Reserve Ratio

Liqt: Liquidity Ratio

Exrt: Annual Average Official Exchange Rate of the Rupee vis-à-vis the United State's Dollar.

Inf t = Inflation

μ: error term controlling for unit-specific residual in the model

α0: intercept of the regression line variables.

Unit Root Tests

As most macroeconomic time series are not stationary at levels (Engle and Granger, 1987), the second step in seeking a methodology for modeling any economic relationship is to ascertain the stationary nature of the variables under scrutiny, otherwise regression results would be spurious (nonsense). Table 1 shows the Augmented Dickey Fuller (ADF) test for all variables under the study.

Table 1
ADF Test Results (Unit Root Tests)

	Intercept				**Intercept and Trend**			
	Level		**First Difference**		**Level**		**First Difference**	
Variables	t-stat	p-value	t-stat	p-value	t-stat	p-value	t-stat	p-value
lnrgdp	-0.2191	0.9275	-6.2461	0.0000	--1.5065	0.8103	-6.1634	0.0000
lnrpvct	-0.5403	0.8722	-4.6902	0.0005	-3.0366	0.1361	-4.738	0.0026
lnrdep	-2.985	0.0451	-5.307	0.0001	**-2.605**	**0.2803**	-5.507	0.0030
lninf	-0.979	0.7511	-4.731	0.0005	**-1.521**	**0.8046**	-4.719	0.0027
lnexr	-0.931	0.768	-4.616	0.0007	**-0.765**	**0.960**	-4.531	0.0045
ir	-1.3167	0.6119	-4.6169	0.0006	-2.7912	0.2091	-4.5509	0.0043
crr	-1.271	0.633	-6.642	0.0000	-2.856	0.1873	-6.615	0.0000
liq	-2.327	0.169	-6.642	0.0000	-2.856	0.1873	-6.615	0.0000

Note: A variable is stationary when ADF values exceed the critical values.

Mackinnon critical values for rejection of null hypothesis of a unit root are:

1 % critical value = -3.689

5% critical value = -2.972

10% critical value = -2.625

The figures shown are 't' ratios for which a suggested significance value in the ADF test is -3.0 or below (Dickey and Fuller, 1979, 1981).

ADF statistics in the above table shows that all the variables included found to be I(1) with one variable lnrdep having deterministic trend. Hence, although it can be modeled at first difference with OLS and extracting trend and cycles for trend-stationary variables, this is possible only if variables are not co-integrated. The Johansen co-integration test has been carried out as follows to identify whether there exists a co-integrated relationships.

Co integration Test

When a linear combination of variables that are I (1) produces a stationary series, then the variables may need to be co integrated. This means that long run relationship may exist among them, which connotes that they may wander from one another in the short run but in the long run they will move together. To establish whether long run relationship exists among the variables or not, co integration test using Johansen's multivariate method has been carried out and reported in Table 2.

Table2 : Johansen's Cointegration Test

(LNRPVCT LNRGDP LNDEP LNINF LNEXR IR CRR LIQ)

	Trace Statistics			Maximum Eigenvalue		
Hypothesized No. of CE(s)	**Trace Statistic**	**0.05 Critical Value**	**P-value**	**Max-Eigen Statistic**	**0.05 Critical Value**	**P-value**
None*	154.7028	125.6154	0.0003	50.1485	46.2314	0.0182
At most 1*	104.5544	95.7536	0.0108	33.7002	40.0775	0.2189
At most 2*	70.8541	69.8189	0.0413	25.0962	33.8768	0.3785
At most 3	45.7579	47.8561	0.0777	20.9319	27.5843	0.2804
At most 4	24.8259	29.7971	0.1677	14.7933	21.13162	0.3036
At most 5	10.0327	15.4947	0.2782	9.8426	14.2646	0.2225
At most 6	0.1901	3.8415	0.6629	0.1901	3.8415	0.6629

* denotes the rejection of null hypothesis at 5 percent level of significance. Trace test indicates 3 cointegrating equations at o.05 level whereas maximum Eigen Value test indicates 1 cointegrating equation at o.05 level.

The Johansson cointegration tests for cointegration shows conflicting results with trace test and maximum eigenvalues test. The trace test indicates a 3 cointegration relation, however, eigenvalue shows only one. Hence it is desired to run OLS at first difference.

Granger Causality Test

A number of studies have been carried out to examine the direction of causality between economic growth and bank lending. Mishra at al (2009) examined the direction of causality between credit market development and economic growth in India through the application of Granger Causality Test and found that credit market development spurs economic growth. Mukhokadhya and Pradhan (2010) assessed the causal relationship between financial development and economic growth of seven Asian developing countries and concluded that no general consensus can be drawn about finance growth relationship in developing countries. Odedokun (1989) found the case of unidirectional causality from the real sector to the financial sector.

Here in the study, Granger Causality Test has been conducted to find out the direction of causality between the private sector credit and variables of interests. The results of Granger Causality Test has been shown in annex 5.

6. Analysis of Results

EstimationResult

Our equation

$$d(lnrpvctt) = \alpha 0 + \alpha 1 d(lnrdept) - \alpha 2 d(irt) - \alpha 3 d(crrt) - \alpha 4 d(liqt) + \alpha 5 d(exrt) + \alpha 6 d(lnrgdp\ t) - \alpha 7 d(lninf) + \mu$$

Results as per the equation

d(rpvctt)= 0.06654 + 0.1159 d(lnrdept)– 0.009 d(irt)-0.006 d(crrt)– 0.0095 d(liqt) +0.0007 d(exrt))+ 1.122 d(lnrgdp t) -0.3591 d(lninf)

(0.1473) (0.5700) (0.4724) (0.6716) (0.0023) (0.8430) (0.0980) (0.4021)

The estimation results of the benchmark specification show that coefficients of real GDP and Liquidity ratio are significant with expected signs with probability of 0.0980 and 0.0023 respectively. With regard to real GDP, 10 percent increase in GDP causes 11.22 percent increase in private sector credit by the banking sector. This fact is also supported by the findings of Budha (2013) that increase in real GDP by 1 percent causes an increase in lending of average bank by 4.24 percent. It shows that GDP is the barometer of the economy and every commercial bank should pay its attention to the overall macro economic situation of the country. If economy is in boom and GDP growth is impressive, banks can lend more money to private sector without any hesitation and vice versa.

With regard to liquidity ratio, increase in such ratio would lead to a decline in private sector credit but by only nominal ratio. All other independent variables - deposit, CRR, IR, exchange rate and inflation seem to have expected sign. Results show that increase in domestic deposit leads to an increase in real private sector credit. However the coefficient is not significant. Increase in CRR and IR leads to a decline in private sector credit, which is theoretically also correct. However their coefficients are also not significant. It means that bank lending in Nepal is not much sensitive to cash reserve ratio and interest rate. It is because of interest insensitive investment pattern and provision of banks' liquid assets to deposit ratio also. Inflation has negative impact on real private sector credit as per the results and it is theoretically also correct. However, inflation coefficient is not significant. Exchange rate appears to have positive impact on private sector credit which is theoretically correct but with insignificant coefficient.

Durbin Watson is 1.77 which is considered quite good in the test. From the results, it can be said that the major determinants of bank lending in Nepal is economic growth (real GDP growth). Second important determinant is liquidity ratio to be maintained by the commercial banks. Inverse relationship between bank's liquid assets to deposit ratio and private sector credit is found. If regulatory authority increases liquid assets to deposit ratio, then banks' credit capacity squeezes. Banks in this situation should pay more attention on limiting the private sector credit to maintain the liquidity on the one hand and on inventing the areas of lending if liquidity ratio is high on the other.

R squared (0.30) is not so high in this model. The dominance of informal sector credit even up to now, low banking practices in rural agricultural areas, interest insensitive investment pattern in Nepal, political instability, lack of investment friendly environment and various other non-economic factors may play role for this low R squared ratio.

Results of Granger Causality Test

The Granger Causality Test shows the evidence of unidirectional casual relationship from GDP to private sector credit but bi-directional casual relationship between private sector credit and liquidity (annex 5).

With lag structure at 2 lags, the estimated F-stat strongly suggests that real GDP does Granger causes the bank lending to private sector but the other way is not true. Hence, the preliminary relationship is in line as expected.

7. Conclusion and Recommendations

The role of credit is considered to be the key to economic growth especially in developing countries as it lubricates the economy. As Commercial banks constitute a major chunk of total assets and total deposits in the banking system in Nepal and extension of credit is one of the major functions of banking institution, the study attempts to capture the determinants of lending behavior of commercial banks. The study applied time series ordinary least square regression model for empirical analysis.

Study shows that commercial banks' lending behavior is mostly determined by the gross domestic product of the country and liquidity ratio to be maintained by the commercial banks. Every 10 percent increase in real GDP causes 11.22 percent increase in private sector credit by the banking sector. As there is significant positive relationship between GDP and private sector credit of commercial banks, they should take in to account the overall macroeconomic situation of the country and should focus more on macro-financial linkage while taking lending decision. If macro economic situation is conducive and supportive, banking performance is enhanced and good lending behavior guaranteed.

As CRR does not seem to have significant impact on credit of commercial banks, it is not a big deal for commercial bank to ensure compliance with the central bank's policy. From central bank's perspective, it is recommended to focus more on other instruments (such as open market operations) of monetary policy as CRR seems insignificant.

Though the explicit determinants of banks' credit behavior are important, other determinants such as regulations of government and central banks in general and credit to deposit ratio, capital adequacy ratio, single obligor limit, loan to value ratio, level of nonperforming loan etc in particular should not be ignored while discussing the determinants of bank lending behavior.

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Annex 1: Major Monetary, Banking and Economic Variables

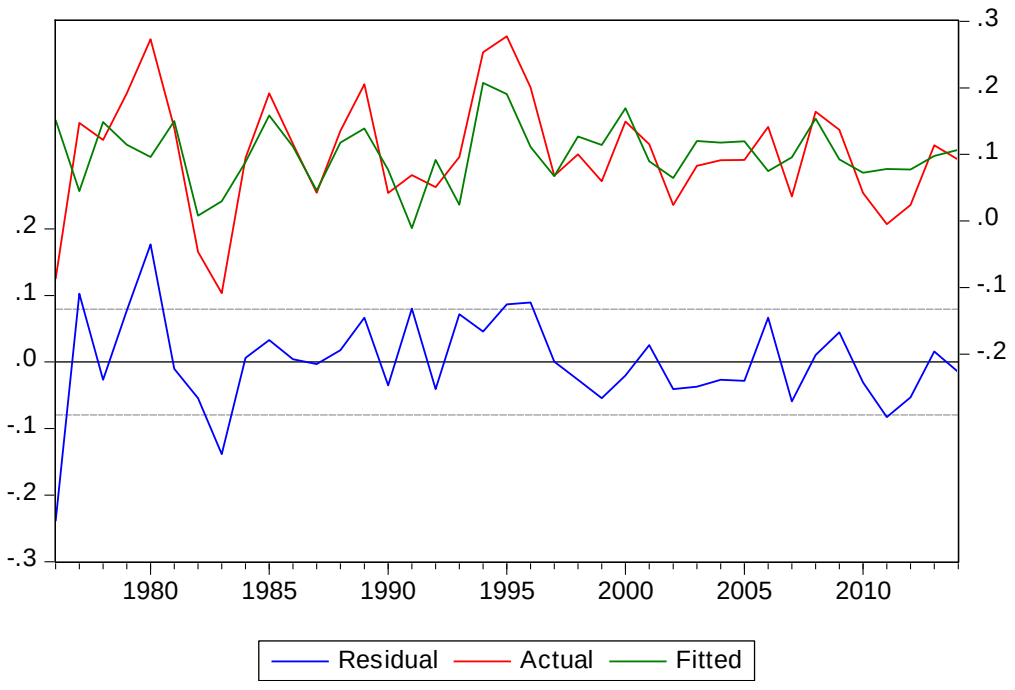
Year	GDP	Deposit	Interest Rate %	Inflation Index	Liquidity%	CRR%	Exchange Rate (Nrs per US$)	Pvct
1975	16571.0	1174.0	15.0	11.2	42.3	5.0	10.6	761.8
1976	17394.0	1605.2	15.0	11.2	41.2	5.0	12.2	693.6
1977	17280.0	2146.8	12.0	11.4	52.1	5.0	12.5	824.7
1978	19732.0	2528.5	12.0	12.7	43.5	7.0	12.3	1037.6
1979	22215.0	2920.9	12.0	13.2	41.0	7.0	12.0	1299.9
1980	23351.0	3351.6	12.0	14.4	36.0	7.0	12.0	1867.6
1981	27307.0	4160.2	12.0	16.4	33.6	9.0	12.0	2439.3
1982	30988.0	4935.4	12.5	18.1	42.9	9.0	12.0	2576.3
1983	33761.0	6308.4	12.5	20.6	45.1	9.0	13.0	2634.8
1984	39390.0	7091.2	13.0	21.9	50.3	9.0	13.9	3079.2
1985	46587.0	8560.1	13.0	22.8	48.1	9.0	15.5	3877.3
1986	55734.0	10315.4	12.5	26.4	43.9	9.0	17.9	5044.9
1987	63864.0	11900.5	12.5	30.0	43.8	9.0	19.9	5970.7
1988	76906.0	14996.2	12.5	33.2	44.4	9.0	21.7	7579.6
1989	89270.0	19008.6	12.5	36.0	42.6	9.0	22.2	10079.8
1990	103416.0	21942.5	11.5	39.5	42.9	12.0	25.6	11527.2
1991	120370.0	26804.9	11.8	43.3	56.3	12.0	28.6	13553.1
1992	149487.0	33686.1	12.0	52.4	52.5	12.0	32.5	17269.3
1993	171474.0	43777.9	12.0	57.1	57.7	12.0	45.7	20694.7
1994	199272.0	52304.8	8.8	62.2	53.3	12.0	49.3	29067.6
1995	219175.0	61164.1	8.8	67.0	42.1	12.0	50.0	41309.2
1996	248913.0	71346.2	10.3	72.4	39.7	12.0	55.5	54584.8
1997	280513.0	81660.6	10.3	78.3	43.5	12.0	57.0	63169.7
1998	300845.0	102543.6	9.8	84.8	40.4	12.0	62.3	75643.9
1999	342036.0	127062.9	8.4	94.4	39.7	12.0	67.9	89433.1
2000	379488.0	154940.8	6.9	97.6	41.0	8.0	69.2	107343.1
2001	441519.0	181674.9	6.1	100.0	42.0	8.0	74.0	123417.4
2002	459443.0	184331.1	5.3	102.9	41.4	8.0	77.0	130088.4
2003	492231.0	203296.9	5.0	107.8	39.9	7.0	77.7	148073.2
2004	536749.0	233292.8	4.3	112.1	40.5	7.0	77.7	168692.8
2005	589412.0	251008.0	3.6	117.2	39.4	6.0	72.1	193270.0
2006	654084.0	290557.9	3.6	126.5	41.4	6.0	72.4	240631.9
2007	727827.0	336792.7	3.6	134.6	41.6	5.0	70.3	265360.6
2008	815658.0	423488.4	4.3	145.0	39.1	5.0	65.2	336781.0
2009	988272.0	552856.9	6.0	163.2	35.8	5.0	77.4	434912.7
2010	1192774.0	617466.3	8.1	178.9	35.3	5.0	74.2	497139.8
2011	1366954.0	676442.1	8.1	200.5	34.5	5.5	72.3	554589.0

Year	GDP	Deposit	Interest Rate %	Inflation Index	Liquidity%	CRR%	Exchange Rate (Nrs per US$)	Pvct
2012	1527344.0	696946.4	6.2	223.5	34.9	5.5	81.7	63360.8
2013	1692643.0	815037.4	5.3	241.3	34.3	6.0	88.3	766327.2
2014	1928517.0	898256.6	4.1	260.5	34.2	5.5	98.2	906852

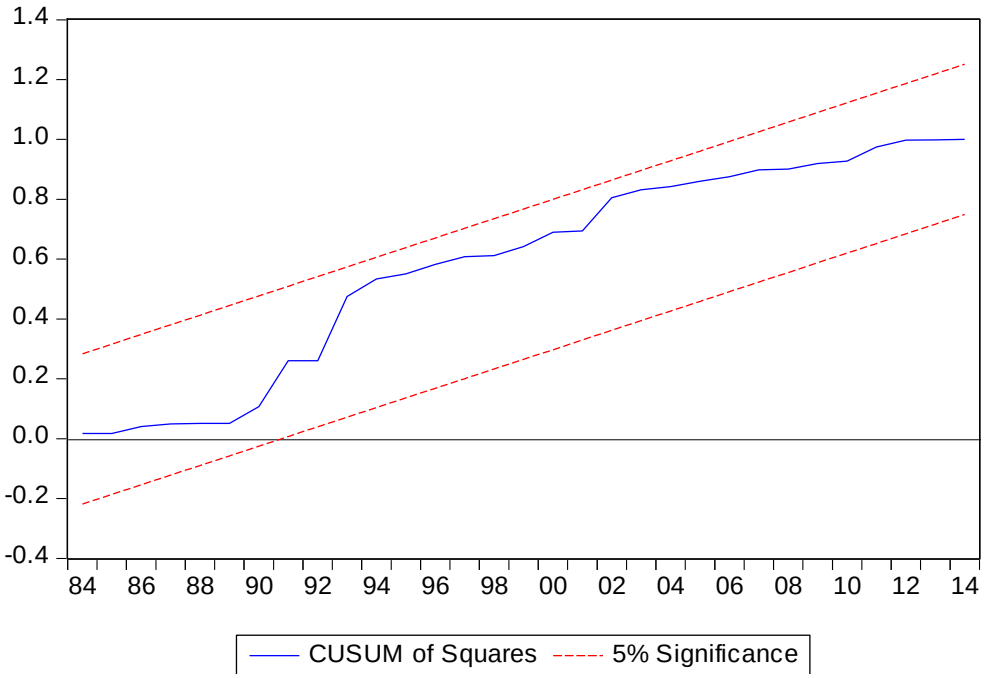
2. Ordinary Least Square Results

Dependent Variable: D(LNRPVCT)				
Method: Least Squares				
Date: 10/31/14 Time: 13:00				
Sample (adjusted): 1976 2014				
Included observations: 39 after adjustments				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.066542	0.049147	1.353931	0.1473
D(LNRGDP)	1.122624	0.675665	1.661509	0.0980
D(LNINF)	-0.359052	0.422671	-0.849483	0.4021
D(IR)	-0.009496	0.013053	-0.727519	0.4724
D(EXR)	0.000670	0.003353	0.199768	0.8430
D(LIQ)	-0.009532	0.002940	-3.242102	0.0023
D(CRR)	-0.006000	0.014019	-0.427963	0.6716
D(LNRDEP)	0.115888	0.201814	0.574230	0.5700
R-squared	0.298819	Mean dependent var		0.100965
Adjusted R-squared	0.186787	S.D. dependent var		0.086136
S.E. of regression	0.079857	Akaike info criterion		-2.036487
Sum squared resid	0.197689	Schwarz criterion		-1.695243
Log likelihood	47.71149	Hannan-Quinn criter.		-1.914052
F-statistic	1.887300	Durbin-Watson stat		1.770991
Prob(F-statistic)	0.105738			

3 Resudial Test



4.Stability Test



5. Granger Causality Test Results

Pairwise Granger Causality Tests
Date: 10/31/14 Time: 13:11
Sample: 1975 2014
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNRDEP does not Granger Cause LNRGDP	38	0.38360	0.6844
LNRGDP does not Granger Cause LNRDEP		3.60847	0.0383
LNINF does not Granger Cause LNRGDP	38	7.05263	0.0028
LNRGDP does not Granger Cause LNINF		1.12418	0.3370
LNRPVCT does not Granger Cause LNRGDP	38	0.01003	0.9900
LNRGDP does not Granger Cause LNRPVCT		7.56887	0.0020
LIQ does not Granger Cause LNRGDP	38	0.13987	0.8700
LNRGDP does not Granger Cause LIQ		1.96204	0.1566
IR does not Granger Cause LNRGDP	38	1.44771	0.2497
LNRGDP does not Granger Cause IR		4.26202	0.0226
CRR does not Granger Cause LNRGDP	38	1.87931	0.1687
LNRGDP does not Granger Cause CRR		2.73648	0.0795
EXR does not Granger Cause LNRGDP	38	3.05532	0.0606
LNRGDP does not Granger Cause EXR		3.84204	0.0316
LNINF does not Granger Cause LNRDEP	38	2.72455	0.0803
LNRDEP does not Granger Cause LNINF		0.56896	0.5716
LNRPVCT does not Granger Cause LNRDEP	38	2.08607	0.1402
LNRDEP does not Granger Cause LNRPVCT		2.64236	0.0862
LIQ does not Granger Cause LNRDEP	38	0.25411	0.7771

LNRDEP does not Granger Cause LIQ		1.83254	0.1759
IR does not Granger Cause LNRDEP	38	0.25106	0.7795
LNRDEP does not Granger Cause IR		3.57315	0.0394
CRR does not Granger Cause LNRDEP	38	1.09436	0.3466
LNRDEP does not Granger Cause CRR		2.74954	0.0786
EXR does not Granger Cause LNRDEP	38	0.67151	0.5178
LNRDEP does not Granger Cause EXR		1.43934	0.2516
LNRPVCT does not Granger Cause LNINF	38	1.01446	0.3736
LNINF does not Granger Cause LNRPVCT		7.28688	0.0024
LIQ does not Granger Cause LNINF	38	1.85237	0.1728
LNINF does not Granger Cause LIQ		2.49348	0.0981
IR does not Granger Cause LNINF	38	1.00487	0.3770
LNINF does not Granger Cause IR		8.91713	0.0008
CRR does not Granger Cause LNINF	38	0.05602	0.9456
LNINF does not Granger Cause CRR		2.71034	0.0813
EXR does not Granger Cause LNINF	38	5.78770	0.0070
LNINF does not Granger Cause EXR		4.93292	0.0134
LIQ does not Granger Cause LNRPVCT	38	5.88248	0.0065
LNRPVCT does not Granger Cause LIQ		10.1033	0.0004
IR does not Granger Cause LNRPVCT	38	1.60395	0.2164
LNRPVCT does not Granger Cause IR		5.03631	0.0123
CRR does not Granger Cause LNRPVCT	38	0.66180	0.5226
LNRPVCT does not Granger Cause CRR		5.39568	0.0094
EXR does not Granger Cause LNRPVCT	38	2.47267	0.0999
LNRPVCT does not Granger Cause EXR		1.65318	0.2069
IR does not Granger Cause LIQ	38	3.14599	0.0562
LIQ does not Granger Cause IR		0.57317	0.5692
CRR does not Granger Cause LIQ	38	3.36748	0.0467
LIQ does not Granger Cause CRR		1.04230	0.3640
EXR does not Granger Cause LIQ	38	2.50330	0.0972
LIQ does not Granger Cause EXR		0.39930	0.6740
CRR does not Granger Cause IR	38	0.39645	0.6759
IR does not Granger Cause CRR		4.34112	0.0212
EXR does not Granger Cause IR	38	9.75752	0.0005
IR does not Granger Cause EXR		2.67991	0.0835
EXR does not Granger Cause CRR	38	4.29350	0.0220
CRR does not Granger Cause EXR		1.24969	0.2998

Paper No. 42

The Socio-Economic Impact of Mobile Banking on Rural Bangladesh

Shudipta Sharma*

Md. Monjur Hossain**

Abstract

This paper aims to explore the socio-economic impact of mobile banking on rural Bangladesh. It also tries to detect the rural people's perception about the new financial phenomena. As like as many other developing countries most of the people in Bangladesh still have no access to formal banking sector. Only 15 percent adult people have bank accounts, though 74 percent people use mobile phone. As part of the government's financial inclusion program, the central bank allowed 28 banks to provide mobile-banking; to date, 19 have launched the service. Due to its easy transaction services mobile banking has become popular among Bangladeshi people within a short span of time. People both urban and rural are using the new technology to transfer money, receive salaries or pay bills from their accounts without visiting any bank branch. The number of subscriber of mobile banking is some three million and around USD 32 million is being transacted through this new service in the country every day. The growing usage of mobile banking service leads experts and policy makers to believe that it will help the country's economic growth as well as overall reduction in inequality. As Bangladesh is still an agricultural country where 70 percent people live in the rural areas, the development depends on rural people. So, it is important to know the exact socio-economic impact of mobile banking on rural areas. This study addressed following empirical questions: How does the financial inclusion benefit rural people? Does it spark entrepreneurship and job creation? Does it increase people's savings tendency? Does it help people to respond to shocks? How does it help rural people to improve their health and education? To find the answers this study has taken semi-structured interview of 30 mobile bank users of Hatirdia village in Narsingdi district. Applying grounded theory and hermeneutics approaches, this study finds that mobile banking affects positively in the socio-economic development in rural Bangladesh. Its impact on in employment creation, business, savings behavior, remittance, agriculture, health care, education and women empowerment is really good. The growing uses of mobile banking decreases the use of informal channels of financial services which have the inherent risks of leakage, fraud, and corruption. This study also finds that rural people use the services of mobile banking as it is easy and fast.

Key words: Mobile Banking, m-Banking, Rural Bangladesh, Socio-economy.

1 Introduction

Banks are the mainstream of the financial system of a country like Bangladesh. Because of close relationship between economic and financial development, the banking system must be robust, resilient and sound for efficient intermediation of financial resources. For that reason, sound macro-economic environment, effective bank management strategies and prudential financial regulations are the means. However, as like as many other developing countries most of the people

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in Bangladesh still have no access to formal banking sector. Only 15 percent adult people have bank accounts, though 74 percent people use mobile phone (Haque, 2013). As part of the government's financial inclusion program, the central bank allowed 28 banks to provide mobile-banking; to date, 19 have launched the service (The Daily Star, 2014). Due to its easy transaction services mobile banking has become popular among Bangladeshi people within a short span of time. People both urban and rural are using the new technology to transfer money, receive salaries or pay bills from their accounts without visiting any bank branch. The growing usage of mobile banking encourages experts and policy makers to believe that it will lead the country's economic growth as well as overall reduction in inequality (Rahman, 2014). As Bangladesh is still an agricultural country where 70 percent people live in the rural areas, the development depends on rural people. So, it is important to know the exact socio-economic impact of mobile banking on rural areas. This study addressed following empirical questions: How does the financial inclusion benefit rural people? Does it spark entrepreneurship and job creation? Does it increase people's savings tendency? Does it help people to respond to shocks? How does it help rural people to improve their health and education? To find the answers this study takes a village named Hatirdia of Manohardi upazila in Narsingdi district as a case study. This study engages a multi-level, multi-method approach to the analysis of the impact of mobile banking on rural Bangladesh. This study will help us to know understand the socio-economic impact of mobile banking on rural areas where most of the people have no access to formal banking sector. This experience will help the policy makers of not only Bangladesh but also other developing countries to improve the socio-economic status of rural people by utilizing mobile banking services effectively.

2 Mobile Banking and Bangladesh Scenario

New information and communication technologies have brought many opportunities for people. Mobile banking is one of them. It is a banking process which provides financial services through mobile technology devices i.e. mobile or cellular phone. This new technology helps the unbanked communities to get financial services efficiently and at affordable cost. Mobile banking is used for performing bank checks, account transactions, payments, credit applications and other banking transaction through a mobile device. The system not only consists to withdraw money but also to transfer money within a very short time.

Mobile banking (also known as M-Banking, mbanking and SMS Banking) can be conducted through the internet browser on the phone, through a program downloaded from the bank, or by short-messaging service (SMS). Customers if they have mobile phone and are registered for this can avail banking service through using it. Therefore, sitting in front of a computer is not a requirement anymore; accessing accounts can occur while users are waiting their turn at the dentist clinic or relaxing at the beach! (Al-Akhras and Qwasmi, 2011). The earliest mobile banking services were offered via SMS in the early 2000s. As the size and capabilities of mobile devices increased in the mid 2000s, so did the effectiveness of mobile banking. Banks introduced services that accommodated more types of cell phones and mobile devices, including smart phones.

In Bangladesh, mobile banking service was inaugurated by ten leading banks on 31 March 2011. At the inaugural press briefing Bangladesh Bank governor Atiur Rahman said 'Mobile banking is an alternative to the traditional banking through which banking service can be reached at the doorsteps of the deprived section of the society.' The central bank governor also said through mobile banking various banking services including depositing and withdrawing money, payment of utility bills and reaching remittance to the recipient would be possible (Sadia, 2013). Among the 10 banks Dutch-Bangla Bank Limited (DBBL) serves the wide and own structured network at first. Moreover, the bank has introduced its mobile banking service expanding the banking service from cities to remote areas for the first time.

Any cell phone owner of any provider can easily open an account for the mobile banking service by going to the DBBL-approved Citycell and Banglalink agents throughout the country. The subscribers merely need show necessary papers and payment of a fee of Tk 10 to open the account. The subscriber will be given a four-digit PIN to avail of the banking service. By using the PIN he can operate all types of banking services including depositing and withdrawing money maintaining security and secrecy of his/her account. The customer will hand over cash to the agent and the agent will initiate the transaction from his/her mobile phone, the agent will help the account holder to do the banking using his PIN. According to the central bank guidelines, the transaction limit for an account holder is fixed at a maximum amount of Tk 25,000 on a daily basis. The limit is applicable for any number of transactions. The Bangladesh Telecommunication Regulatory Commission (BTRC) has set the charge at 2 percent for each transaction for 'cash-in' and 'cash-out' purposes and Tk 5 for the lowest amount of transactions for mobile banking. However, the registration fee, salary and remittance disbursement services will be provided free of cost. Among the mobile banking service-providers, 'bKash' has set its charge at 1.85 percent for remitting money, Dutch-Bangla Bank at 2 percent and Islami Bank at 1.5 percent under mobile banking services.

The central bank allowed 28 banks to provide mobile-banking as part of the government's financial inclusion program. To date, 19 have launched the service. Due to its easy transaction services mobile banking has become popular among Bangladeshi people within a short span of time. People both urban and rural are using the new technology to transfer money, receive salaries or pay bills from their accounts without visiting any bank branch. Mobile banking services have succeeded to include many unbanked rural people to the formal banking system (Ahmed, 2011). Bangladesh Bank (BB) data shows some three million people make now the use of different services under mobile banking. There are about 70,000 outlets of mobile banking service-providers across the country, making the services available to the users. Some USD 32 million is being transacted through mobile banking in the country everyday and Bangladesh is in the seventh position in providing mobile banking services in the world. Another account shows that the volume of mobile banking transaction is 5.6% of the country's GDP (Ahmed, 2014). It is observed that person to person money transfer—'cash in' and 'cash out'—are the most popular types of transactions. However, study reports say, in Bangladesh, the mobile banking users of rural areas are 7.40 times more likely to achieve moderate improvement than weak improvement on livelihood compared with the users of urban areas. Similarly, the mobile banking customers of semi-urban areas are 5.15 times more likely to have moderate improvement than weak improvement on livelihood compared with the customers of urban areas (Sadia, 2013).

At present, bKash, the Brac Bank-initiated mobile banking service, is the country's leading service-provider in mobile banking. bKash has 58,000 agents across the country with around 4 million clients and 20 percent of them transact regularly. DBBL, which has mobile banking outlets even at the union council level, is next in line, after bKash, as service –providers in mobile banking, in terms of volume of transactions, clientele coverage and number of personnel, directly or indirectly, involved in the process of making such services available to the people. The company's mobile banking subscribers stood at around 12 lakh till April 2014 (The Financial Express, 2013).

3 Socio-economic Status of Bangladesh

Bangladesh is an agrarian country where most of people live in rural areas. Though the socio-economic condition of the country has improved in recent years, it is not good enough yet. Unicef data shows that 84 percent of the population - or 129 million people – live on less than $2 a day. This is despite an increase in national income per capita. The number of people living on less than a dollar a day has increased from 36 per cent to 41 per cent in the last three years. The poverty gap is widening.

Many children must work, are denied an education and are vulnerable to violence, abuse, and exploitation. An estimated 5 million children aged 5 to 14 years are working, many under dangerous conditions. Poverty is the main cause of child labor. Net primary school enrolment rates are 93 per cent for boys and 96 per cent for girls. However, the dropout rate is high. Fewer than half the children who complete primary school reach expected competencies because of poor teaching methods, overcrowded classrooms and a lack of home support. The adult literacy rate is estimated at 48 per cent. Dowry and dowry-related violence are widespread and pose serious threats to women. Women are the most likely victims of acid attacks. Bangladesh has one of the highest rates of child-marriage in the world. Nearly two-thirds of adolescent girls are married (10-19 years).

4 A case study on Socio-Economic Impact of Mobile Banking on Hatirdia village

Hatirdia village is situated some 75 kilometre away from Dhaka, capital city of Bangladesh. The area and the population of the village are around 2.5 square kilometer and 3,000 respectively. Though Hatirdia is a business hub in the area, most of the people of the village are involved in farming or agri-based business. There are one government primary school, a high school and a college in the village. The literacy rate is 60 percent. Two banks—Janata Bank, state owned commercial bank, and Krisi Bank, state owned specialized bank for farmers, are situated in the village. However, most of the people don't have any account with these banks. Only 20 percent adult people have bank account and most of them are businessmen or foreign remittance receiver. However, a good number of farmers have opened bank account with the banks recently as the central bank allows them to open an account by only Tk 10. Despite of this, most of the people use mobile banking service since its inception due to its easy method.

This study involved a qualitative investigation of 30 mobile bank users and agents of the village. Primary data has been collected through different in-depth interviews of these individuals. Secondary data has been collected from newspaper and journal articles. To interpret the interview texts grounded theory (Strauss & Corbin, 1990) and hermeneutics analysis (Packer, 2011) approaches are applied here.

5 Economic Impact of Mobile Banking

Various study reports say that growing financial inclusion increases a nation's GDP. As entrepreneurs with business ideas gain access to credit, economic activity grows, and new businesses and jobs mean a more productive society. In addition, there is an accounting benefit from the formalization of savings within the banking system, as this will power further credit creation, increasing investments. A study says that with the mobile financial services adoption, Bangladesh could see a GDP increase of US$6 billion, or 2 percent, by 2020 (BCG, 2011). Mobile banking services will help the country such way in the economic development. In our studied village we also find this true. Let's see how mobile banking impact on rural economy.

5.1 Impact on New Job Creation

It is said that increased access to finance facilitates entrepreneurship, new business creation, and new jobs. A World Bank study also finds a 1 percent increase in financial inclusion corresponds to a 0.51 percent increase in business creation, and a 15 percent inclusion increase leads to employment growth of 1 percent (BCG, 2011). In Hatirdia village the mobile banking has helped a group of unemployed youth to launch an entrepreneurship. Most of them are directly involved in mobile banking as an agent. The agent gets a commission from the bank in every transaction. Some of them were involved in mobile phone and accessories business before being an agent.

However, this new business has become their main business and many of them had to appoint an assistant to manage customers. Lokman Mia said,

I started my business with mobile accessories. But the profit was so limited and I had to plan to change my business. But when I became the agent of bkash and DBBL fortune had supported me. Now mobile banking is my main business. To manage the huge customers I recruited an assistant (Mia, 2014).

5.2 Impact on Business

Mobile banking service has huge impact on rural business. Before the mobile service era, small businessmen had to make their payment to the whole seller by present physically. It was huge time and money consuming. Now they can make the payment easily through the mobile banking service. Md. Ataur Rahman, a small agri-product businessman, is one of them. He neither received any formal education nor had a bank account. The 42- year-old man said,

It was really hard for me to open an account in a traditional bank. Because the process was so complex for me and I feel worried to go to a bank office. That is why I had to go to another district regularly to make the payment to my whole seller. It took a day and most of the time I had to close my shop on this day. But in the age of mobile banking the process is easier now. I have opened an account in a mobile banking service provider since the process is simple and easy. Nowadays, by paying the payment through mobile bank, I ask my whole seller over phone to send products from other districts. I didn't face any problem in this process. Life is very easy now (Rahman, 2014).

Apu Sarkar, a small retail fruit seller, has similar experience. Though he has bank account with two different banks, he feels comfort to make his transaction through mobile banking. The 24-year-old man said,

The transaction process in a traditional bank is not so easy for an illiterate man like us. Moreover, the bank does not allow me to make transaction anytime I needed. It has limited working hours and two holidays in a week. But as a businessman we have to send money in emergency case very often. The mobile banking provides me the service. Nowadays I can send money anytime to the whole seller whenever needed. It is less expensive and time consuming comparing to other banking (Sarkar, 2014).

5.3 Impact on Remittance and Illegal Transaction

Bangladesh's economy greatly depends on foreign remittance nowadays. Huge numbers of Bangladeshi citizen are working in abroad and they send foreign remittance regularly. Important fact is that most of them are from rural areas. Another point is that a good number of people has opened bank account to merely collect the remittance. Different traditional banks are also trying to attract customers by offering various opportunities so that they transact their foreign transaction through their banks. A good number of people are taking these opportunities. But still in many cases, especially in emergency, they depend on informal transaction called hundi. Mobile banking service greatly impact on this sector. As the process is easy rural people use it and the illegal transaction is decreasing day by day. Abdul Jalil, a farmer, regularly receives foreign remittance from Saudi Arabia. He said,

My elder brother has been working in Saudi Arabia for five years and he sends me money every month. Before the mobile banking era it was hard for me to collect the money from traditional bank. That's why we made the transaction through hundi. But the days are past now. My brother sends me money directly to my mobile account nowadays and I cash-out it from a mobile banking agent easily (Jalil, 2014).

5.4 Impact on Savings Behavior

As most of the rural people are not involved in formal banking, their saving tendency is not good. They often take loan with high interest from local money lenders. Many people are also involved in informal savings. Mobile banking has also brought a change in this sector. Most of the people who have a mobile bank account and transact money regularly save an amount for emergency case. Basir Ahmed is one of them,

I don't have any savings account in any bank. That's why I didn't have any savings. I had to borrow money from others in emergency case. Several times I took loan on high interest rate from local money lenders. But now I keep an amount in my mobile bank account. In every transaction I save a percentage of money. I also get interest from my bank against my savings (Ahmed, 2014).

5.5 Impact on Agriculture

Agriculture is the major sector of Bangladesh economy. According to new GDP measurement system, it provides about 13.09 percent of the country's GDP. It is also said that formal financial inclusion of farmers would boost up the development of this sector. Realizing the fact Bangladesh Bank has been allowing farmers to open a bank account by only Tk 10 so that they can take the benefit of different government financial programs. Following the decision, as mentioned earlier, a good number farmer of Hatirdia village has opened bank account in two traditional banks. However, in emergency cases farmers have been dependent on local money lenders since mobile banking service is available. They can now manage money from their relatives or friends any time through mobile banking. Shamsul Islam, a farmer, explained his experience,

Before the mobile banking era I had to struggle to manage money to buy fertilizers, pesticides or seeds in emergency. Now I call my brother working in abroad and he sends me the money through mobile banking. I don't need to take loan or borrow money from others nowadays (Islam, 2014).

5.6 Impact on Other Economic Activities

Mobile banking makes different economic activities easy in rural and urban Bangladesh. People don't have to go different places to collect or pay money nowadays. It saves people money and time a lot.

Ziaul Haq is a government employee. He has an apartment at capital city and it is rented. He said,

I had to go to Dhaka every month to collect house rent. It was not only boring but also time and money consuming job for me. Now I collect the house rent through my mobile bank account easily. In this way mobile banking makes the world smaller to me (Haq, 2014).

6 Social Impact of Mobile Banking

Mobile banking not only included unbanked people to formal financial system but also has huge positive social impact on rural Bangladesh. It is aiding in securing economic stability, reducing poverty, and fostering rural development as it benefits education, health, and entrepreneurship. It can increase family and child welfare as it improves health care through mobile payments for medical workers and patients and makes insurance more accessible.

6.1 Impact on Health Care

Serious injuries and funerals can have a devastating effect on the poor. A study shows the potential harm of health shocks on the poor in Bangladesh. In the study, food shortages occurred in 35 percent of the cases, children dropping out of school in 10 percent of the cases, resorting to child labor in 11 percent. Fully 60 percent of these households never recovered from the damage caused

by health shocks (BCG, 2011). Mobile banking is helping the rural people to mitigate the impact of health shocks by providing different facilities. People can easily save money for future health care costs with mobile banking service. Moreover, they can manage money immediately which improves their chances of receiving immediate health care access. Ahsan Kabir, 39, a businessman, shared his experience how he be benefited from mobile banking in medical purpose. He said,

Few days ago I went to Dhaka for medical treatment. That was Friday and I needed money to do some urgent medical tests prescribed by doctors. I was searching for money and mobile banking relief me from anxiety. One of my relatives sent money through my mobile bank accounts. Finally I could complete my medical treatment successfully. Otherwise, I would have to go to Dhaka next week for those tests (Kabir, 2014).

Muslesh Uddin, 62, also found positive impact of mobile banking on health care. He said,

My son is an executive of a readymade garment. Before the mobile banking era, he came to home in every month for giving me the monthly family expenses. On those days, in case of emergency especially for medical, formal banking could not help us. Now my son send me money at my mobile account anytime that makes my life flexible and tension free (Uddin, 2014).

6.2 Impact on Education

Education is the backbone of a nation. But the education system of Bangladesh especially in rural area is not good enough. People have to send their children in cities for better education. But the money transaction process was so complicated and time consuming before the mobile banking era. In emergency cases, especially in examination period, students had to struggle to manage the tuition and examination fees that hampered their examinations. But the process is very easy now. Hasibul Hasan Onik, 22, a university student, said,

I have experience to receive money from my father in three ways—banking channel, post office and mobile banking. Comparing with other ways I have found mobile banking is less expensive and simple. That's why I told my father to send my education expenses through my mobile bank account. I can get the money immediately that relief me from anxiety (Onik, 2014).

Md. Tanver Ahammed, 31, a private executive, provide education expenses to his sister who lives in another district. He said,

Mobile banking provides me a relief from tension regarding sending money to my sister. Otherwise I had to make a plan to manage a time to go to bank or post office for sending money. Nowadays my sister collects money from an ATM booth any time through mobile banking (Ahammed, 2014).

6.3 Impact on Women Empowerment

Mobile banking service has an impact on rural women empowerment. Before the mobile banking era, women had to depend on men for almost every economic activity as they usually don't go to market. Now they can make their transaction themselves. Swapna Rani Sharma, 38, said,

I work in a house in my village as a housemaid. As the owner of the house lives in another district he pays my salary through mobile bank every month. If there would not be the mobile banking service, I would have to depend on my husband or any other man to collect the money from post office in the market. Now, I can do it myself. Moreover, I can call my owner to send me money in emergency through the mobile banking. I think it makes me self dependent (Sharma, S.R. 2014).

7 Conclusion

Bank plays a great role in the economic development in every country across the world. If the banking system of a country is strong, the socio-economic status of the country must be strong. Banks are functional in the process of savings, capital formation, investment, production in the rural economy. As human life is becoming more frequent day by day in touch of technology, banking system has to adjust with this. Mobile banking is one of the tremendous touches of technology in banking sector. Though this technology has been populated in developed country earlier, in Bangladesh it was a dream for this opportunity in banking. But through the progress of Digital Bangladesh the dream has come true. Rural people are also using the easy and fast banking service as like as urban people across the country. They have taken this service as an opportunity and a mean to make their lives easy, secured and comfortable. The positive impact of the new type of banking is also seen nowadays in every sector of rural areas especially in socio-economic areas. A good number of people are now included in formal banking sector that has brought a positive change in the rural people livelihood. Moreover, its impact on rural socio-economy especially in employment, business, savings, remittance, agriculture, access to health care, education and women empowerment is really good. It can be said that the mobile banking service would help to eradicating poverty from the country. Now it is necessary for the government and the regulators to encourage the banks, mobile operators and other financial service providers to adopt and expand mobile banking as a priority for extending financial services to a huge number of unbanked people in remote rural areas of Bangladesh. However, some people complained that the mobile banking is not secured enough as an agent can do forgery with the customers. To solve this problem bank authorities discourage to transact money through agent account. They suggest to making the transaction by opening personal account. So, we can say that there is lack of awareness among people regarding the safe transaction. The government and bank authorities should conduct campaign to increase the awareness so that people make the transaction through their own account. However, another study finds the major constraints in development of m-banking included operational issues (e.g. security, system design, implementation and maintenance); customer misuse of products and services; legal issues (e.g. without proper legal support, money laundering may be influenced); strategic issues; reputation issues (e.g. if the bank fails to provide secure and trouble free m-banking services, this will cause reputation risk); credit issues and liquidity risks (Islam, 2013). This study was conducted in small range in a village only. If the study could be conducted in several villages, more accurate findings would be come. This is a limitation of the study. Future researchers would work on how could mobile banking service play role in the economic development of rural people. They could also find the suitable mobile banking strategy for rural Bangladesh so that people take benefit from the service and change their livelihoods.

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Paper No. 43

An empirical relationship between financial development indicators and human capital in Asian Countries

Madhu Sherawat

Abstract

The objective of the study is to investigate the relationship between financial development indicators and human capital for Asian countries using the annual data from 1984-2012. The stationarity of the variables are checked by LLC, IPS, Fisher-type ADF and PP panel unit root tests. The Pedroni's and Kao's panel co-integration approaches are employed to examine the long run relationship among the variables. To estimate the coefficients of co-integrating vectors, both FMOLS and PDOLS techniques are used. The short term and long run causality is examined by panel granger causality. The Pedroni's and Kao's co-integration approaches support the existence of the long run relationship among the indicators of financial development, economic growth and human capital. The DOLS and FMOLS estimators revealed that both financial development indicators and economic growth variable act as an important driver for the increase in human capital. The results of panel granger causality indicate that causality runs from indicators of financial development, economic growth and public spending on education to human capital. There is hardly any study that examines the impact of financial development indicators and economic growth of human capital in Asian economies, therefore the present study fill the research gap in the literature.

Keywords: Financial development, economic growth, human capital, panel co-integration, panel dynamic OLS, fully modified OLS, Asian countries.

JEL classification: C32, D53, E24.

Paper type: Research paper.

1. Introduction

Several economists have investigated the relationship between financial development and economic growth (Schumpeter, 1911; Patrick, 1966; McKinnon, 1973; Levine, 1997; Beck et al., 2000; Beck, Levine, 2004; Halkos, 2010; Bittencourt, 2012; Hsueh et al., 2013; Menyah and Nazlioglu, 2014). Azir and Duenwald (2002) have suggested three ways in which financial development can affect economic growth, i. e. (1) It increases the marginal productivity of capital by collecting information to evaluate alternative investment projects and by risk sharing; (2) by raising the proportion of saving to an investment channel via financial development and (3) by increasing private saving rate of the people. More precisely financial development assist economic growth by creating more efficient markets through intermediation between savers and borrowers selection of good investment, reduction of transaction costs and through market integration. Financial market reforms reduce inefficiencies and increases the developmental role of finance. Further, liberalized financial markets diminish transaction costs, lengthening the time horizon of financial contracts and refining valuation process.

However, during the last two decades, a growing stream of researchers started to focus on the difficulties of GDP, representing and synthesizing the state of the economy and people's well being (Powdthavee 2007; Veenhoven, 2007). Hence, another strand of researchers examined the relationship between financial development, inequality and poverty (Beck et al., 2007; Clarke et

al., 2003; Levine et al. 2000, Odhiambo, 2009). They found that financial development boost economic growth and may reduce income inequality and poverty.

Theoretically, financial development is as important as human capital and both contribute significantly to economic growth. Physical capital combined with the poor human capital may produce low economic growth. Physical capital contributes to human capital only when finance is allowed "to do what finance can do", which increases efficiency by transferring purchasing power from users with low return to users with high return. Finance attack poverty by increasing income and in the long run finance reduces poverty by improving health and education. This occurs through the role of investment in upgrading skills and in providing services and physical infrastructure that improves health and longevity (EOLSS, 2002).

Hence, this study merges these branches of literature, aims to provide empirical evidence on whether financial development indicators enhances well being of the people, measured by human capital. At the same time it tries to identify what are the main financial development indicators that drive this impact.

In this regard, the objective of this study is to empirically investigate the influence of financial development indicators on human capital in some selected Asian economies over the time period 1984-2012 by employing panel data analysis techniques. The more specific objectives are to find out:

1. To estimate whether there is a long-run relationship between financial developments, economic growth and human capital in selected Asian economies.

2. To investigate the influencing directions between different financial development indicators and human capital and compare the influencing magnitudes of different indicators on human capital.

3. To explore the direction of the causality between financial development and human capital.

The study is arranged in the following manner. After an introduction which has been discussed in Section 1 above, Section 2 presents related literature review. Data source, variables and econometric framework are discussed in Section 3. Section 4 presents the detailed discussion of the methodology used in the study. The analysis of results is presented in Section 5. Section 6, reported the conclusions of the study.

2. Literature Review

Human capital and physical capital, both determine growth endogenously and are crucial to economic growth. Though both are required for long run growth, the accumulation of physical capital takes place in the early stages and human capital follows (Graca et al., 2005). There has been a growing literature on the relationship between financial development and Human Capital in the literature, among them are, De Gregorio (1992), Pagano (1993), De Gregorio (1996), Outrivelle (1999) and Evans et al (2002) Papagni (2006). De Gregorio (1992) suggested that human capital accumulation raises saving rate in the long-run, but in the case of short run it lowers the productivity of investment. The low level of human capital reduces overall savings in the economy and increases domestic credit to the private sector to cater for educational matters. Ramirez et al. (1998) examined the links between economic growth and human development in Sub-Saharan countries for the time period 1970–1992. The result reported that there exists a strong positive relationship in both directions (from human development to economic growth and vice versa) and that public expenditures on social services and female education are especially important links determining the strength of the relationship between economic growth and human development.

Outreville (1999) examined the relationship between the level of financial development and socioeconomic variables (reflecting different levels of development of human capital) for 57 developing countries. He concluded that that both human capital and sociopolitical stability are important factors in explaining financial development. Evans et al (2002) found a positive relationship between money and human capital and also provides evidence for complementarly between Financial Development and Human capital. Pradhan and Abraham (2002) explored the role of human development policy on the economic growth of Indian states for the period 1980–97. The findings suggest that human development position of the states is strongly determined by the human development policy pursued in Indian states. Chi (2008) concluded that the human capital indirectly had an immense impact on economic growth in China through investment in physical capital. The study also concluded that a developed financial system is an essential accompaniment to human resources in the growth process. Kakar et al. (2011) investigated the long-run relation between education expenditures and economic growth in Pakistan over a period of 1980–2009. The empirical findings revealed that education has a long run relationship with economic growth.

Zhang and Zhuang (2011) examined the effect of the combination of human capital on economic growth in thirty one Chinese States over the period 1997-2009 by using Generalized Methods of Moments (GMM) and considered. The results indicated that higher education was more effective than the primary and the secondary education on economic growth in China. Kuri (2011) investigated the association between the process of financial inclusion and the level of human development in the context of different states of India. The study concluded that the level of human development and financial inclusion are positively correlated which states that having a high level of human development are also the states with a relatively high level of financial inclusion. Asghar et al. (2012) examined the role of human capital in terms of education and health on economic growth of Pakistan over the time period 1974–2009. The results confirm strong positive impact of human capital on economic growth. Kendal (2012) investigated the relationship between banking sector development, human capital and economic growth in states of India. The study reported that a decline in the ratio of credit to net domestic product from 75% to 25% preceding as an average of 4% decrease in growth rate.

Hakeem and Oluitan (2012) investigated the link between human capital and financial development in South Africa for the period of 1965-2005. The study found that there is a weak relationship between financial development and all the proxies of human capital used, except life expectancy at birth and secondary school enrollment. The empirical results suggested that two possible directions of causality exist, one from human capital to financial development, and evidence of reverse causality for different measures of human capital. Zaman et al. (2012) examined the impact of financial indicators on human development in Pakistan by using annual data over the period 1975-2010 for Pakistan. The results indicated that different financial indicators played an important role on increasing human capital, and financial development indicators had a balanced long term and significant relation with human capital in Pakistan except market capitalization. The results of Variance Decomposition suggest that broad, money supply (M2) had the biggest share in changes in human capital measures in Pakistan.

Nik et al (2013) explored the relationship between financial development and human capital in Iran over the period 1977-2010 by employing a Vector Auto Regression model. The empirical results of the study indicate that the cash flow has a negative effect on human capital, which is also responsible for increase in inflation. It is also found that due to the lack of the best financial resource allocation, the facilities provided by the banking system has negative effect on human capital. Akhmat et al. (2014) examined the role of economic growth and financial development in human development for a panel of selected five SAARC countries: Bangladesh, India, Nepal, Pakistan and Sri Lanka during the time period 1988–2008. The empirical result stated that there is a long run relationship between the three variables for the selected time span. It is found that

financial indicators exert the positive impact on human capital and economic growth has a negative impact on human capital.

3. Data source, variables and econometric framework

The annual data used in this study over the period 1984-2012[1] for ten Asian economies: Bangladesh, Bhutan, India, Nepal, Sri Lanka, Indonesia, Philippines, Pakistan, Thailand and Viet Nam. All relevant data has been taken from the World Bank Development Indicators (WDI, 2012) and International Financial Statistics published by the International Monetary Fund (IMF).

In this study, the following variables are used:

Human capital is measured by primary school enrollment (% gross, HCAP) because it is believed that educational attainment is a way to measure human capital (Zaman et al., 2012; Akhmat et al., 2014). According to the UNCTAD (1999, p. 5), "Human development is a process of enlarging people's choice. The most critical ones are to lead a long and healthy life, to be educated and to enjoy a decent standard of living. Human development is measured by UNDP as a comprehensive index – called the human development index (HDI) – reflecting life expectancy, literacy and command over the resources to enjoy a decent standard of living". Skilled and well-educated people have generally better access to information and are more likely to behave as less risk adverse people. Higher education leads to lower risk aversion and higher savings (Kelly, 1980). Economic growth is measured by per capita real (constant US $) (Odhiambo, 2009).

Three proxy variables are used for financial development: (1) broad money supply as a percentage of GDP (Bittencourt, 2012; Odhaimbo, 2009; Kar et al., 2011; Zaman et al. 2012), (2) Domestic credit provided by the banking sector as a share GDP (Nik, 2013) and (3) Domestic Credit to the private sector as a share of GDP [2] (Levine, 1992; Demirguc-Kunt and Levine, 1999; Khan and Senhadji, 2003; Levine, 2004; Shahbaz et al, 2008; Odhiambo, 2009; Kar et al. 2011; Colombage 2009; Zaman et al. 2012). Public spending on education as a share of GDP

variable is also taken to capture the effect of Govt.'s spending on human capital (Annabi et al., 2011). All the variables are taken in their natural logarithm. Table 1 presents the definition and expected signs of these variables on human capital; it can be observed that all of them expected to have a positive impact on human capital.

Table 3: Variables identifications and expected signs

Variables	Symbol	Measurement	Expected sign	Data source
Dependent variable				
Human capital	LHCAP	School enrollment, primary (% gross)	Positive	WDI
Independent variables				
Economic growth	LPGDP	GDP per capita (constant 2005 US$)	Positive	WDI
Financial Indicators				
Broad money supply	LBM	Broad money supply as percentage of GDP	Positive	WDI
Bank credit	LBR	Domestic credit provided by banking sector as a share of GDP	Positive	WDI

Private sector credit	LCR	Domestic credit to private sector as a share of GDP	Positive	WDI
Public spending	LPS	Public spending on education as a share of GDP	Positive	WDI

The model used to test the relationship between human capital and financial development indicators is given below:

LHCAP = f (LPGDP, LBM, LBR, LCR, LPS) .... (1)

$$LHCAP_{it} = \alpha_{it} + \beta_{1i} LPGDP + \beta_{2i} LBM + \beta_{3i} LBR + \beta_{4i} LCR + \beta_{5i} LPS + \varepsilon_{it} \quad \text{.... (2)}$$

Where i =1, 2,. . ., N represents selected Asian economies in the panel, t =1,2,. . .,T refers to the time period. The parameters β1, β2, β3 and β4 represents the long-run elasticity estimates of human capital (LHCAP) with respect to economic growth and financial development indicators respectively and ε_t is the white noise error term.

4. Methodology

4.1 Panel unit root test

To avoid spurious regression, the panel unit root test must be taken first in order to identify the stationary properties of the relevant variables. There are a variety of panel unit root tests exist in the literature, which include Breitung (2000), Hadri (2000), Choi (2001), Levin et al. (2002) and Im et al. (2003) among others. This study uses four types of panel unit root tests: Levin et al. (2002, LLC) test, Im–Pesaran–Shin test (2003, IPS) test, and Fisher-type ADF and PP tests (Choi, 2001; Maddala and Wu, 1999) to examine the stationary properties of the variables.

The LLC (2002) test is based on the ADF test and assumed the homogeneity in the dynamics of the autoregressive coefficients for all panel units with cross-sectional independence. The model in a panel setting is expressed as follows:

$$\Delta Y_{i,t} = a_i + \beta_i Y_{i,t-1} + \sum_{j=1}^{p_i} \tau_j \Delta Y_{i,t-j} + \varepsilon_{i,t} \quad \text{..... (3)}$$

Where, βi is restricted such that it is identical across countries. Δ is the first difference operator, $Y_{i,t}$, is a series for panel member (country), p_i denotes the number of lags in the ADF regression and the error term $\varepsilon_{i,t}$ are assumed to be independently and normally distributed random variables with zero means and finite unit specific variances σ_i^2; i=1,2, y ,N; and t=1,2, y ,T. The lag order p_i in equation (1) is allowed to vary across the countries.

The IPS (2003) test is employed which allows for heterogeneous autoregressive coefficients. It suggest averaging the augmented Dickey–Fuller (ADF) unit root tests while allowing for different orders of serial correlation, The authors used the average of the tβi statistics from equation (1) in order to perform the following Z statistic:

$$Z = \sqrt{N}\ (\bar{t}\text{-E}\ (\bar{t}))\ /\ \sqrt{V(\bar{t})} \quad \text{.....}$$
(2)

Where $\bar{t} = \frac{1}{N}\left(\sum_{i=1}^{N} t_{\beta i}\right)$, $\mathrm{E}(\bar{t})$ and $V(\bar{t})$ are respectively the mean and variance of each tβi statistic, and they are generated by simulations. Z converges to a standard normal distribution. This test is also based on the averaging individual unit root test, denoted by $\bar{\mathrm{t}} = \frac{1}{\mathrm{N}}\left(\sum_{\mathrm{i}=1}^{\mathrm{N}} \mathrm{t}_{\beta \mathrm{i}}\right)$. The Fisher's (1932) unit root test combines the p-values from individual unit-root tests. Fisher (1932), Maddala and Wu (1999) suggested a non-parametric test statistic based on Fisher test as presented below.

$$P = -2\sum_{i=1}^{N} \ln \rho_i$$

The null hypothesis is that each series in the panel has a unit root, i.e., H0: $\rho_i = 0$ for all i and the alternative hypothesis is that not all of the individual series has a unit root.

4.2 Panel co-integration tests

Having established that all variables are integrated at an order of one, the next step is to apply co-integration analysis to determine if a long-run relationship exists among the variables. This is conducted by applying the Pedroni's (1994, 2004) and Kao's residual co-integration test (1999). The empirical model for this test is based on the equation (4) given below.

$$y_{it} = \alpha_{it} + \delta_i t + \beta_{1t} x_{it} + \beta_{2t} x_{it} + \beta_{3t} x_{it} + \beta_{4t} x_{it} + \beta_{5t} x_{it} + \varepsilon_{it} \quad \text{.... (4)}$$

where i=1,...,N for each country in the panel and t=1,...,T refers to the time period. The parameters α_{it} and δ_i allow for the possibility of country-specific fixed effects and deterministic trends, respectively. The estimated residual (ε_{it}) indicates the deviation from the long-run relationship. All variables are expressed in natural logarithms so the β_i's parameters of the model can be interpreted as elasticities. To test the null hypothesis of no co-integration, ρ_i=1, the following unit root test is conducted on the residuals as follows:

$$\varepsilon_{it} = \rho_{it} + \varepsilon_{it-1} + \omega_{it} \quad \text{.... (5)}$$

Pedroni (1999, 2004) proposed two types of tests to discuss seven co-integration statistics. The first type test is based on the within-dimension approach (i.e. panel co-integration statistics), which includes four statistics: panel v-statistic, panel ρ-statistic, Pedroni Panel (PP)-statistic, panel Augmented Dickey–Fuller (ADF). These statistics pool the autoregressive coefficients across different members for the unit root tests of the estimated residuals. The second type test is based on the between- dimension approach (i.e. group mean panel co-integration statistics), which includes three statistics: group rho-statistic, group PP-statistic, and group ADF- statistic. These statistics are based on averages of the individual autoregressive coefficients associated with the unit root tests of the residuals for each panel member in the panel dataset. All seven statistics are distributed asymptotically as standard normal.

Of the seven tests, the panel v-statistic is a one-sided test where large positive values reject the null hypothesis of no co-integration whereas large negative values for the remaining test statistics reject the null hypothesis of no co-integration. Kao's residual co-integration (1999) is a generalization of the Dickey–Fuller (DF) and Augmented Dickey–Fuller (ADF) tests in the context of panel data.

4.3 Panel dynamic OLS (DOLS) and fully modified OLS (FMOLS)

The distribution of OLS estimators is asymptotically biased and depends on nuisance parameters associated with the presence of serial correlation in the data (Kao and Chiang, 2001; Pedroni, 2001a, 2001b). Thus, it is required to estimate the vectors of co-integrating relationship by employing effective techniques.

Therefore, to investigate the panel co-integrated relationships among the variables, we employed the panel DOLS method provided by Kao and Chiang (2000) and fully modified OLS (FMOLS) estimator initially suggested by Phillips and Hansen (1990). Kao and Chiang (2001) proved that these two techniques led to normally distributed estimators. They also proved that both OLS and FMOLS exhibit small sample bias and that DOLS estimator appears to outperform both estimators.

The panel dynamic OLS (DOLS) includes advanced and delayed values (ΔXi,t) in the co-integrated relationship to eliminate the correlation between regressors and error terms. The panel DOLS estimator can be defined as:

$$\hat{\beta}_{DOLS} = \frac{1}{N}[(\sum_{t=1}^{T} Z_{i,t} * Z'_{i,t})^{-1} (\sum_{t=1}^{T} Z_{i,t} * \widehat{W}_{i,t})] \quad \text{.... (6)}$$

Where, $Z_{i,t} = [X_{i,t} - \overline{X_{\iota}}, \Delta X_{i,t-ki}, \ldots\ldots, \Delta X_{i,t+ki}]$ is vector of regressors and $\widehat{W}_{i,t} = W_{i,t} - \overline{W_{\iota}}$

Fully modified least squares (FMOLS) regression was originally designed by Phillips and Hansen (1990) to provide optimal estimates of co-integrating regressions. The method modifies least squares to account for serial correlation effects and for the endogeneity in the regressors that result from the existence of a co-integrating relationship. Consider the following co-integrated system for a panel of i=1, 2, 3, 4… N states over time t = 1, 2, 3, 4… M.

$$Yit = \alpha_i + \beta_i Xit + \varepsilon it \quad \text{..... (7)}$$

$$Xit = Xit\text{-}1 + \vartheta it \quad \text{..... (8)}$$

Where, Y represents human capital indicator (LHCAP) and X represents the corresponding vector of independent variables.

Let $Zit = (Yit, Xit)' \sim I(1)$ and $\emptyset_{it} = (\varepsilon it, \vartheta it)' \sim I(0)$ with long run covariance matrix $\Omega = L_i L_i'$ Li is the lower triangular decomposition of Ω_i , which can be decomposed as $\Omega_i = \Omega_i^0 + \Gamma_i + \Gamma_i'$.

Where, Ω_i^0 is the contemporaneous covariance and Γ_i is a weighted sum of co-variances. We can also augment the above co-integrating regression with lead and lagged differences of the regressors to control for endogenous feedback.

This can be presented as follows:

$$Yit = \alpha_i + \beta_i Xit + \sum_{k=k_i}^{k_i} \delta_{ik} \Delta Xit\text{-}k + \varepsilon it \quad \text{..... (9)}$$

The panel FMOLS estimator of the β is:

$$\beta_{NT}^{*} = N^{-1} \sum_{i=1}^{N} (\sum_{i=1}^{T} (X_{it} - \overline{X_{\iota}})^2)^{-1} \left(\sum_{i=1}^{T} (X_{it} - \overline{X_{\iota}}) Y^{*}_{it} - \Gamma \widehat{\partial_{\iota}}\right) \quad \text{..... (10)}$$

Where $Y^{*}_{it} = (Y_{it} - \overline{Y_{\iota}}) - \frac{\widehat{L_{21\iota}}}{\widehat{L_{22\iota}}} \Delta Xit$

$$\widehat{\partial_{\iota}} = \widehat{\Gamma_{21\iota}} + \widehat{\Omega_{21\iota}^{0}} - \frac{\widehat{L_{21\iota}}}{\widehat{L_{22\iota}}} (\widehat{\Gamma_{21\iota}} + \widehat{\Omega_{22\iota}^{0}})$$

4.4 Panel Granger causality test

The co-integration relationship only indicates that there are causality links between variables. It is essential to perform the causality test if the direction of variables interacting is identified. In this

study, the panel-based VECM suggested by Engle and Granger (1987) is employed to conduct the causality test with two steps.

The first step estimates the long-run parameters in equation (2) in order to obtain the residuals corresponding to the deviation from equilibrium. The second step estimates the parameters related to the short-run adjustment. The second step is estimation of the Granger causality model with a dynamic error correction. The empirical model is as follows:

$$\Delta Ly_{it} = \theta_{1j} + \partial_{1i} ECM_{it-1} + \sum_{k=1}^{q} \theta_{11ik} \Delta Ly_{it-k} + \sum_{k=1}^{q} \theta_{12ik} \Delta Lx_{it-k} + u_{1it} \quad \text{..... (7)}$$

$$\Delta Lx_{it} = \theta_{2j} + \partial_{2i} ECM_{it-1} + \sum_{k=1}^{q} \theta_{21ik} \Delta Lx_{it-k} + \sum_{k=1}^{q} \theta_{22ik} \Delta Ly_{it-k} + u_{2it} \quad \text{..... (8)}$$

Where the term Δ denotes the first difference in the variable and k is the optimal lag length determined by the Schwarz information criteria, y is the parameter to be estimated and u is the serially uncorrelated error term with zero means. The directions of causal relationship can be identified by testing the significance of the coefficient estimates of each dependent variable in equations (4) and (5). To test the short run dynamics can be considered transitory. For short-run causality, we test the following null hypotheses: H0: θ_{12ik}=0 or $\theta_{21ik} = 0$ in equations (4) and (5). To capture the long-run effect, we can we can utilize the speed of adjustment parameter ∂, which is the coefficient of the error correction terms. Finally, the joint tests of $ECT_{i,t-1}$ and the respective inter active terms are employed to check for strong causality.

5. Discussion of Results

The analysis begins with the examination of the stationarity properties of the variables by employing Levin et al. (2002), Im et al. (2003), the ADF-Fisher Chi-square and the PP-Fisher Chi-square panel unit root tests. The results are presented in table 2. It can be inferred from table 2 that the unit root hypothesis cannot be rejected when the variables are taken in levels. Nevertheless, when the first differences are used, the hypothesis of unit root non-stationary is rejected at the 1% level of significance. It implies that variables are differenced stationary, I(1).

Table 2: Panel unit-root test results

Method	LHCAP	LPGDP	LBM	LBR	LCR	LPS
LLC (2002)						
Level	0.2356	0.7828	0.4412	1.2360	-1.7699	-1.0242
First difference	-4.2380***	-6.0971***	-5.3339***	-5.7004***	-7.2124***	-3.1204**
IPS (2003)W-stat						
Level	0.6483	-1.0452	0.5872	1.3395	-1.0121	-1.0362
First difference	-4.320***	-3.4582**	-3.9361***	-4.5854***	-5.3401***	-5.0123***
ADF-Fisher Chi-square						
Level	14.1577	10.2747	11.7538	8.4783	12.5012	12.0014
First difference	52.3022**	52.3537***	47.9090***	70.6930***	60.2547***	46.1201
PP-Fisher Chi-square						
Level	10.5210	13.1520	12.0452	5.4204	8. 6343	7.0123
First difference	120.8021**	116.3541***	48.952**	93.7501***	180.1452***	51.0141**

Note: *, **, *** indicates significant at 10%, 5% and 1% level of significance respectively.

The presence of long run relationship among the variables is searched by employing co-integration frame- work introduced by Pedroni's (2004) and Kao's (1999) co-integration approach. As shown in Table 3, the results of Pedroni's (2004) heterogeneous panel tests suggest that the null of no co-integration cannot be accepted at the 5% significance level except for the panel v-statistic, the panel r-statistic and the group r-statistic. The results of Kao's (1999) residual panel co-integration tests are presented in table 4. The results indicate we reject the null of no co-integration at the 5% significance level. Thus, it can be inferred that there exists a long run relationship between financial development indicators and human capital in selected Asian economies.

Table 3: Pedroni (2004)'s residual co-integration test results (LHCAP as dependent variable)

	NIT	T	IT
Panel v-Statistic	0.3362	0.9621	1.0023
Panel rho-Statistic	1.0125	0.1025	0.8521
Panel PP-Statistic	0.7952	-0.1520	-2.6693**
Panel ADF-Statistic	0.1402	-1.9210	-2.8565**
Group rho-Statistic	2.6921	-2.1858*	-0.3154
Group PP-Statistic	1.2652	-1.8962	-2.6601**
Group ADF-Statistic	-0.5620	-2.7751*	-2.6923**

Note: NIT: No trend and intercept; T: only trend and no intercept; IT: Both trend and intercept.

*, **, *** indicates significant at 10%, 5% and 1% level of significance respectively.

Table 4: Kao's residual co-integration test results (LHCAP as dependent variable)

	t-statistic	Probability
ADF	-3.5880**	0.0415

Note: The ADF is the residual-based ADF statistic (Kao, 1999).

** indicate statistical significance at the at the 5% level.

After establishing that there exists a long-run relationship between financial development indicators, economic growth, public spending on education and human capital, the next step is to estimate the coefficients of co-integrating relationship. The long-run effect of these variables have been estimated using the panel FMOLS estimator suggested by Pedroni (2000) and the panel DOLS estimator proposed by Kao and Chiang (2000). The results are reported in Table 5. The empirical findings suggest that both financial indicators and economic growth variables exert the positive impact on human capital. However, financial indicators are significant at 5%, whereas the impact of economic growth is significant at 10% in explaining the variation in human capital in Asian economies. Additionally, expenditure on education variable is significant at the 10% level in the estimated model. The DOLS estimates suggest that, if there is a 1 % increase in LBM and LCR, human capital increases by 0.221% and 0. 085 %, respectively, but the coefficient of LBR is not significant in the relationship with respect to human capital.

According to FMOLS model, if there is a 1 % increase in LBM and LCR, human capital increases by 0.182% and 0.093% respectively. Thus, it is worth concluding that financial development indicators directly contribute to human capital by the efficient resource mobilization and credit expansion, which raise investment in human capital i.e. education expenditure, health expenditure and welfare activities.

Table 5: Panel long-run elasticity (LHCAP as dependent variable)

Panel methods	LPGDP	LBM	LBR	LCR	LPS
DOLS	0.168* (1.9041)	0.221* (1.9201)	0.062 (0.5201)	0.085** (2.9962)	0.052* (2.0601)
FMOLS	0.191* (1. 8826)	0.182** (2.0215)	0.093 (0.0125)	0.069** (2.0145)	0.062* (1.9201)

Note: Figures in parenthesis are t-statistics.

*, ** indicate statistical significance at the 10 and 5 and level.

Once the existence of the long run relationship between financial development and financial development is ascertained, we apply a panel granger causality method to identify the direction of the causality. Tables 6 show the results of the panel causality between human capital, economic growth and financial development indicators. Table 6 shows the empirical evidence indicates that in the short-run, there exists unidirectional causality running from economic growth, financial development and public expenditure on education indicator to human capital. The error correction term is statistically significant with the required negative sign for human capital equation reflecting that there has been long-run relationship between the variables (i.e. economic growth, financial development and public expenditure and human capital).

Table 6: Panel causality test results

Dependent Variables	Sources of Causation						
	Short run (F-Values)						Long-run
	ΔLHCAP	ΔLPGDP	ΔLBM	ΔLBR	ΔLCR	ΔLPS	ECT (t Value)
ΔLHCAP	----	2.0921**	1.9210*	0.2510	2.2410**	2.0112*	-2.6920**
ΔLPGDP	0.5620	----	0.0362	0.0114	2.9211**	0.1852	-1.0210
ΔLBM	1.2014	1.0024	----	0.9621	0.0361	1.0254	-0.6310
ΔLBR	0.6025	1.6014	1.0245	----	1.2051	0.9621	-0.7211
ΔLCR	0.0125	1.0231	1.1103	1.8210	----	0.0365	-0.9021
ΔLPS	0.9631	0.0149	0.2659	1.0012	1.0071	----	-0.2311

Note: *, ** and *** indicate statistical significance at 10%, 5% and 1% level.

6. Conclusion and policy implications

The main objective of the study is to empirically investigate the influence of financial development indicators on human capital in the context of major Asian countries i.e. Bangladesh, Bhutan, India, Nepal, Sri Lanka, Indonesia, Philippines, Pakistan, Thailand and Viet Nam using the annual data from 1984-2012. The study explores the influencing directions between financial development indicators and human capital and further compares influencing magnitudes of different indicators on human capital. Both these objectives have been achieved with the use of modern econometric techniques. In this regard the present study employed panel unit root, panel co-integration, panel granger causality, and FMOLS and DOLS framework.

The co-integration result reveals that all the indicators of financial development have long run equilibrium relationship with human capital. The results of FMOLS and PDOLS indicate that both economic growth and financial development indicators exert a positive impact on human capital. Additionally, expenditure on education variable is significant at the 10% level in the estimated model. The panel granger causality result confirms a unidirectional causality running from

economic growth, financial development and public expenditure on education indicator to human capital.

Based on the empirical findings, this study proposes few policy implications which involve financial investment and linking solutions to contribute to human capital in Asia: (1) Our result confirms that financial development boost human capital in Asian countries which in turn affect economic growth positively. This is because workers with more than an elementary school education have a much higher marginal product than no more than elementary education, (2) Our study recommend for higher investment in human capital which will generate higher returns in less developed region. Therefore, financial investment and human capital can achieve economic efficiency and reduce poverty and income inequality in Asia.

Note:

[1] The selection of the sample period and countries is based on the availability of continuous time series data on selected variables.

[2] Due to unavailability of the data set, sector specific credit is not used in the study.

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Paper No. 44

Are Mergers and Acquisitions Necessarily Anti-Competitive? Empirical Evidence of Indian Manufacturing Sector

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Abstract

The monopoly theory postulates that firms use route of mergers and acquisitions (M&A), especially of horizontal type, to raise market power and charge monopoly prices. However, impact of M&A on market structure may vary depending on number and size distribution of firms in an industry, entry of new firms, import competition, expansion of markets, etc. In addition, whether M&A will raise market concentration may also depend on motive of the synergies. The efficiency theory, on the other hand, suggests that M&A are planned and executed to reduce costs through scale economies. Integration through M&A may also enhance firms' productive efficiency, innovative efforts and dynamic efficiency resulting in greater competitiveness. Further, when the MNCs enter into a market through acquisition, one may expect spillovers of technology and managerial competencies on others restricting increase in market concentration in the long-run. It is also observed that greater contestability in different markets limit firms' monopolistic behaviour. Thus, nature of impact of M&A on market structure is not clear. In India, policy initiatives and regulatory changes made during the last two decades of economic reforms have resulted in a significant increase in the number of M&A. Given the policy induced flexibilities, while domestic firms have taken the route of mergers to restructure their business and grow, foreign firms have entered into specific markets through acquisitions. This has led to introduction of the Competition Act 2002 to ensure that such strategies do not cause any appreciable adverse impact on competition in relevant markets. This raises two important questions: First, do M&A necessarily increase market concentration? Second, should the regulatory structure for M&A be designed in isolation of other related policies, particularly when the process of economic reforms has deepened in the areas like FDI, international trade and intellectual property? The present paper is an attempt to address these two issues. Using Arellano-Bond dynamic panel data estimation techniques and a panel dataset of 34 major industries of Indian manufacturing sector over the period from 2001-02 to 2008-09, the paper finds that M&A do not necessarily cause appreciable adverse impact on market concentration. Instead, degree of sellers' concentration is influenced by growth of market, capital intensity, firms' advertising efforts, and their financial performance. Thus, findings of the present paper call for rethinking on policies and regulations relating to M&A, international trade and intellectual property, as they can play significant role in enhancing firms' competitiveness and restrict emergence of monopoly power. It is also necessary to integrate different policies and regulations with greater industry-specific flexibility.

JEL classification: L1, L4, L5, O3

Key words: Economic Reforms, Mergers and Acquisitions, Market Concentration, Manufacturing Sector, India

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1. Introduction

The policy initiatives and regulatory changes made during the last two decades of economic reforms have changed the environment and functioning of Indian manufacturing sector considerably. With enhanced competitive pressures following economic reforms, domestic firms in particular have adopted a variety of coping strategies. It is observed that many of these firms, especially the private sector enterprises, have taken the route of mergers and acquisitions (M&A)22 to restructure their business and grow. The foreign firms, on the other hand, have entered into specific industries through acquisitions. The result has been an unprecedented increase in the number of M&A during the post-reform period (Beena 2000; Basant and Mishra, 2012). This wave of M&A and growing concerns on possible emergence of monopoly power have, in turn, led to enactment of the Competition Act 2002 to ensure that such strategies do not cause appreciable adverse impact on competition in relevant markets.

Thus, while the restrictions on mergers, acquisitions and entry of large firms under the Monopolies and Restrictive Trade Practices Act (MRTPA) were removed following initiation of economic reforms in 199123, the wave of M&A in the 1990s necessitated introduction of the Competition Act 2002 for regulating the larger deals to prevent emergence of monopoly power in relevant markets. This raises two important questions: First, do M&A necessarily increase market concentration? Second, should the regulatory structure for M&A be designed in isolation of policies relating to FDI, international trade, and intellectual property? The present paper is an attempt to address these two issues. More specifically, the objective of the present paper is to understand impact of M&A on market concentration in major industries of Indian manufacturing sector controlling the influence of various policy and regulatory dimensions. This is very important as the rationale of efficiency gain through competition has been instrumental in shaping economic policies of the country in the new policy regime. Further, given that the process of economic reforms has deepened in the areas like FDI, international trade and intellectual property, a deeper understanding of inter-linkages among various policies and regulations is necessary for their fine tuning under emerging strategy setting by firms.

The paper is divided into six sections. The relevant studies are reviewed and emerging issues are highlighted in the next section. The third section of the paper specifies the functional model to be estimated and hypothesizes possible impact of the independent variables. The Estimation techniques applied and sources of data used in the paper are mentioned in the fourth section. The fifth section of the paper presents and discusses the regression results. The sixth section summarizes the major findings and concludes the paper with emerging policy implications.

2. Review of Literature

There are a number of theories that explain why a firm acquires or merges with other firms. The monopoly theory postulates that firms use the route of M&A to raise their market power (Steiner, 1975, Chatterjee, 1986). There are evidences of increase in market concentration following M&A (e.g., Hart et al, 1973; Hannah and Kay, 1977)24. However, since M&A are industry specific activities (Mitchell & Mulherin, 1996), impact of M&A on market concentration may vary depending on the number and size distribution of firms in an industry, entry of new firms, import competition,

[22] Although mergers and acquisitions are different in definitions and statutory procedures, their effects from an economic perspective are by and large the same. Hence, in the present paper, no distinction is made between the mergers and the acquisitions.

[23] This was accompanied by removal of entry restrictions on private sector enterprises under the Industries Development and Regulation Act (IDRA) and substantial relaxation of shareholding and other business restrictions on the multinational corporations (MNCs) under the Foreign Exchange Regulation Act (FERA).

[24] When it is so, lowering prices and increasing consumer surplus in a Cournot oligopoly require considerable synergies (Farrell and Shapiro, 1990).

expansion of the market, other business strategies, etc. In addition, whether M&A will raise market concentration may also depend on motive of the particular synergy (Banerjee and Eckward, 1998). A number of studies (e.g., Weiss, 1965; Mueller, 1885; Mishra, 2005) have shown either no significant change or decline in market concentration following M&A.

On the other hand, the efficiency theory suggests that M&A are planned and executed to reduce costs of operation through scale economies (Porter, 1985; Shelton, 1988). These scale economies may arise at the plant level (Pratten, 1971) or due to operation of several firms within one enterprise (Scherer et al., 1975). Integration of firms through M&A may, therefore, enhance productive efficiency, innovative efforts, dynamic efficiency, and hence competitiveness, particularly of the weaker firms25. Further, with entry of the MNCs through acquisitions, one may expect spillovers of technology and managerial competencies. All these may restrict increase in market concentration in the long run.

Thus, impact of M&A on market concentration is not clear in the literature. Given that there has been significant increase in the number of M&A in Indian manufacturing sector during the post-reform period, it is, therefore, necessary to examine impact of such combinations on market concentration. However, so far, very limited efforts have been made in this regard. Although Khanna (1997) and Roy (1999) have found that M&A have resulted in oligopolistic markets, impacts of other factors on market structure are not adequately controlled in these studies. Similarly, Mishra (2005) has attempted to understand influence of some of these factors along with M&A, but the study examines overall changes in market concentration in the 1990s. In other words, approach followed by Mishra (2005) is largely comparative static in nature and, hence, fails to capture dynamics of market concentration. More importantly, since the study is confined to the 1990s, changing structure of markets and firms' behaviour after enactment of the Competition Act 2002 and recent amendments to the Indian patent Act (1970) has remained unexplored.

More importantly, with innovations resulting in new products, new processes, and new markets, disequilibrium in markets is very likely, particularly when entry and exit are free (Mueller, 1990). This makes competition dynamic and largely technology driven rivalry for markets rather than price and output-based competition within markets (Schumpeter, 1950). Hence, competition should be viewed as a dynamic process of rivalry (Vickers, 1995), and understanding impact of M&A requires use of a dynamic framework. But, the anti-trust policies largely focus on static analysis limiting in-depth understanding of impact of M&A on market concentration.

Further, a number of studies have found evidence of variations in merger activity across industries (e.g., Mulherin and Boone, 2000; Harford, 2004; Basant and Mishra, 2012). Such inter-industry variations in M&A can be caused by both firm and industry level factors. As regards the firm-specific factors, Maquieira, et al. (1998) have pointed out that M&A, particularly of non-conglomerate types, are aimed at gaining synergy. In addition, firms use the route of M&A to increase their value (Bradley et al., 1988), enhance efficiency (Rhoades, 1998), or to have excess cash debt capacity (Bruner, 1988). The industry level factors, on the other hand, include economic, regulatory and technology shocks (Mitchell and Mulherin, 1996), and extent of capacity utilization (Andrade and Stafford, 2004). These factors are likely to have considerable bearing on changes in structure of different markets. Proper understanding of impact of M&A on market concentration, therefore, requires controlling influence of these factors.

Finally, in contestable markets, potential competition may not cause prices to descend to the competitive level, but may provide restraints on monopoly pricing (Morrison and Winston, 1987). When new firms enter into such markets with lower prices, incumbents may fail to raise market

[25] However, there is possibility of increase in X-inefficiency following M&A (Church and Ware, 2000). But, improvement in cost efficiency has every potential to outweigh X-inefficiency. According to Levin (1990), horizontal mergers with less than 50 percent of the market enhance efficiency.

concentration through M&A. Hence, impact of M&A on market structure is likely to depend on market contestability as well. Since economic reforms have resulted in introduction of liberal policies relating to trade and investment, greater contestability in different markets is expected to restrict the scope for monopolistic behavior of the incumbents. But, this aspect has remained largely unexplored in Indian context. Further, recent amendments to the Indian Patent Act (1970) are expected to provide the firms an incentive to innovate. It is observed that in-house R&D intensity (although still low) has grown significantly in recent years (Basant and Mishra, 2012). Given that greater innovative efforts influence dynamics of market structure, impact of M&A should be reexamined using a wider timeframe that can potentially capture role of these amendments.

3. Model Specification:

From above discussion it is clear that impact of M&A on structure of different markets in Indian manufacturing sector should be explored with adequate control for the nature of integration, efficiency gains, changes in patent laws, market contestability, and other related factors. Accordingly, in the present paper, the functional model is specified using the structure-conduct-performance (SCP) framework based on Scherer and Ross (1990). The SCP framework is preferred to other available alternatives[26] due to its consistent theoretical underpinnings for empirical analysis. It is based on neoclassical theory and analyzes how behaviour of a firm varies and thereby affects structure of relevant market and its performance. Hence, when we consider M&A as important strategic responses by firms to economic reforms, the SCP framework appears to be the most useful approach to understand their impacts on market structure.

It is assumed that the degree of sellers' concentration depends on a set of variables relating other structural aspects of the market, strategic behaviour of firms, their performance and policies and regulation of the government such as growth of sales (GRS), presence of the multinational corporations (MNC), capital intensity (KIR), advertising intensity (ADVT), technology intensity (TECH)[27], number of mergers and acquisitions (M&A)[28], import intensity of exports (IMP)[29], and returns on capital employed (ROCE). Further, since recent developments in industrial organization literature suggest for analyzing market structure in a dynamic context[30], examining impact of M&A on market concentration requires using a dynamic model. Hence, the regression model envisaged in the present paper also includes lagged dependent variable as one of the independent variables. We may, therefore, write,

$$CON = f(L\_CON, GRS, MNC, KIR, AVDVT, TECH, M\ \&\ A, IMP, ROCE)$$

Here, growth of sales, MNC participation and capital intensity are expected to capture structural aspects of markets (other than market concentration), advertising intensity, technology intensity, mergers and acquisitions and import intensity of exports for strategic behaviour (conduct) of firms, and returns on capital employed their financial performance. In addition to its strategic implications, advertising can also be seen as a proxy for structural aspect of market representing extent of product differentiation. Similarly, import intensity can be considered as a variable that influences market competition. Some of these independent variables can act as proxies for various policy changes as well. For example, while presence of the MNCs and the number of mergers and

[26] Some of the alternative approaches to industrial organization literature include the Marshallian School, the Austrian School, and the `Workable Competition' School, etc. See Reid (1987) for a discussion in this regard.

[27]Here, the ratio of total expenditure on foreign technology purchase and in-house R&D to sales is used as a measure of technology intensity.

[28]In the present paper, no distinction is made between mergers and acquisitions as their effects from an economic perspective are largely the same.

[29] By import intensity of exports, we refer to the ratio of imports of final goods to their exports.

[30]See Audretsch et al (2001) for a detailed discussion in this regard.

acquisitions are partly outcomes of investment and competition related policies, import intensity of exports can be expected to capture impact of policies relating to international trade. Similarly, technology intensity can partly capture effects of policies relating to technology development including regulation of intellectual property. One may also expect capital intensity to capture effects trade and technology related policies.

As mentioned above, presence of the MNCs in an industry is expected to capture extent of foreign investment therein. A considerable portion of this investment takes the route of acquisition including cross-border acquisition of minority holding. Acquisition of shares by the foreign investors constituted around two-fifths of the total FDI equity inflows during 2005-07 (Rao and Dhar, 2011). This has important implications for market structure as these enterprises enjoy certain benefits vis-à-vis the domestic firms. Besides, the MNCs have greater access to superior production technology and management know-how (Ramstetter, 1999), which help these enterprises to produce their products more efficiently. The MNCs also possess internally established brands and sophisticated marketing networks that help them to penetrate in the international market in a larger way. All these are likely to give the MNCs a distinct competitive edge and thereby influence market structure. On the other hand, demonstration effects or technology externalities and emerging competitive threats from the MNCs can increase innovative efforts of the domestic firms. When it is so, the industries with larger presence of the MNCs are likely to have greater competitiveness of the domestic firms, which in turn can restrict increase in market concentration. Thus, inclusion of MNC participation as an independent variable is likely to have considerable importance while understanding impact of M&A on market structure.

Possible Impact of the Independent Variables:

Since M&A are largely industry specific activities (Mitchell & Mulherin, 1996), the present paper uses the relationships envisaged above to examine impact of M&A on market concentration at industry level. However, a similar framework can be used to examine impact of such integration on market share of firms as well. The details on measurement of the variables are provided in the Appendix. What follows next is a brief discussion on the likely impact of these independent variables on market concentration.

Lagged Market Concentration (L_CON): Impact of M&A on market concentration is likely to depend on its initial level. In a concentrated market, M&A is expected to result in greater market concentration. This is so because integration of larger firms in such markets is likely to result in greater concentration, whereas combinations of smaller firms have little scope to restrict emergence of monopoly power.

Growth of Sales (GRS): Growth of sales for the industry as a whole represents expansion of its market. It is expected that, ceteris paribus, high rate of growth of sales would have a negative impact on market concentration through various mechanisms. For example, larger markets are typically associated with more elastic demand (Barron et al., 2008) and thereby have limited scope for increasing market concentration through M&A. A larger market may also encourage entry of new firms resulting in lower market concentration. However, when new firms enter into a market through acquisition, market concentration may not change despite growth of sales. Further, a market that expands at a high rate may experience greater concentration when entry is restricted. Impact of growth on market concentration, therefore, depends on the relative strength of these diverse forces.

MNC Participation (MNC): Here, MNC participation can be considered as a proxy for inflows of foreign investment. It is generally expected that entry of the MNCs would result in greater market concentration as these firms have larger capital base, wider scale of production and better technology and management practices. Market concentration may also increase when the foreign

firms take the route of acquisition to enter into Indian market. However, demonstration effects or technology externalities and emerging competitive threats from FDI can increase innovative efforts and competitiveness of domestic firms restricting increase in market concentration following acquisition. Similarly, entry of foreign firms through Greenfield investments can increase competition in local markets. Impact of MNC on market concentration, therefore, depends on how these forces empirically dominate each other.

Capital Intensity (KIR): High capital intensity in an industry can act as an entry barrier and deter entry of new firms making market less contestable. When it is so, one may expect market to be more concentrated in an industry where capital intensity is high. However, higher capital intensity can make firms more competitive in the international market, particularly when capital goods embody better technology and this in turn may lower degree of sellers' concentration in the domestic market. Thus, impact of capital intensity on market concentration is largely an empirical issue.

Advertising Intensity (ADVT): When firms use advertising as a strategy to create entry barrier, industries with greater advertising intensity may have more concentrated market. On the other hand, if advertising follows larger product differentiation and facilitates dissemination of information on product quality and prices, market concentration may not increase. Besides, increase in market concentration following advertising in the short-run may reduce firms' efficiency and competitiveness lowering market concentration in the long run. Impact of advertising on market concentration, therefore, depends on relative strength of these diverse forces.

Technology Intensity (TECH): Impact of firms' efforts towards technology development on market concentration is not clear. On the one hand, one may expect such efforts to act as entry barrier and limit market competition. On the other, when technology strategies enhance firms' competitiveness, market concentration may be reduced. Greater competitiveness of larger firms can also wipe out the small and inefficient firms from the market and thereby raise market concentration. Further, when domestic firms rely heavily on foreign technology and there is lack of efforts towards development of indigenous technology, competitive edge in the international market may be limited. Besides, lack of necessary knowledge and skills may also limit benefits of imported technologies. Thus, impact of technology strategies on market concentration depends on how these opposite forces influence each other.

Mergers and Acquisitions (M&A): It is hypothesized that mergers and acquisitions, even those of horizontal type, do not necessarily alter degree of sellers' concentration in a market. This is so because impact of a particular merger or an acquisition on market concentration depends on a number of other factors, viz., initial structure of the market, prior market shares of the firms involved in M&As, product structure in the industry, extent of entry, extent of import competition, other business strategies of firms such as advertising and innovation. In addition, public policies and regulations also play crucial role in this regard. Hence, impact of M&A on market concentration may vary depending on strength of these diverse forces.

Import Intensity of Exports (IMP): Import competition is expected to have considerable impact on market concentration. If imported products are of better quality or cheaper, market contestability is enhanced. Thus, an industry with higher import intensity is expected to be more competitive. This may be true, especially when domestic firms are capable of facing the threat of competition. But, if the weaker firms fail to resist the competitive threat from quality imports and leave the industry, market concentration may increase. It may also be so when importing firms are dominant in the market. On the other hand, higher export intensity of an industry signals greater penetration in the international market and lesser concentration in the domestic market. When seen in this line, one may expect an inverse relationship between export intensity and

market concentration (Chou, 1986). Impact of import intensity of exports on market concentration would, therefore, depend on the balance of these diverse forces.

Returns on Capital Employed (ROCE): Firms with better financial performance are expected to have greater ability as well as willingness to grow resulting in greater market concentration. On the other hand, in the absence of entry barriers, better financial performance of incumbents may encourage new firms to enter into the market enhancing competition. Impact of performance on market concentration, therefore, depends on relative strength of these diverse forces. When these effects are balanced, financial performance may not have any statistically significant impact on market concentration. For example, Delorme et al. (2002) find no statistically significant impact of profitability on market concentration.

4. Estimation Techniques and Data

The present paper applies the Arellano-Bond (1991) dynamic panel data estimation techniques to estimate the model specified above. This is so because the Arellano-Bond (1991) dynamic panel data estimation techniques are based on the generalized method of moments (GMM). As compared to the method of instrumental variable applied in many of the existing studies (e.g., Balestra and Nerlove, 1966; Anderson and Hsiao, 1981; Bhargava and Sargan, 1983), the GMM estimators are expected to bring in more information on data during the course of estimation (Ahn and Schmidt, 1995). The Arellano-Bond (1991) estimators are also consistent and more efficient than the Anderson-Hsiao (1981) estimators. In addition, the GMM estimators of Arellano-Bond (1991) have generalizations that can address heteroscedasticity problem, specification tests, etc.

Further, the Arellano-Bond (1991) dynamic panel data estimation techniques uncover the joint effects of the explanatory variables on the dependent variable and control for the potential bias due to endogeneity of the explanatory variables including the lagged dependent variable. In order to control for endogeneity problem further, one-year lag value of the lagged dependent variable and other explanatory variables are used as the instruments. Besides, size of the market (MSZ), marketing and distribution intensity (MDI) and profitability (PROF) are used as additional instrument while estimating the model. In addition, presence of autocorrelation problem and validity of the instruments are tested by applying Arellano-Bond (1991) test for autocovariance and Sargan test (1958) of over-identifying restrictions respectively31.

The present paper uses both the one-step and two-step estimators. While the statistics based on the two-step estimates are used to test for model specification and overall significance of the estimated model, the one-step estimates are used to draw inferences on individual coefficients. This is so because the asymptotic standard errors of one-step estimators are unbiased and reliable to draw inference on the individual coefficients. Moreover, since the additive measures of market concentration suffer from various limitations (Mishra et al, 2011), the present paper uses alternative measures of market concentration to substantiate the findings. Necessary data are sourced from different databases of the Centre for Monitoring Indian Economy (CMIE). While information on M&A are compiled from the Business-Beacon database of CMIE, data on rest of the variables are collected from the Prowess database of this organization.

[31]In Arellano-Bond (1991) dynamic panel data model, it is a serious problem when there is autocorrelation of second order. In fact, the Arellano-Bond test for autocorrelation may become unreliable when the number of cross sectional units is small. Further, the panel dataset used in the present paper is for a period of only 8 years as compared to cross-sectional units of 34 industres. Hence, the problem of autocorrelation is unlikely to be acute in the present context.

5. Regression Results and Discussions

As mentioned above, the model is estimated by applying the Arellano-Bond (1991) dynamic panel data estimation techniques. Summary statistics of the variables used in estimation are provided Table 1, whereas Table 2 and 3 present the regression results along with the statistics used for testing autocorrelation and validity of the instruments. It is found that the Wald-Chi2 is statistically significant for all the estimated models. Hence, all the estimated models are statistically significant. Further, the Sargan Test statistic is not statistically significant indicating that the estimated models do not suffer from the problem of over-identified restrictions. In addition, the statistics for Arellano Bond test of both AR (1) and AR (2) are not statistically significant. This means that all the estimated models are free from the problem of autocorrelation.

Table1: Summary Statistics of the Variables

Variable	Number of Obs.	Mean	Standard Deviation	Minimum Value	Maximum Value
HHI	272	0.1162	0.1353	0.0082	0.9267
GRSI	272	0.2203	0.1687	0.0411	0.9616
MSZ	272	4.2703	0.5376	3.0538	5.7992
GRS	272	4.2293	3.0367	-6.3844	15.7307
MNC	272	0.0030	0.0057	0.0000	0.0410
KIR	272	0.6588	0.3318	0.1920	2.3259
ADVT	272	0.0091	0.0138	0.0001	0.0855
MDI	272	0.0428	0.0205	0.0057	0.1147
TECH	272	0.0177	0.0129	0.0031	0.0721
M&A	272	3.8240	0.9634	1.3863	6.2897
IMP	272	0.1506	0.4324	0.0000	4.7309
PAT	272	0.0287	0.0565	-0.1266	0.2185
ROCE	272	0.1649	0.0904	-0.0589	0.5645

We use one-step estimates for drawing inference on individual coefficients. It is observed that the coefficient of lagged concentration, growth of sales, capital intensity, advertising intensity, and returns on capital employed are statistically significant. Hence, the degree of sellers' concentration in a market is influenced by lagged concentration, growth of market, capital intensity, firms' advertising efforts and returns on capital employed. Further, while the coefficient of lagged concentration, capital intensity and returns on capital employed are positive, those of growth of sales and advertising are negative. This means that current market concentration is higher in industries where the market is already concentrated, capital intensity is high or the existing firms realize higher rate of returns on capital employed. On the other hand, the industries with larger growth of sales or greater efforts by firms towards advertising have less concentrated market.

Table 2: Regression Results with HHI as Measure of Market Concentration

Variable	Two-Step Estimates		One-Step Estimates	
	Coefficient	z-Statistic	Coefficient	z-Statistic
Intercept	-0.0216	-1.05	-0.0557	-0.58
L_CON	0.6029	12.61**	0.5698	2.03**
GRS	-0.0010	-2.73**	-0.0013	-1.81*
MNC	2.8714	3.07**	3.1923	0.93
KIR	0.0442	3.57**	0.0855	2.01**
ADVT	-1.0527	-2.34**	-2.0191	-1.99**
TECH	0.0733	0.53	-0.2915	-0.71
M&A	0.0049	1.12	0.0130	1.04
IMP	0.0054	0.97	0.0028	0.44
ROCE	0.0751	3.43**	0.1253	3.60*
Wald–Chi2	1297.82**		102.11**	
Sargan Test for over-identification	11.15 (0.19)			
Arellano Bond Test for AR (1)	0.20 (0.84)		0.28 (0.78)	
Arellano Bond Test for AR (2)	-0.94 (0.35)		-0.74 (0.46)	
Number of Observations	204		204	

Notes: (i) The z-statistic in one-step estimation is based on robust standard errors; (ii) Figures in the parentheses indicate level of statistical significance of the respective test statistic; (iii)*Statistically significant at 10 per cent level; (iv) **Statistically significant at 5 per cent level.

However, the present paper does not find any statistically significant influence of mergers and acquisitions on market concentration. This means that mergers and acquisitions do not necessarily alter structure of a market. This is so because whether a particular merger or an acquisition will raise market concentration depends on a variety of other factors including initial structure of the market, barriers to entry, extent of competition from imports, other business strategies of the firms such as advertising and their financial performance. These factors influence impact of M&A on market concentration in different directions. When these diverse forces are balanced, market concentration may not change significant following M&A. For example, acquisitions may adversely affect interests of the managers towards development of new products, technologies or processes as there may be fewer internal post-acquisition rewards for innovative activities (Hitt et al., 1991). When it is so scope for increase in market concentration through innovation may be limited. This is very important in Indian context considering that industries with large number of M&A have low R&D intensity (Hitt et al., 1996; Basant and Mishra 2014)

Further, in many cases, synergy among weaker firms through M&A can restrict increase in market concentration. There are evidences (e.g., Weiss, 1965; Mueller, 1885; Mishra 2005) of no significant change or decline in market concentration following M&A. The finding of the present paper that M&A do not have any significant impact on market concentration is consistent with some of the earlier studies in Indian context as well. It is observed that the wave of M&A in Indian corporate sector did not have any detrimental impact on market competition (Mishra, 2005), or consumers' welfare (Mishra and Kumar, 2011).

Table 3: Regression Results with GRS Index as Measure of Market Concentration

Variable	Two-Step Estimates		One-Step Estimates	
	Coefficient	z-Statistic	Coefficient	z-Statistic
Intercept	0.0498	1.84*	0.0087	0.11
L_CON	0.5649	6.13**	0.5980	3.85**
GRS	-0.0018	-3.26**	-0.0023	-2.68**
MNC	-0.4146	-0.37	0.5017	0.15
KIR	0.0503	2.39**	0.0880	2.00**
ADVT	-2.2780	-4.06**	-2.8979	-2.53**
TECH	0.0897	0.42	0.0015	Neg.
M&A	0.0009	0.21	0.0083	0.95
IMP	0.0042	0.67	0.0033	0.48
ROCE	0.1204	3.18**	0.1529	2.75**
Wald–Chi2	215.82**		135.74**	
Sargan Test for over-identification	10.25 (0.25)			
Arellano Bond Test for AR (1)	0.04 (0.97)		-0.02 (0.99)	
Arellano Bond Test for AR (2)	-0.73 (0.46)		-0.60 (0.55)	
Number of Observations	204		204	

Notes: (i) Neg. – Negligible (<0.005); (ii) The z-statistic in one-step estimation is based on robust standard errors; (iii) Figures in the parentheses indicate level of statistical significance of the respective test statistic; (iv)*Statistically significant at 10 per cent level; (v) **Statistically significant at 5 per cent level.

Further, acquisitions in the early 1990s in India were driven by the motives of market entry32, diversification of product/service portfolio, increasing market shares, whereas, the mergers were motivated by the need for consolidation at the business/group levels, consolidation of shareholding, and financial and tax consideration (Venkiteswaran, 1997). Besides, on many occasions, shortage of human capital also induced firms towards M&A (Roy, 1999). On the other hand, mergers at industry-level were influenced by low market concentration, high cash flows and high Tobin's q (Agrawal and Sensarma, 2007). According to Mishra (2011), inter-industry variations in incidence and extent of M&A in Indian manufacturing sector in the 1990s were caused by a set of factors relating to structure of markets, other business strategies of the firms, their performance, and industry-specific policies of the government. Given such diverse objectives of integration and industry-specific aspects, it is very likely that M&A do not have any significant impact on market concentration in many industries.

In the present paper, market is found to be less concentrated in industries with high rate of growth of sales. This is so possibly because a fast growing industry creates more opportunity for existing firms to expand (Basant and Saha, 2005). It is also possible that high rate of growth of market induces entry of new players into an industry (Duetsch, 1984; Highfield and Smiley, 1987; Saikia, 1997). When there is larger entry following growth of market, degree of sellers' concentration is likely to decline. Hence, priority may be given towards development and expansion of markets to restrict firms' monopoly power. Designing appropriate public policies and institutions are crucial in this regard.

It is interesting to note that, contrary to the findings in many of the existing studies (e.g., Comanor and Wilson, 1974; Martin, 1979; Shepherd, 1982; Das et al.1993), the present paper finds that

[32]This is true especially for the MNCs that have used the acquisition route to enter/strengthen their presence in India.

market is less concentrated in industries where firms make larger efforts towards advertising. Whether this signals greater product differentiation and wider choices available to the consumers requires further scrutiny. It is also possible that greater access of consumers to information on product quality and prices through advertising on available alternatives has reduced sellers' control over the market.

The present paper finds that market concentration is high in capital intensive industries. This is so because high capital intensity in an industry is likely to reflect existence of large sunk costs that create entry barrier and thereby give rise to monopoly profit (McDonald, 1999). Besides, capital market imperfections may lead to discrimination by offering preferential lending rates to large established firms in capital-intensive industries. This higher cost of capital makes the small firms less competitive and thereby restricts them from entering into the industry (Basant and Saha, 2005). Given limited entry, capital intensive industries are likely to have more concentrated market.

It is also found that competition from imports vis-à-vis exports does not have any significant impact on market concentration. This is so possibly because while greater exports is likely to make domestic market more competitive (Chou, 1986), increasing competition from imports may reduce market concentration (Mishra and Behera, 2007), particularly when impact of efficiency gain is larger as compared to exit effects. The balancing effects of exports and imports may, therefore, leave market concentration largely unchanged.

The present paper does not find any significant influence of firms' technology strategies on market concentration. It is possible that although technology strategies give a firm competitive edge in the short-run, such advantages may not be continue in the long-run due to strategic conjecture by other firms in the same line. Further, the R&D base of domestic firms is generally low due to their limited financial and intellectual capabilities towards development of indigenous technologies, and their overall technical change is adaptive in nature (Kumar and Siddharthan, 1994). This is true particularly for the small and the medium firms of the developing countries that do not have in-house R&D facilities (Brouwer and Kleinknecht, 1993). As a result, market concentration may not change following such strategies. A review of the existing studies does not show any consensus on the nature of impact of in-house R&D efforts on firms' competitiveness. For example, while Willmore (1992) and Wagner (2001) find a positive impact of in-house R&D on exports, Lefebvre et al. (1998) find no significant impact of in-house R&D on export competitiveness of firms.

However, when technology strategies result in capital formation, market concentration increases. In the present paper, capital intensive industries are found to have higher market concentration implying that policies towards imports of capital goods require serious scrutiny. Since increase in capital intensity by importing capital goods does not necessarily provide any distinct advantage in the international market, greater efforts should be made towards development of indigenous capital equipments. It is also necessary to develop a pool of skilled human resources for better utilization of capital equipment.

6. Summary and Conclusions:

In the context of wave of M&A in Indian manufacturing sector during the post-reform period, the present paper is an attempt to understand impact of M&A on market concentration in major industries. Using Arellano-Bond dynamic panel data estimation techniques and a panel dataset of 34 major industries over the period from 2001-02 to 2008-09, the paper finds that M&A do not necessarily cause any appreciable adverse impact on market concentration. Instead, it is influenced by growth of market, capital intensity, firms' advertising efforts, and their financial performance. While market is less concentrated in industries with growing market and greater advertising efforts by firms, higher capital intensity and better financial performance raises market concentration.

The findings of the present paper call for rethinking on policies and regulations relating to M&A, international trade and intellectual property, as they can play significant role in making markets more competitive. More specifically, policy resolutions on M&A require further scrutiny on the following aspects: First, if there is any necessity to regulate M&A in Indian manufacturing sector, particularly when they are not necessarily anti-competitive. Instead, whether integration of (weaker) firms through M&A should be encouraged to enhance their competitiveness and restrict emergence of monopoly power. Second, if there should be uniform thresholds of assets and turnover in regulating M&A across industries given that nature and extent of impact on market concentration may differ depending on industry-specific factors. Third, whether there should be any flexibility in the Competition Act for objective-specific assessment of M&A, considering that a merger or an acquisition may not lead to increase in market concentration when it is motivated by more efficient operation (Banerjee and Eckward, 1998).

In addition, there is a need for integration of different policies and regulations as the process of economic reforms has deepened in the areas like FDI, privatization and disinvestment, intellectual property regulation, etc. over the years. For example, a considerable portion of FDI inflows in recent years have taken the route of M&A. With introduction of liberal FDI policies one may, therefore, expect significant spillover of technologies and expertise that can potentially reduce the cost of production and improve the quality of products. Similarly, innovation and introduction of new products can give the consumers a wider range of choices without causing any adverse impact on market concentration. Policies and regulations may, therefore, be designed to encourage firms towards greater in-house R&D. While these issues are important, addressing them require detailed analysis at firm level to have better insights and hence clear direction in this regard.

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In the present paper, all the variables are measured as simple three previous years' averages to make the data set more consistent over time along with taking care of the adjustment process and eliminating the problem of simultaneity amongst the variables. Accordingly, all the variables are measured as simple moving average of previous three years with the year under reference being the starting year.

Dependent Variable:

Market Concentration (CON): The present paper uses two alternative measures of market concentration, viz., the Herfindahl-Hirschman Index (HHI) and the GRS Index (GRSI).

(i) Herfindahl-Hirschman Index (HHI): The Herfindahl-Hirschman Index of market concentration is constructed by using the formula,

$$HHI_{jt} = \frac{\left(\sum_{i=1}^{n} s^2{}_{it} + \sum_{i=1}^{n} s^2{}_{i,t-1} + \sum_{i=1}^{n} s^2{}_{i,t-2}\right)}{3}$$

Here, HHIjt is Herfindahl-Hirschman Index for industry j in year t and si stands for market share of the ith firm in the industry. Market share of a firm is defined as the ratio of the firm's sales to total industry sales.

(ii) GRS Index (GRSI): The GRS index of market concentration is defined as,

$$GRSI_{jt} = \frac{\sum_{i=1}^{n}\left(\frac{n^2 s_{1t} + 0.3s_{it}^2}{n^2 + 0.3ns_{1t}s_{it}} s_{it}\right) + \sum_{i=1}^{n}\left(\frac{n^2 s_{1,t-1} + 0.3s_{i,t-1}^2}{n^2 + 0.3ns_{1,t-1}s_{i,t-1}} s_{i,t-2}\right) + \sum_{i=1}^{n}\left(\frac{n^2 s_{1,t-2} + 0.3s_{i,t-2}^2}{n^2 + 0.3ns_{1,t-2}s_{i,t-2}} s_{i,t-2}\right)}{3}$$

Here, s1 stands for market share of the largest firm in the industry. The GRS index is based on Taylor's series33.

Independent Variables:

Growth of Sales: The trend growth rate of sales over a period of last five years is used as a measure of this variable. In other words, the estimated slope coefficient of the following trend equation is used as a measure of rate of growth of sales in year t:

$$\ln(S_t) = \alpha + \beta t + u_t$$

This equation is estimated over a period of previous five years, i.e., for the year t, t-1, t-2, t-3 and t-4.

MNC Participation (MNC): The ratio of FOREX spending as dividends (FDIV) to total sales is used as a measure of the presence of MNCs in an industry, i.e.

$$KIR_{jt} = \frac{\left(\frac{\sum_{i=1}^{n} CE_{it}}{\sum_{i=1}^{n} S_{it}} + \frac{\sum_{i=1}^{n} CE_{i,t-1}}{\sum_{i=1}^{n} S_{i,t-1}} + \frac{\sum_{i=1}^{n} CE_{i,t-2}}{\sum_{i=1}^{n} S_{i,t-2}} \right)}{3}$$

Here, MNCjt stands for the extent of the presence of MNCs in industry j in year t.

Capital Intensity (KIR): Here, KI is measured by using the following formula:

$$KIR_{jt} = \frac{\left(\frac{\sum_{i=1}^{n} CE_{it}}{\sum_{i=1}^{n} S_{it}} + \frac{\sum_{i=1}^{n} CE_{i,t-1}}{\sum_{i=1}^{n} S_{i,t-1}} + \frac{\sum_{i=1}^{n} CE_{i,t-2}}{\sum_{i=1}^{n} S_{i,t-2}} \right)}{3}$$

Here, KIRjt stands for capital intensity in industry j in year t and CE for capital employed.

Advertising Intensity (ADVT): The ratio of advertising expenses (AE) to sales is used as a measure of ADVT, i.e.,

$$ADVT_{jt} = \frac{\left(\frac{\sum_{i=1}^{n} AE_{it}}{\sum_{i=1}^{n} S_{it}} + \frac{\sum_{i=1}^{n} AE_{i,t-1}}{\sum_{i=1}^{n} S_{i,t-1}} + \frac{\sum_{i=1}^{n} AE_{i,t-2}}{\sum_{i=1}^{n} S_{i,t-2}} \right)}{3}$$

Here, ADVTjt stands for the advertising intensity in industry j in year t.

[33] For the details on derivation of this index, see Ginevicius and Cirba (2009) and Mishra et al. (2011).

Technology Intensity (TECH): The ratio of total expenditure (TE) on foreign technology purchase and in-house R&D to sales is used as a measure of technology intensity, i.e.,

$$TECH_{jt} = \frac{\left(\frac{\sum_{i=1}^{n} TE_{it}}{\sum_{i=1}^{n} S_{it}} + \frac{\sum_{i=1}^{n} TE_{i,t-1}}{\sum_{i=1}^{n} S_{i,t-1}} + \frac{\sum_{i=1}^{n} TE_{i,t-2}}{\sum_{i=1}^{n} S_{i,t-2}} \right)}{3}$$

Here, TECHjt stands for technology intensity in industry j in year t.

Mergers and Acquisitions (M&A): Natural logarithm of total number of mergers and acquisitions taking place in an industry during last three years is used as a measure of M&A, i.e.,

$$M\ \&\ A_{jt} = \ln\left(\sum_{i=1}^{n} M\ \&\ A_{it} + \sum_{i=1}^{n} M\ \&\ A_{i,t-1} + \sum_{i=1}^{n} M\ \&\ A_{i,t-2} \right)$$

Here, M&Ajt represents number of mergers and acquisitions in industry j in year t.

Imports Intensity of Exports (IMP): We use the ratio of FOREX spending (FS) on final goods to FOREX earning (FE) on final goods as a measure of import intensity of exports, i.e.,

$$IMP_{jt} = \frac{\left(\frac{\sum_{i=1}^{n} FS_{it}}{\sum_{i=1}^{n} FE_{it}} + \frac{\sum_{i=1}^{n} FS_{i,t-1}}{\sum_{i=1}^{n} FE_{i,t-1}} + \frac{\sum_{i=1}^{n} FS_{i,t-2}}{\sum_{i=1}^{n} FE_{i,t-2}} \right)}{3}$$

Here, IMPjt stands for import intensity of exports of industry j in year t.

Returns on Capital Employed (ROCE): The ratio of profit before interest and tax (PBIT) to Capital employed (CE) is used as a measure of returns on capital employed, i.e.,

$$ROCE_{jt} = \frac{\left(\frac{\sum_{i=1}^{n} PBIT_{it}}{\sum_{i=1}^{n} CE_{it}} + \frac{\sum_{i=1}^{n} PBIT_{i,t-1}}{\sum_{i=1}^{n} CE_{i,t-1}} + \frac{\sum_{i=1}^{n} PBIT_{i,t-2}}{\sum_{i=1}^{n} CE_{i,t-2}} \right)}{3}$$

Here, ROCEjt stands for returns on capital employed of industry j in year t.

Additional Instruments

Market Size (MSZ): We use the natural logarithm of sales as a measure of MSZ, i.e.,

$$MSZ_{jt} = \frac{\left(\ln\left\{\sum_{i=1}^{n} S_{it}\right\} + \ln\left\{\sum_{i=1}^{n} S_{i,t-1}\right\} + \ln\left\{\sum_{i=1}^{n} S_{i,t-2}\right\} \right)}{3}$$

Here, MSZjt is the size of the market of industry j in year t.

Profitability (PROF): The ratio of profit after tax (PAT) to sales is used as a measure of profitability, i.e.,

$$PROF_{jt} = \frac{\left(\frac{\sum_{i=1}^{n} PAT_{it}}{\sum_{i=1}^{n} S_{it}} + \frac{\sum_{i=1}^{n} PAT_{i,t-1}}{\sum_{i=1}^{n} S_{i,t-1}} + \frac{\sum_{i=1}^{n} PAT_{i,t-2}}{\sum_{i=1}^{n} S_{i,t-2}} \right)}{3}$$

Here, PROFjt stands for profitability of industry j in year t

Marketing and Distribution Intensity (MDI): The ratio of marketing and distribution related expenses (MDE) to sales is used as a measure of MDI, i.e.,

$$MDI_{jt} = \frac{\left(\frac{\sum_{i=1}^{n} MDE_{it}}{\sum_{i=1}^{n} S_{it}} + \frac{\sum_{i=1}^{n} MDE_{i,t-1}}{\sum_{i=1}^{n} S_{i,t-1}} + \frac{\sum_{i=1}^{n} MDE_{i,t-2}}{\sum_{i=1}^{n} S_{i,t-2}} \right)}{3}$$

Here, MDIjt stands for the marketing and distribution intensity of industry j in year t.

Paper No. 45

Key Factors of Enterprise Development: Evidence from Solar Sector of Nepal

Maheshwar Prasad Yadav*

Abstract

This paper aims at determining the key factors of enterprise development in the context of solar sector of Nepal. The variables are introduced via an extension of the econometric model, which explicitly includes Almon (1965) Polynomial Lag Model by using IBM SPSS Statistic 20. The number of solar companies comprises as dependent variable for the indicator of enterprise development while number of solar home systems and capacity of solar home systems installed are included as independent variables. The empirical results are estimated by using annual data of 21 years from 1992/93 to 2012/13 with entire study period divided into different sub-periods. The study reveals that the growth and development of solar sector is encouraging over the year. The study comprises the number of solar home systems and capacity of solar home systems installed has significant impact on enterprise development. The study demonstrates the enterprise development is influenced not only by the current values of the independent variables but also by the past values. The study also shows that number of solar home systems play a very strong role in the enterprise development while capacity of solar home systems play a weak role in the enterprise development in Nepal. In addition, the solar sector plays a vital role in climate threat mitigation and environmental conservation in Nepal in one way or another. The results may be varied in other area and/or sector of Nepal and beyond.

JEL classification: L26, P42, Q29, Q42

Key words (3-5 words): Enterprise development, greenhouse gas emissions, solar home systems, solar sector.

Introduction

Entrepreneurship is the dynamic process of creating incremental wealth. Entrepreneurship is the recognition and pursuit of opportunity without regard to the resources you currently control, with confidence that you can succeed, with the flexibility to change course as necessary, and with the will to rebound from setbacks (Thapa, Thulaseedharan, Joshi, & Goswami, 2008). Entrepreneurship is the process of creating something new with value by devoting the necessary time and effort, assuming the accompanying financial, psychic, and social risks, and receiving the resulting rewards of monetary and personal satisfaction and independence. Entrepreneurship though looks a simple term is highly encompassing.

Moreover, entrepreneurship is the major contributor in building and sustaining economic growth. Entrepreneurship is concerned with the process of creating new enterprise or business firms (Sharma, 2008, p. 112). The entrepreneurial spirit has appeared as the engine of economic development (Agrawal, 2003). It has resulted millions of new enterprises in the world, which has served as the driving force for economic development. The sustainable economic development depends upon product and services produced in the country rather than remittances-based economy like Nepal. The unemployment situation is also acute in Nepal. The large number of

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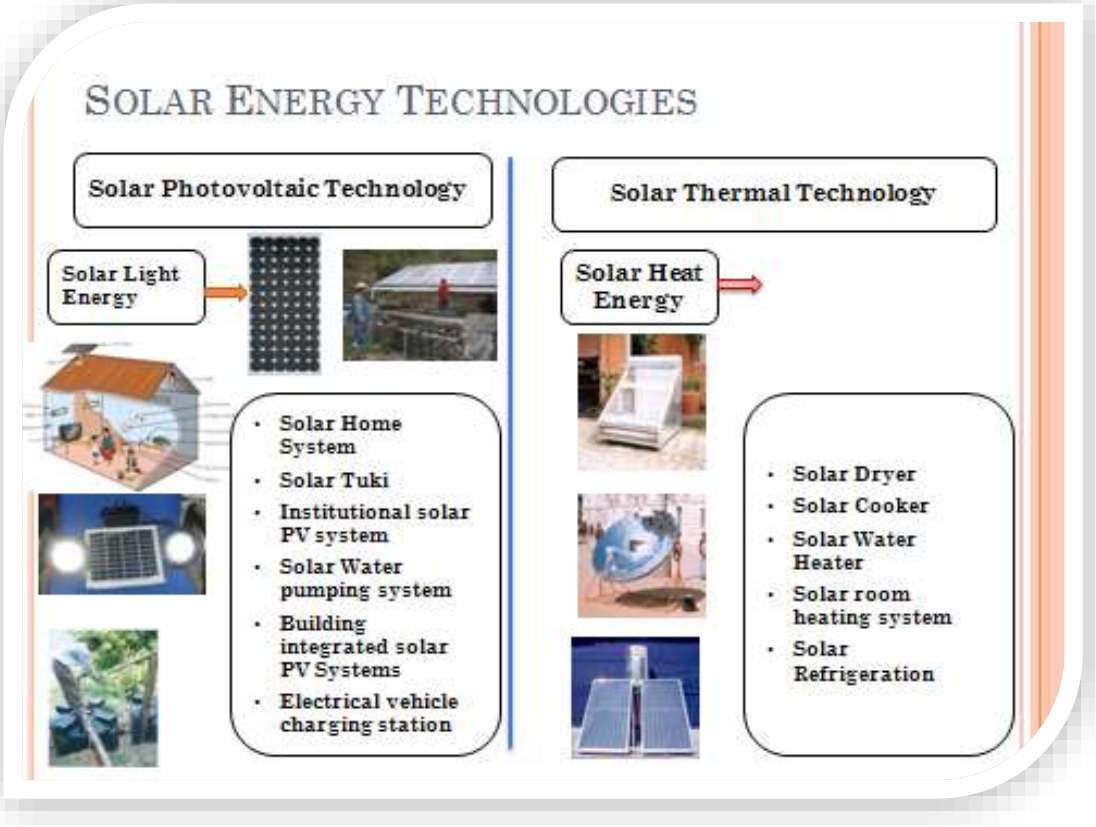
youths is departing abroad day by day for employment that establishes remittances-based economy. In these circumstances, the enterprise development is the best way to generate employment locally and convert remittances-based economy into the sustainable economy. China can be considered a good example of getting success with following a transformational entrepreneurship.

The importance of financial capital is a key determinant of entrepreneurial success and propensity to pursue entrepreneurial activities. Likewise, almost every firm needs a substantial financial input. The financial resources of the starting entrepreneur are important (Bosma, Praag, & Wit, 2000, p. 20). In order to have success as an entrepreneur, the importance of optimal financing for enterprises is vital. Having capabilities in this respect can be indicated as owning financial capital for start up and growth of an enterprise. Viewed in this perspective, key factor specifically, financial capital and size of market are important resources in determining entrepreneurial success.

Additionally, energy is a vital input for many everyday activities like cooking, heating, lighting, etc. The backbones of modern society- agriculture, health sector, transportation, education, and industry - rely on it (AEPC, 2014). However, power cuts with an average of 10 hours per day have been common in Nepal and Nepal Electricity Authority publishes a time table for power cuts. Solar energy can be seen as a more reliable source of energy in Nepal than the traditional electricity. Private installations of solar panels are more frequent in Nepal. Solar energy is radiant light and heat from the sun harnessed using a range of ever-evolving technologies such as solar heating, solar photovoltaic, solar thermal energy, solar architecture and artificial photosynthesis (International Energy Agency, 2011).

It is an important source of renewable energy and its technologies are broadly characterized as either passive solar or active solar depending on the way they capture and distribute solar energy or convert it into solar power. Active solar techniques include the use of photovoltaic systems, concentrated solar power and solar water heating to harness the energy. Passive solar techniques include orienting a building to the Sun, selecting materials with favourable thermal mass or light dispersing properties, and designing spaces that naturally circulate air. Moreover, Adhikary (2012) dealt with green economy in pursuance of sustainable development and nature for an improved and sustained quality of life.



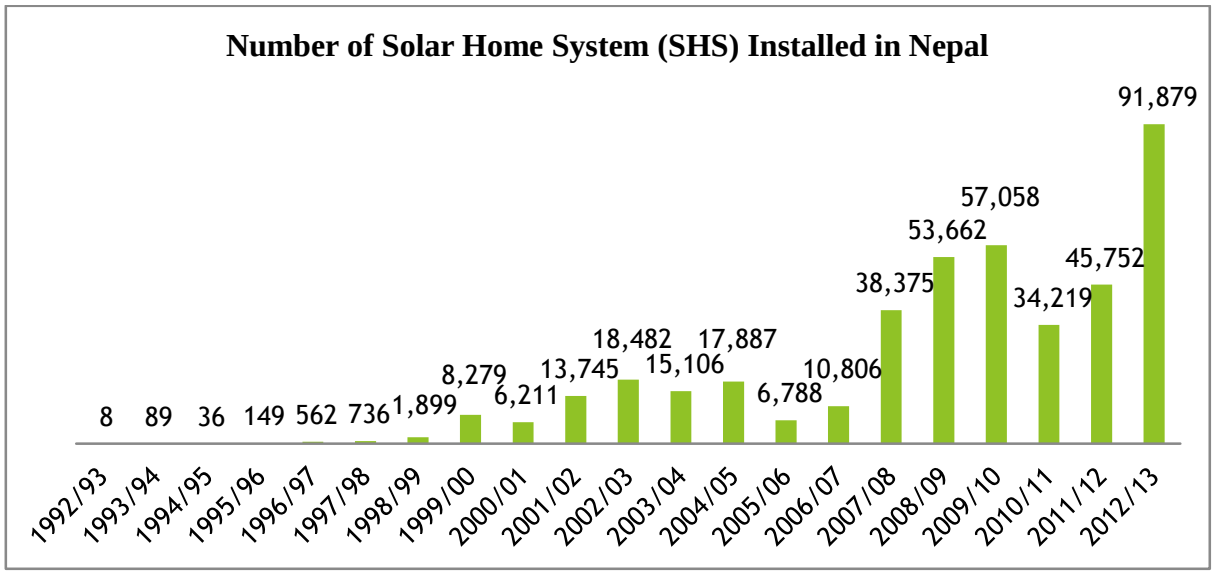
Source: Piya (2009).

Nepal has over a long history of promoting solar home systems. Over 421,728 solar home systems installed throughout the country by mid July 2013 with the total capacity of 10,461,799 Wp. There are 97 solar companies working in the sector. Moreover, solar companies have been involving in plants construction throughout 75 districts of Nepal. A large number of people have gotten employment directly, indirectly in this sector. There are many NGOs, consulting firms, entrepreneur that are involved in promotion of solar technology. As the demand for solar is increasing, employment of skilled and unskilled labour has been increasing every year. Thus, the potential of the solar development to create employment has already been demonstrated.

The trend of solar development in Nepal is presented in Figure 1. The trend of solar development over the year is encouraging. This approach has lasted throughout the centuries and thousands of solar home systems operate in Nepal, China, India, Bangladesh and other developing countries today.

Figure 1

Trend of Solar Development in Nepal



Source: Alternative Energy Promotion Centre (AEPC) 2014 and Solar Electric Manufacturers' Association, Nepal (SEMAN) 2014.

Despite all these evidences of the solar and related sector, no such study on key factors for enterprise development in solar sector has yet been conducted in Nepal. With the above backcloth, this study aims at determining key factors for enterprise development in the context of solar sector in Nepal. The present study emphasizes role of number of solar home systems (SHS), capacity of solar home systems installed (C) in determining enterprise development in Nepal.

The remainder of the paper is organized as follows. Section 2 describes the methodology employed in this research while empirical results are mentioned in section 3. Section 4 summarizes the results and offers some agenda for future research. Finally, section 5 acknowledges all whose write ups or contributions used in this study.

Methodology

Data

This paper is based on secondary data covering a period of 21 years from fiscal year 1992/93 to 2012/13 of Nepalese solar sector. The secondary data and information is collected from the Alternative Energy Promotion Centre (AEPC), Government of Nepal and Solar Electric Manufacturers' Association, Nepal (SEMAN), Kathmandu, Nepal. The variables are introduced in this study are related with the factors of enterprise development such as, number of solar companies (BC), total number of solar home systems, and capacity of solar home systems installed (C) in Nepal. In addition, the study comprises growth and development of solar sector in Nepal as well as climate threat mitigation and environmental conservation.

The Model

This study attempts to assess the role of key factors in enterprise development by estimating various models. The theoretical statement of the models is that the number of solar companies (SC) is regarded as subject to the constraints of total number of solar home systems (SHS), and capacity of solar home systems installed (C) in Nepal. The theoretical statement is framed as,

$C = f(SHS, C)$ ... (1)

The equation to be estimated is therefore specified as,

$SC = a + b1SHS + b2C + Ui$ ... (2)

Where, Ui = Error term or disturbance

Although the lag models are extensively used in econometric analysis, all economic problems may not correspond to the assumption of monotonically decreasing lag pattern. There are some situations where the effect of the lagged independent variable may follow cyclical pattern, the coefficient increases gradually before reaching a peak and then decreases. This type of lag pattern can be taken care of by using the Almon (1965) Polynomial Lag Model. The Almon Lag Scheme is expressed as a linear function of the current and the K previous values of X:

$Yt = a + b0\ Xt + b1\ Xt\text{-}1 + b2\ Xt\text{-}2 + \ldots + bt\ Xt\text{-}k + Ui$ ... (3)

Whereas the coefficient b0 is known as the short run or impact multiplier because it measures the change in the mean value of Y following a unit change in X in the same period, b1, b2...bt are called delay or interim multipliers because they measure the impact on mean Y of a unit changes in X in various time periods.

The relationship of number of solar companies with total number of solar home systems and number of solar home systems (C) installed is analyzed within the framework of Almon Polynomial Lag Scheme, as these relations are expected to follow an inverted V-type lag pattern. Five-year length of lag is taken for applying the Almon Log Scheme between the specified variables. The reason for this choice of lag length is periodic plans (except the second and interim) in Nepal are worked out for time horizon of 5 years.

Empirical Results

In this section, an attempt is made to determine growth and development of solar sector, the key factors of enterprise development in the solar sector of Nepal its role in climate threat mitigation and environmental conservation.

Growth and Development

This section comprises growth and development of solar sector in Nepal. The growth and development of the sector is encouraging over the year based on its growth in business both in term of number and turnover. The growth and development of solar sector by periodic development plan is given in Table 1.

Table 1

Solar Home Systems' Installation by Periodic Development Plan of Nepal

Solar Home Systems	Periodic Development Plan of Nepal				*Total*
	8th Plan (1992-97)	*9th Plan (1997-2002)*	*10th Plan (2002-07)*	*Interim (11th & 12th) Plan (2007/08-2009/10-2012/13)*	
Number	844 (0.20%)	30870 (7.32%)	69069 (16.38%)	320945 (76.10%)	**421728 (100%)**
Capacity (Wp)	30090 (0.29%)	1198112 (11.45%)	1995888 (19.08%)	7237709 (69.18%)	**10461799 (100%)**

Source: AEPC 2014.

Note: The figures in parentheses are percentage of the corresponding values.

The growth of solar home systems is in increasing trend from eighth plan to till interim periodic development plan both in terms of number and capacity. The installation of systems is less than one percent out of total in eighth plan while it's grows up in ninth and tenth plan. Considerably, there were 76.10 percent systems based on number of solar home systems and 69.18 percent of systems based on its capacity installed in interim periodic development plan of Nepal. Despite of prolonged political transition, it is a major turn in development of solar sector in Nepal during this period.

Likewise, it may be interesting to analyze by development region-wise installation of solar home systems in Nepal. The solar home systems' installation by development region in Nepal till mid July 2013 is given in Table 2.

Table 2

Solar Home Systems' Installation by Development Region in Nepal till mid July 2013

Solar Home Systems	Development Region					*Total*
	Far Western (FWDR)	*Mid Western (MWDR)*	*Western (WDR)*	*Central (CDR)*	*Eastern (EDR)*	
Number	63001 (14.82%)	163972 (38.57%)	66079 (15.54%)	65578 (15.43%)	66473 (15.64%)	425103 (100%)
Capacity (Wp)	1372729 (13.16%)	3355798 (32.17%)	2016759 (19.33%)	1709227 (16.39%)	1976449 (18.95%)	10430962 (100%)

Source: AEPC 2014.

Note: *The figures in parentheses are percentage of the corresponding values.*

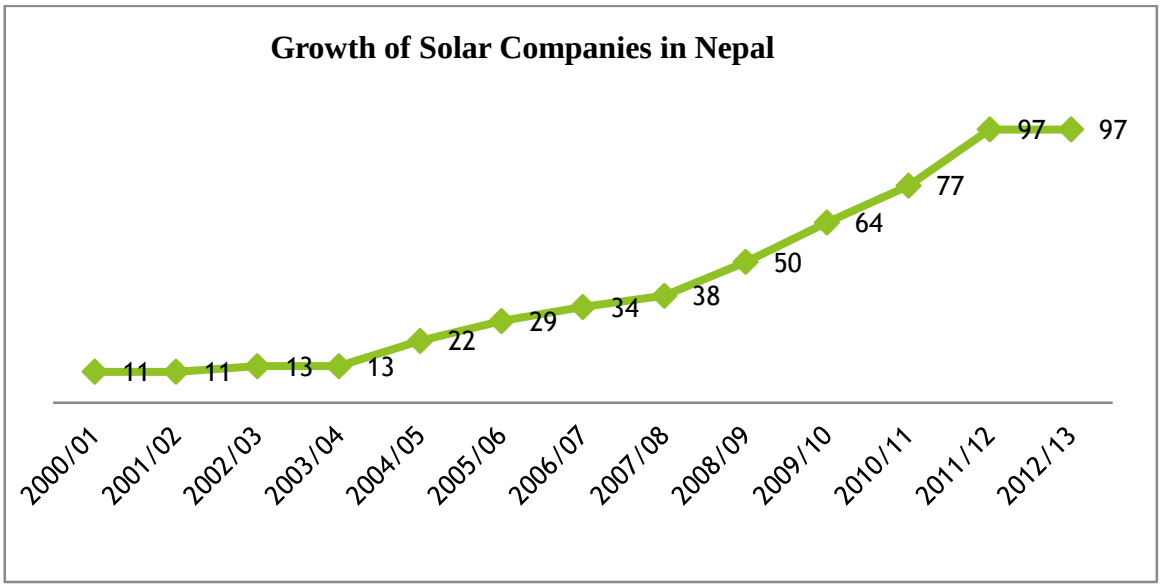
The results on solar home systems' installation by development region in Nepal till mid July 2013 show interesting facts about solar sector in Nepal. More number of solar systems were installed in mid western development region of Nepal both in terms of number (38.57 percent) and in terms of capacity (32.17 percent) out of total systems installed in Nepal. Being the region with very un-served part of nation called Karnali with different kind of development; the solar sector served this region at greater extent. Moreover, the far western development region has slightly lower number of solar systems installed than that of rest three regions (eastern, central and western). The eastern, central and western development region has almost equal number of systems installed

till mid July 2013 both in terms of number and capacity. Consequently, the development of the solar sector is encouraging over the year.

Furthermore, it may be interesting to assess the growth of solar companies in Nepal. The formal program on solar sector in Nepal started from 1996. Therefore, the solar companies have grown up after this period. Consequently, an umbrella association of solar companies called Solar Electric Manufacturers' Association, Nepal (SEMAN) has established in 2000. Figure 2 shows the trend of SEMAN's associated solar companies' growth over the year.

Figure 2

Growth of Solar Companies in Nepal



Source: AEPC 2014 and Solar Electric Manufacturers' Association, Nepal (SEMAN) 2014.

There were only 11 solar companies working in the sector in fiscal year 2000/01. However, it reached 97 solar companies in fiscal year 2012/13. Based on increase in solar companies, increase in number and capacity of systems installed, the sector has been grown considerably.

Key Factors of Enterprise Development

In this section, an attempt is made to determine the key factors of enterprise development in the solar sector of Nepal. One of the important indicators of enterprise development is the number of solar companies in the sector. Although there are some other indicators of enterprise development, the overall effect of sector efforts is examined in terms of growth in number of solar companies. It is used as a measure of enterprise development. First of all, the time series linear regression of the model show the impact of number of solar home systems and capacity of solar home systems installed as presented in Table 3.

Table 3
Regression of enterprise development on key factors for 1992/93 to 2012/13

Regression of number of solar companies (SC) on total number of solar home systems installed (SHS) and capacity of solar home systems installed (C) for the Period of 1992/93 to 2012/13

Regression Equation: $SC = a + b_1SHS + b_2C$ … (4)

Dependent Variable	Intercept	Regression Coefficient of		Adj. R^2	SEE	F	Eq. No.
		SHS	C				
SC	29.84 (2.75)*	3.38 (3.14)*	-2.58 (2.40)*	0.75	15.95	18.71	I
SC	7.15 (0.66)		0.76 (3.91)*	0.54	21.43	15.27	II
SC	10.44 (1.20)	0.82 (4.70)*		0.64	19.10	22.08	III

Source: AEPC 2014 and Solar Electric Manufacturers' Association, Nepal (SEMAN) 2014.

Notes: (1) Figures in parentheses are t-values.

(2) ** and *** indicate that the results are significant at 5 percent and 10 percent level of significance respectively.

The overall results presented in equations I to III in Table 1 are encouraging. The signs of all the coefficients are as expected except the sign of capacity of solar home systems installed in equations I. It presents the usual simple linear relationship of number of solar companies (SC) with total number of solar home systems (SHS) installed and capacity of solar home systems (SHS).

Moreover, one unit of solar home system increase in total solar home systems leads to about 3.38 number of solar companies increase holding other variables constant in equation 1 while the same is noticed to be 0.82 numbers in equation III. The influence of capacity of solar home system is negative in equations I. On the other side, one unit increase in capacity of solar home systems is resulted 0.76 number of solar companies in equation II holding other variables constant while the influence of loan is negative in equations I. All the coefficients of both solar home systems and its capacity of solar home systems are statistically significant. The goodness of all the models is also satisfactory.

The regression equations presented in Table 3 show the strong role-played by total solar home systems installed over the year while weak role-played by capacity of solar home systems installed in determining enterprise development.

Similarly, it may now be interesting to see the results when entire-period of the study are divided into three sub-periods. Table 4 presents the regression results of number of solar companies (SC) on total number of solar home systems (SHS) and capacity of solar home systems (C) installed in Nepal for various time-periods.

The results presented in Table 4 indicate that the estimated coefficients have expected signs of solar home systems for all the periods. However, the estimated coefficients have not expected signs of capacity of solar home systems for all the periods. All the coefficients of both solar home systems and its capacity of solar home systems are statistically significant. The goodness of all the models is also satisfactory. The regression equations presented in Table 4 also show the usual simple linear relationship of number of solar companies (SC) with total number of solar home systems (SHS) and capacity of solar home system (C) installed in Nepal.

Table 4
Regression of enterprise development on key factors for various time periods

Regression of number of solar companies (SC) on total number of solar home systems installed (SHS) and capacity of solar home systems installed (C) for various time periods

Regression Equation: $SC = a + b_1SHS + b_2C$ … (5)

Time Periods	Intercept	Regression Coefficient of		Adjusted R^2	SEE	F	Eq. No.
		SHS	C				
1992/93-2012/13	29.84 (2.75)*	3.37 (3.14)*	-2.58 (2.40)*	0.75	15.75	18.71	i
2005/06-2012/13	53.13 (3.34)*	11.16 (2.22)**	-10.45 (2.08)**	0.65	16.34	7.35	ii
2000/01-2010/11	24.43 (2.33)*	2.65 (2.65)*	-1.94 (1.92)**	0.62	13.90	9.24	iii

Source: AEPC 2014 and Solar Electric Manufacturers' Association, Nepal (SEMAN) 2014.

Notes: (1) Figures in parentheses are t-values.

(2) ** and *** indicate that the results are significant at 5 percent and 10 percent level of significance respectively.

The regression equations presented in Table 4 show the strong role-played by total solar home systems installed over the year while weak role-played by capacity of solar home systems installed in determining enterprise development as well.

Furthermore, it may be interesting to see the results obtained by applying the Almon Lag Scheme. The results applying the Almon Lag Scheme are presented in Table 5.

Table 5
Regression of enterprise development on key factors and its one to five year lag values

Regression of number of solar companies (SC) on total number of solar home systems installed (SHS) and its one to five year lag values; the number of solar companies (SC) on capacity of solar home systems installed (C) and its one to five year lag values for the period of 1992/93 to 2012/13

Regression Equations:

$SC = a + b_0SHS_1 + b_1SHS_{t-1} + b_2SHS_{t-2} + b_3SHS_{t-3} + b_4SHS_{t-4} + b_5SHS_{t-5}$ … (6)

$SC = a + b_0SHS_1 + b_1SHS_{t-1}$ … (7)

$$SC = a + b_0C_{1+} b_1C_{t-1} + b_2C_{t-2} + b_3C_{t-3} + b_4C_{t-4} + b_5C_{t-5} \quad \ldots (8)$$

$$SC = a + b_0C_{1+} b_1C_{t-1} \quad \ldots (9)$$

A	b_0	b_1	b_2	b_3	b_4	b_5	Adj. R^2	SEE	F	Eq. No.
0.52 (1.18)	0.12 (3.27)	-0.03 (0.83)	0.49 (11.58)**	0.38 (11.11)**	0.08 (2.23)	0.24 (4.87)	0.99	0.38	999	6
2.07 (0.25)	0.30 (1.29)	0.63 (2.64)*					0.70	15.58	14	7
-2.96 (2.71)	0.09 (1.98)	-0.04 (0.87)	0.45 (9.25)**	0.46 (10.21)**	0.02 (0.38)	0.37 (5.66)	0.99	0.51	515	8
-2.81 (0.25)	0.27 (1.08)	0.62 (2.52)*					0.60	18.07	9	9

Source: AEPC 2014 and Solar Electric Manufacturers' Association, Nepal (SEMAN) 2014.

Notes: (1) Figures in parentheses are t-values.

(2) ** and *** indicate that the results are significant at 5 percent and 10 percent level of significance respectively.

Total number of solar home systems (SHS) and capacity of solar home systems (C) installed contribute enterprise development i.e., number of solar companies (SC) in a lagged pattern. The Almon Lag Scheme is employed to test the lag structure of the effects of total number of solar home systems (SHS) and capacity of solar home systems (C) installed on number of solar companies (SC).

All the coefficients of solar home systems (SHS) are positive for one to five year lag in equation 6 and 7 except one year lag value in equation 6. Likewise, all the coefficients of capacity of solar home systems (C) installed are positive except one year lag value in equation 8. The coefficients of solar home systems (SHS) are statistically significant for two year lag and three year lag values in equation 6 as well as one year lag value in equation 7. Similarly, the coefficients of capacity of solar home systems (C) installed in Nepal are statistically significant for two year lag and three year lag values in equation 8 as well as one year lag value in equation 9. The goodness of all the models is also satisfactory. The results show enterprise development is influenced not only by the current values of the key factors but also by the past values in the solar sector of Nepal.

Climate Threat Mitigation and Environmental Conservation

Energy plays indispensable role in running the wheels of the economy of any country and more importantly in the lives and livelihoods of its people. Global warming is one of the most challenging serious and debated issues in the world today. The substitution of traditional fuels such as fuel wood, crop residue and dung, and commercial fuels such as kerosene and LPG to some extent by the solar has a great potential of reducing greenhouse gas emission into the atmosphere. Such reduction analyzed from nationwide perspective can be very significant rather than at the household level. Greenhouse gas emission reduced from the decrease in use of fuel wood, decrease in use agriculture residues, and decrease in use of dung and kerosene consumption.

The "greenhouse effect" of certain gases in the atmosphere was discovered by a French scientist in 1827. In line with this, UN Summit on global warming termed as the Earth Summit took place in Rio de Janerio, Brazil in 1992. The Summit formulated and adopted the UN Framework Convention on Climate Change (UNFCCC), which established principles and objectives but there was no specific target or obligations. Nepal ratified the Convention in 1995 and because a Party of the UNFCCC. In the follow up, the Conference of the Parties (CoP) of the UNFCCC that was held in Kyoto, Japan in 1997, drafted and adopted Kyoto Protocol. This treaty of UNFCCC sets specific targets and actions for parties.

Under the Clean Development Mechanism (CDM), emission reduction from projects in developing countries can be traded with Annex I countries to meet their targets. Nepal signed the instrument of accession to the Protocol and because a party in September 2005. Solar is an important renewable energy that can be registered and get benefits from CDM money.

Solar is an important in relation to forest conservation. Forest conservation is an important factor for quality of life. The decrease in fuel wood consumption due to its substitution by solar stoves has threshold benefits. Firstly, at individual level it incurs financial gains to the households as they can save some money which would otherwise be spent in purchasing the fuel wood. Similarly, the substitution of fuel wood by solar also saves time and effort required on fuel wood collection, which in some cases could even be many hours of daily work. Secondly, at national level the decrease in the use of fuel wood contributes to some extent in reducing the prevailing high rate of deforestation of the country.

Fthenakis & Kim (2007) find solar-electricity-generation technologies often are deemed "carbon-free" because their operation does not generate any carbon dioxide. However, this is not so when considering their entire lifecycle of energy production; carbon dioxide and other gases are emitted during the extraction, processing, and disposal of associated materials. They determined the greenhouse gas (GHG) emissions, namely, CO2, CH4, N2O, and chlorofluorocarbons due to materials and energy flows throughout all stages of the life of commercial technologies for solar-electric-power generation, based on data from 12 photovoltaic (PV) companies, and reviews of nuclear-fuel life cycles in the United States, Europe, and Japan. Previous GHG estimates vary widely, from 40 to 180 CO2-eq./kWh for PV, and 3.5–100 CO2-eq./kWh for nuclear power. Country-specific parameters account for many of these differences, which are exacerbated by outdated information. They conclude, instead, that lifetime GHG emissions from solar- and nuclear-fuel cycles in the United States are comparable under actual production conditions and average solar irradiation, viz., 22–49 g CO2-eq./kWh (average US), and 17–39 g CO2-eq./kWh (south west) for solar electric. Through reduction in green house gas emission and forest conservation, solar plays a vital role for climate threat mitigation and environmental conservation in Nepal.

Summary and Conclusions

The purpose of the paper is to investigate the role of key factors for enterprise development in the solar sector of Nepal. This study was based on secondary data only. The necessary data on number of solar companies (SC), total number of solar home systems (SHS) and capacity of solar home systems (C) installed in Nepal were collected for the period of fiscal year 1992/93 to 2013/14 from AEPC and SEMAN. The role of the key factors was accomplished by using various regression models. The regression equations used in this study are estimated with the entire study period divided into different sub-periods as well as applying Almon (1965) Lag Model. In addition, the study determined growth and development of solar sector in Nepal as well as climate threat mitigation and environmental conservation from the sector.

The results of the empirical analysis lead to the important conclusions. The study reveals that the growth and development of solar sector is encouraging over the year. The results show the number of solar home systems (SHS) and capacity of solar home systems (C) installed have significant role in enterprise development in the context of Nepal. The enterprise development is influenced not only by the current values of number of solar home systems (SHS) and capacity of solar home systems (C) installed but also by the past values. Likewise, the study suggests that the strong role-played by number of solar home systems (SHS) while weak role-played by the capacity of solar home systems (C) installed for enterprise development in Nepal. In addition, the solar sector plays a vital role in climate threat mitigation and environmental conservation in Nepal in one way or another. The results may be different in other area and/or sector of Nepal and beyond.

This paper can be extended by using a combination of qualitative and quantitative information extracted from primary and secondary sources of data. A second avenue of research is to conduct a case study of renewable energy enterprises (REEs) to get possibly more concrete results. A final research avenue is to make the study more fruitful by adding additional variables that are related with enterprise development such subsidy, loan to get a greater insight into the results.

Acknowledgements

I owe a deep of gratitude to my research supervisor Prof. Dr. Radhe S. Pradhan for his constant encouragement, patient guidance and valuable supervision at every stage of my work. I appreciatively acknowledge the cooperation received in collecting data from AEPC and SEMAN as well as all writers and researchers whose write up used as references for this study. In this limited space, it is simply impossible to give the names of a large number of friends and well wishers who helped me in this work in one way or another. I wish to express the sincerest thanks to them all. I would also like to express debt of gratitude to my family for their continuous support in my efforts. Last but not least, I am also indebted to Nepal Rastra Bank for providing an opportunity to present this paper in its 2nd International Conference on Economics and Finance.

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Paper No. 46

Food security situation in Nepal: A study based on nutrition analysis.

By Rudramani Khatiwada*

Abstract

This paper tried to investigate the nutrition consumption patter of Nepali society and influencing factors which mainly carried to food insecurity in Nepal. The earlier studies investigated that the socio-economic condition, lower capabilities of food growing lands are mainly responsible for the food insecurity in Nepal. Here it is tried to identify the net production and consumption pattern of food. This paper mainly based on secondary data and the complex statistical or mathematical tools are not needed to find the answer of the objective. Simple analysis is used to find the nutrition consumption pattern. Similarly, data are presented in simple chart or diagrams.

Keywords: food security; food Insecurity; Mountain; Hill; Terai; food balance

1. Introduction

The concept of food security was introduced in the mid-1970s at the time when there was a global food crisis (FAO, 2003). The initial focus of attention was to increase food supply with price stability of at least basic foodstuffs at the national and international level. Food security has always been threatened by rising price, changing food habit, erratic weather in key grain exporting countries, global warming, deforestations, decreasing farming land, migration, increasing crop use for biofuel production, export restrictions, growing global population, low global stocks and climate change (WB, 2011). In addition, poor people are less able to afford for good food due to higher prices. It was estimated that additional 44 million people are extremely poor and surviving under US $ 1.25 per day and further 10 percent increase in global prices could drive an additional 10 million people to poverty (WB, 2011). The successful activities for food security need access to income and social capital. Food security may be discontinued by instability in food prices, food production and household income generating power.

In 1960s and1970s, agricultural economists forecasted that population growth would dramatically outpace and food production can create starvation worldwide. The development inequality increased due to the pace of population, however, agricultural productivity has grown rapidly enough that the world still produces sufficient food for its expanding population. Even if productivity of food continues to be strong, but there is no guarantee that, the need of nutrition for the poorest and most vulnerable people will meet in present world and this fact expanded and diversified internationally as an approach of 'hunger reduction.

Nepal, one of poorest country, has a population of 27.1 million in 2005 (UNDP HDR, 2007). The human development indicator shows that its position was 145 out of 179 countries (UNDP, 2008). The employment situation shows that 80 percent of adult men are employed, but the corresponding female employment-to-population ratio is less than 59 percent, reflecting women's comparatively limited employment opportunities in Nepal (CBS, 2009). Around 70 percent of employed men and more than 80 percent of employed women are in vulnerable employment, consisting of either own-account work or unpaid family work in Nepal. A reflection of widespread

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low-productivity employment and the reliance on subsistence agriculture of a large share of the country's workers. The situation of country shows that more than 80 percent workers are living with family on less than US$ 2 per day in 2004 an more than half workers are living in extreme poverty of less than US$ 1.25 per day (ILO, 2009).

Spending time rebuilding damaged infrastructure during Maoist movement or investing in new agricultural pursuits is a near impossibility for the majority of Nepalese. The high food prices and a series of natural disasters have further plunged people already on the edge into deeper poverty. World Food Programme (WFP) has highlighted some major issues of 41 percent of its 27 million people undernourished. For the most vulnerable, food is scarce and few resources are available to rebuild or improve their livelihoods. The economic status shows that 24 percent of the population live on less than US$1 a day – more than three million of them are children. The devastating effects of food insecurity, poverty, conflict and high food prices are taking their toll. The Chronic malnutrition rates for children under 5 years are 80 percent with acute malnutrition rates as high as 23 percent (WFP, 2011). In response to the above, WFP launched a US$109 million operation to provide critical food assistance to protect lives and restore the livelihoods of more than 2.7 million people affected by conflict, high food prices and natural disasters and it is related with a range of factors and risks, which increase food insecurity.

Nepal was capable to feed own people up to 1989 except in some cases of drought, flood and deficiency. The migration situation from India, China, Hill, Mountain and other major cities are responsible for food problem in Nepal (Adhikari, 2007).

Objectives of the study

This study analyses food insecurity situation in Nepal. It specifically aims at analysing growth in population, cereal food production, food requirement and food surplus/deficit. It analyses the food situation for the country as a whole followed by development regions and ecological regions. It deals with the following issues:

1. There is concern that food production may have declined as a result of insecurity, diminished access to land and other farm inputs internal displacement and involuntary migration.

2. There is concern that, as a result of all these factors and the associated food availability declined combined with deterioration in access and entitlements to food, food consumption may have fallen.

3. There is concern that this is leading to serious food deficits at regional and ecological regions.

Lack of detailed and reliable data makes more intensive and comprehensive study impossible at this time. However, it is possible to indicate at least some features.

Nature of data

This study is mainly based on secondary in nature for all the five developmental regions and all the three ecological regions. The study data are gathered from 2000/01 to 2009/10.

For the purpose of study, edible food is calculated by deducting wastage, seed and non-food items. The non-food item consists of 10.2 percent for wheat, 17.43 percent for rice, 40.5 percent for maize crop as a standard of FAO.

The remainder of the paper is organized as the section two describes the analysis of data. The summary and conclusion are described in section three.

Analysis of Data

Food production and availability in Nepal.

Food security covers the concept not only the production of food but also the physically availability by proper transportation for the hunger people. The distribution of food by government programme, social bodies, NGOs and INGOs and their networks are important especially at the crisis time. The country's production of food and local household production are very important for food security however, there are various sources of foods available in Nepal.

The measurement system of local household food production in Nepal is very complex in nature and it is very difficult to measure and analyse the food situation in an internationally recognised form. Similarly the traditional measurement of household system of food in Nepal cannot provide the actual figure of production. The food availability concept statistically refers to need of foods at the community level. The food accessibility in Nepal shows the economic and social status to get food especially purchasing power of the local people based on food price in relation with wage rates, income and barter system. The food utilisation also refers to the food security in Nepal. This is related with conversion of food into nutritious form for physical and mental function. The safe drinking water and health conditions are complementary factors for the food utilisation in Nepal. The reverse of the food availability, food accessibility, food utilisation and risks increase food insecurity. In short, vulnerability arises from environmental risks, market risk, entitlement risks and nutritional risks.

The total estimated population of country was 23,151,423 in 2000/01 which increased to 28,043,744 in 2009/10, leading to the average annual growth rate of 2.15 percent. Similarly, the total cereal food production increased from 4,513,179 m. tons in 2000/01 to 4,967,467 in 2009/10, the average annual growth rate being 1.14 percent. Hence the average annual growth rate in cereal food production is less than that of average annual growth rate in population. The per capita food production varied from 5.1 m. Tons in 2000/01 to 5.6 m. Tons in 2009/10. The cereal food requirement increased from 4,430,128 m. tons in 2000/01 to 5,297,444 m. tons in 2009/10. The per capita food requirement varied from 0.188 m. tons to 0.192 m. tons. The average annual growth rate in cereal food requirement has been 2.01 percent which is less than average annual growth rate cereal food production. Over a period of time, Nepal has moved from food surplus country to food shortage country.

Table 1: Food production and availability in Nepal

Food Balance in Nepal (Unit: Food in M. Tons, growth in percentage)										
Year	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Population	23,151,423	23,701,451	24,249,996	24,797,059	25,342,638	25,886,736	26,427,399	26,966,581	27,504,280	28,043,744
Population Growth	----	2.38	2.31	2.26	2.20	2.15	2.09	2.04	1.99	1.96
Cereal Food Production	4,513,179	4,543,049	4,641,466	4,884,371	4,942,553	4,867,825	4,737,219	5,187,392	5,160,406	4,967,467
Cereal Food Growth Rate	----	0.66	2.17	5.23	1.19	-1.51	-2.68	9.50	-0.52	-3.74
Per Capita Food	5.10	5.20	5.20	5.10	5.10	5.30	5.60	5.20	5.30	5.60

Food Balance in Nepal (Unit: Food in M. Tons, growth in percentage)										
Year	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Production										
Per Capita Food Requirement	4,430,128	4,463,027	4,565,820	4,671,344	4,779,710	4,890,993	5,005,282	5,122,668	5,293,316	5,297,444
Per Capita Food Requirement	0.191	0.188	0.188	0.188	0.189	0.189	0.189	0.190	0.192	0.189
Food Requirement Growth Rate	----	0.74	2.30	2.31	2.32	2.33	2.34	2.35	3.33	0.08
Food Balance	83,051	80,022	75,646	213,027	162,843	-23,168	-268,063	64,724	-132,910	-329,977

Source: Agri-Business and Promotion Centre, MOAC, 2010.

The food balance sheet of Nepal reveals the food deficit country for last several years. As a result, food security was the major problem although; it was not getting valuable emphasis it would otherwise have deserved. Many reasons have identified behind the food insecurity and lack of sufficient food production in Nepal.

The food surplus or deficit mainly related with rainfall pattern because most of the land in Nepal depends on monsoon. WFP, MOAC, and FAO estimated that food deficit will increase in Nepal in coming years due to low production of wheat and barley. The food deficit report indicates that at least 66 percent of households are suffering from food shortage, 43 percent households are reducing daily food need, 30 percent households in Mountain and Hill region are enforcing them for the use of seed stock, 23 percent households are withdrawing school children due to food and economic condition, and 73 percent of the head of household have gone outside of the home in search of new work to generate income (WFP, MOAC, FAO, 2008/09).

Population and land area

The concentration of population is highest in Terai region (46.43 percent) followed by Hill region (42.45 percent) and Mountain region (6.99 percent). In terms of land area, Hill region has the highest area followed by Mountain and Terai region. The Terai region has lowest area of land but population concentration is highest. The higher population in Terai is adding more challenge to the country because the land size is decreasing year to year.

Table 2: Population distribution of Nepal in different regions in 2000/01

Areas	Male	Male Percent	Female	Female Percent	Male and Female Percent	Total	Land (Sq. Km.)
Terai Region	5,710,059	23.64	5,502,394	22.78	46.43	11,212,453	34,019
Hill Region	5,016,802	20.77	5,234,309	21.67	42.45	11,251,111	61,345
Mountain region	837,060	3.47	850,799	3.52	6.99	1,687,859	51,817
Nepal	11,563,921	47.88	11,587,502	47.98	100	23,151,423	147,181

Source: Statistical Year Book of Nepal, 2009. CBS Nepal and Statistical Information, 2009/10, MOAC.

The food deficit situation shows the alarming condition where most of the years have food deficit.

Cereal food production

Table 3: Item wise cereal grain production in Nepal in years 2000/01 to 2009/10. (Unit: Metric Tons)

Edible cereal grain production in Nepal, 2000/01 - 200910											
Year	Rice		Maize		Wheat		Millet		Barley		Total
	Prod.	%	Prod.	%t	Prod.	%	Prod.	%	Prod.	%	
2000/01	2,356,646	52.22	1,001,478	22.19	914,885	20.27	231,915	5.14	8,255	0.18	4,513,179
2001/02	2,294,205	50.5	999,831	22.01	1,008,827	22.21	231,714	5.10	8,472	0.19	4,543,049
2002/03	2,271,914	48.95	1,059,751	22.83	1,069,257	23.04	231,931	5.00	8,613	0.19	4,641,466
2003/04	2,455,971	50.28	1,082,455	22.16	1,105,087	22.62	232,373	4.76	8,485	0.17	4,884,371
2004/05	2,358,540	47.72	1,186,840	24.01	1,151,282	23.29	237,778	4.81	8,113	0.16	4,942,553
2005/06	2,314,065	47.52	1,097,612	22.54	1,211,445	24.88	238,651	4.90	7,667	0.16	4,869,440
2006/07	2,060,280	42.79	1,292,259	26.84	1,211,898	25.17	242,333	5.03	8,514	0.18	4,815,284
2007/08	2,336,694	44.98	1,348,140	25.95	1,263,912	24.33	238,711	4.59	7,754	0.15	5,195,211
2008/09	2,461,204	47.69	1,383,647	26.81	1,069,167	20.72	240,030	4.65	6,358	0.12	5,160,406
2009/10 #	2,185,936	44.01	1,282,438	25.82	1,248,333	25.13	243,231	4.90	7,529	0.15	4,967,469

Note:- # Preliminary , MOAC.

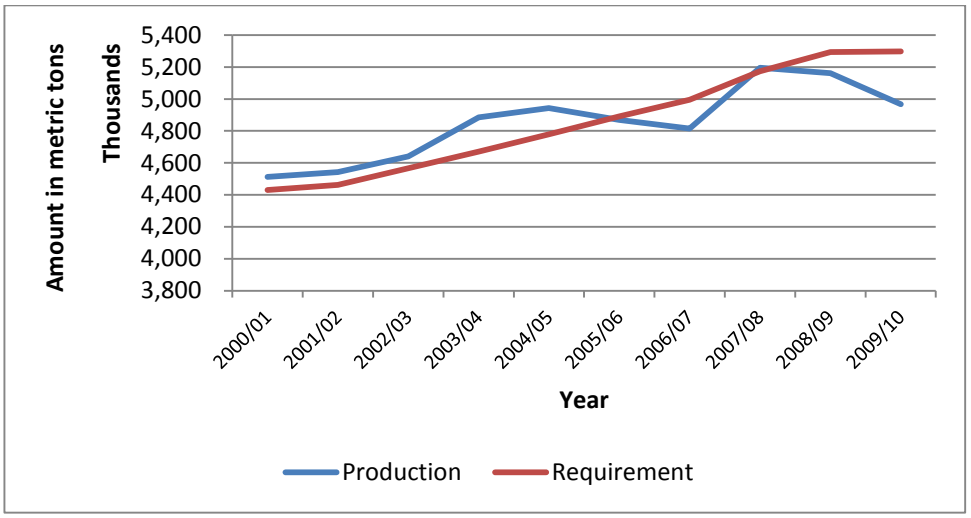
Source: Agriculture Statistics, MOAC, 2009/10 (www.moad.gov.np)

Rice is the most common cereal grain and it holds dominant position (47.67 percent in 2009/10) followed by maize, wheat, millet and barley. In 2000/01, rice occupied about 52 percent among total cereal production.

The production of rice was 2,356,646 metric tons in 2000/01 which declined to 2,309, 546 m. tons in 2009/10. It all shows that rice is the main cereal grain in Nepal followed by maize. The production of maize was 1,001,478 metric tons in year 2000/01, which increased to 1,173,445 m. tons in 2009/10. The production of wheat increased from 914,885 m. tons in 2000/01 to 1,125,409 in 2009/10. Thus rice occupies a dominant position in Nepalese economy, followed by maize and wheat.

The Terai region of Nepal is the main source of food for Nepal. In recent years the food production of Terai is rapidly decreasing due to inter migration of people. People are using the farming lands to construct residential buildings. The size of farming land is decreasing every year (Adhikari, 2007). The rapid decrease in food production of the country is an alarming signal. The food production and requirement of the country is shown in Figure 1.

Figure 1: Comparison of production and requirement of cereal food in Nepal (amount in metric tons)



In Neal, the food requirement is increasing rapidly from 2000/01 to 2008/09. The food production is more than the requirement till 2004/05 but the situation changed after 2004/05 and the food deficit periods have emerged more frequently. The food production varied widely while the requirement has increased consistently over time.

Food balance in various regions

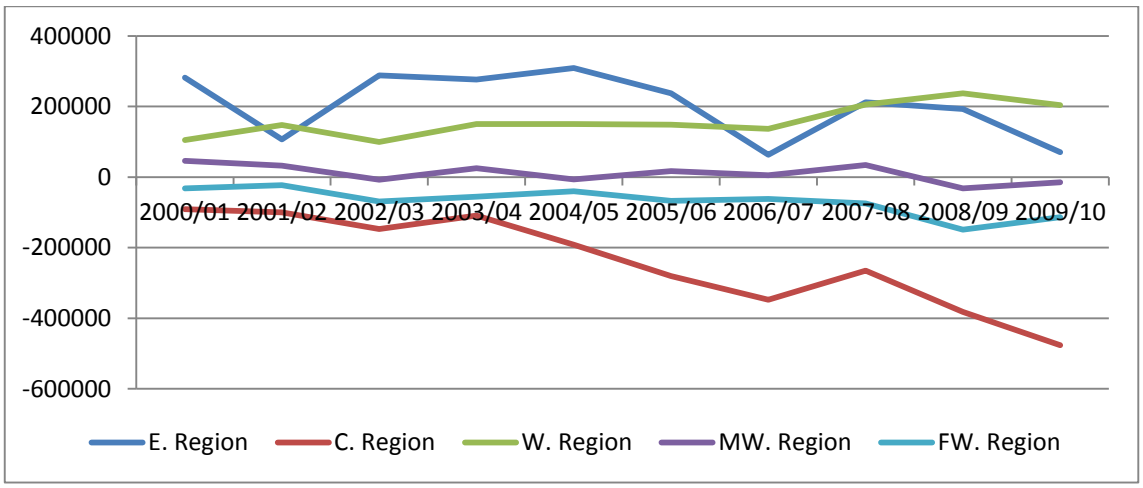
The food deficit regions were observed to be far Mid-Western Region and Central Region in 2000/01. The major food surplus region was Western Region followed by Eastern Region. All other regions have food deficits.

Table 4: Food surplus / deficit in various regions for last 10 years in Nepal (amount in M. Tons).

Area	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Eastern Region	281,593	106,904	288,015	276,645	309,109	237,262	62,984	212,511	193,526	70,650
Central Region	-91,341	-99,620	-147,607	-109,399	-191,199	-280,632	-347,575	-265,307	-382,377	-476,285
Western Region	104,890	147,981	99,803	150,598	150,153	148,300	137,151	206,011	237,309	203,793
Mid-western Region	46,399	32,296	-7,075	25,335	-6,111	17,180	5,592	34,570	-32,367	-14,529
Far mid-western Region	-32,022	-22,728	-68,763	-55,291	-39,722	-67,160	-61,864	-74,289	-149,000	-113,611
By ecological region										
Mountain	-52,502	-55,607	-49,977	-53,558	-29,407	-53,434	-56,071	-41,356	-69,188	-486,419
Hill	-154,650	-222,874	-157,992	-185,623	-100,697	-157,161	-228,552	-189,331	-345,610	-591,620
Terai	516,671	443,316	372,341	527,070	357,067	265,545	80,911	344,180	281,889	178,149
Nepal	309,519	164,835	164,372	287,889	226,963	54,950	-203,712	113,695	-132,910	-329,982

(Source: Agri. Business Promotion and Marketing Development Directorate. Harihar Bhawan, Lalitpur, Nepal, , WFP, MOAC, 2010).

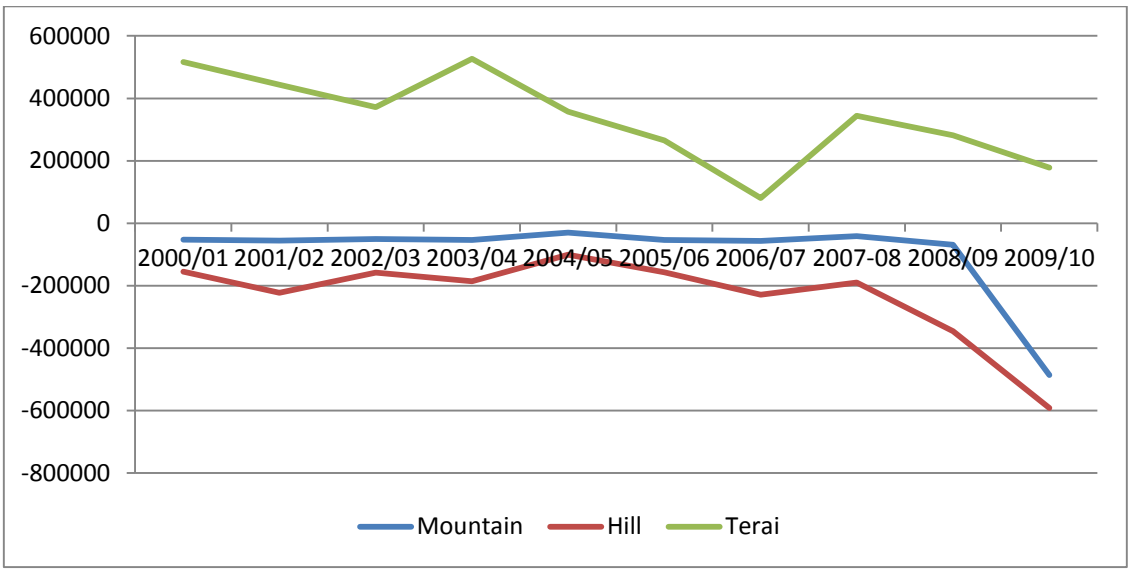
Figure 2: Food surplus /deficit classified by development Regions (in metric tons).



Nepal has also been classified by ecological regions, namely Mountains, Hills and Terai regions. Figure 4 shows the cereal food surplus/deficit classified by Mountains, Hills and Terai regions.

Similarly, food surplus in Terai region decreased while food deficit increased in other regions over time. Hence food security problem is likely to increase much more in the years to come.

Figure 3: Food surplus / deficit classified by ecological regions (in metric tons)



In Nepal, Terai region is the only region with food surplus but it has a decreasing trend. Hill areas have more alarming situation than Mountain areas but both of these two regions have food deficits.

The trend of cereal food surplus in Nepal is in decreasing trend year by year. This shows Nepal must seek some other alternatives to increase the food production such as irrigation, use of fertiliser, new seeds, agricultural technicians.

The total agricultural land available is about 2,641,742 ha. The government report shows that 48 percent lands have irrigation facility but in reality it is much less than 42 percent because most of the irrigation projects are not successful (DI, 2007, WB 2010).

In Nepal only 14 districts have sufficient foods to feed the people. All of the districts of the Western region, Mid-Western region and Far-Western regions have food deficits. The Mountain Districts of Western region, Mid-Western region and Far-Western regions have serious alarming situation. Similarly Hill regions have same problems as compared to Mountain regions. There are a total of 17 Terai districts out of 19 that have food problems in year 2009/10. In short, it is concluded that Nepal has 68 percent of districts that have food insecurity situation.

Table 5: Food surplus/deficit districts of Nepal

Regions	E-Region	C-Region	W-Region	MW-Region	FW-Region	Total
Mountain	1(3)	2(3)	2(2)	5(5)	3(3)	13(16)
Hills	3(8)	7(9)	3(11)	4(7)	4(4)	21(39)
Terai	3(5)	13(19)	0(3)	1(3)	0(2)	17(20)
Total	7(16)	22(31)	5(16)	10(15)	7(9)	51(75)

Food available through other sources

The Nepalese People are buying food from market and cultivating in land. Apart from this food is available through other sources such as government mechanism, traditional practices and INGOs. The food deficit areas of Nepal are getting food aid especially Far-Western and Mid-Western regions since these areas have been suffering from food deficit since 1972. The food aid was considered temporary problem initially but this became permanent because farmers of the concerning places stopped food cultivation and food dependency increased dramatically. The food aid was however, small as compared to local food production but the aid food played very important in the country especially for the women and children to fulfil malnutrition. The main problem of the food aid was that it did not help to increase local food production. Similarly the local people had not worked hard to grow food and psychologically they relied on the food aid. The food price in food deficit areas was found to be very high due to lack of transportation.

Different INGOs, NGOs and UN Body are supplying foods for poor where NFC and WFP are major. The supplied foods from these bodies are not sufficient to cover the food deficit population. The government organisation, NFC, which used to supply food to deficit areas have short in supply. The Government of Nepal has adopted neoliberal policy at 1990 whom aim is to withdraw hand from social sector involvement. The main reason of reducing food supply by NFC is neoliberal policy. The food supplied by NFC in different parts of Nepal has been decreasing per year. The sale of NFC in capital city was only 15.5 percent at year 1997/98 (Bhole and Adhikari, 1999). Furthermore, the supply of NFC had decreased to 9 percent in 2002 (Pandy, 2002). The food supplied by NFC in year 2009/10 is 22.76 percent of the total requirement. The food supply contribution by NFC is very small as compared to need of hunger people even though the Government of Nepal has been shouldering a huge amount of subsidy. However, other sectors and donor body are supplying food but seemed to be inferior in quality. The question always rose that food insecure households are really benefitted by the food distribution by NFC since the government of Nepal has subsidised huge amount of money for the food distribution.

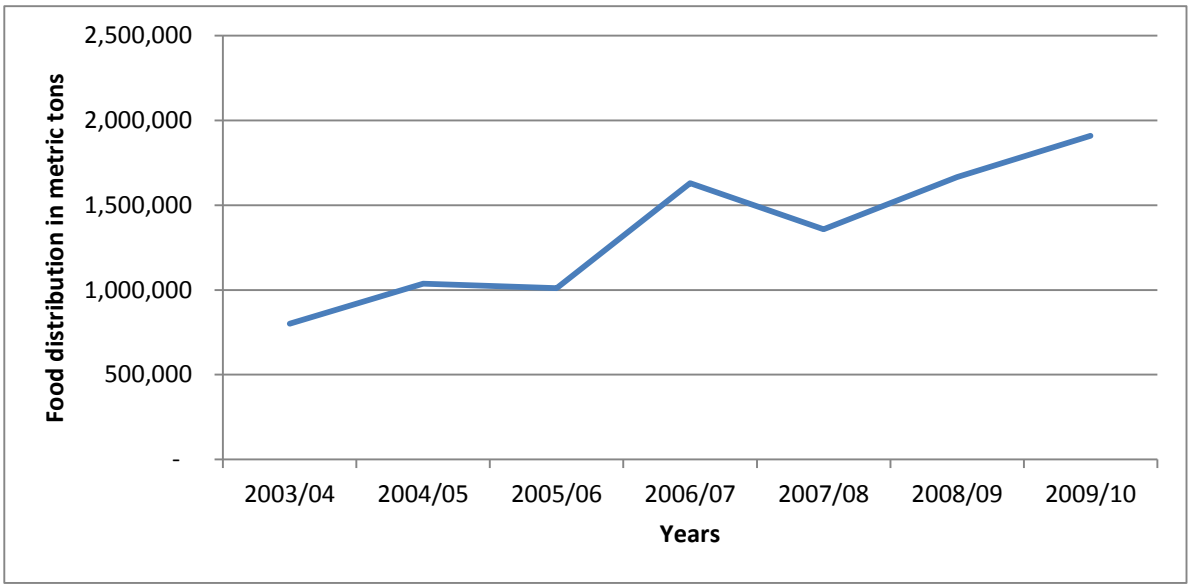
The food distribution role of WFP in Nepal is very important to feed hunger people. The food distribution and expenses incurred there-of by WFP in Nepal is produced below.

Table 6: WFP's food distribution and expenses
(Unit: Food in Metric Tons and expenses in US $ million)

WFP contribution in Nepal (Unit: Food in Metric Tons and Direct expenses in US $ million)								
Year	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	Annual average
Food Distribution	801,044	1,036,580	1,011,038	1,629,852	1,357,311	1,665,623	1,909,153	1,344,372
Direct Expenses	16	21	17	25	37	44	53	30

(Source: WFP, evaluation report, 2010).

Figure 4: Food Distribution by WFP Nepal (M. Tons)



The above chart shows the food distribution pattern by WFP Nepal. The food distribution has increased over time. Consequently, the expenses on food have also increased over time.

Food and Nutrition Level

Nepal had exported food and live animals worth Rs 3.5 billion 1998 and import was Rs.7.7 billion only. Nepal is investing huge amount to purchase food items, therefore, Nepal has lack of funds to invest in other sectors such as irrigation, research and development onagriculture sector. However, government has increased the investment in agriculture sector but the output from agriculture sector is not considerable.

The main feature of food security is the access of sufficient food to all people at all time. There is a need to conduct a study of food situation which may include health survey, nutritional survey or even food consumption survey. The nutritional situation is more important than food availability. The households are not producing sufficient food but consuming through other systems like purchase, exchange of food through labour and other property. Some surveys have been conducted in the country and revealed that nutritional status of children has been deteriorating. According to 1975 national survey the chronic malnutrition rate were 48.1 percent and acute malnutrition children rate were 6.6 percent. Similarly the survey of 1995 revealed that 63.5 percent of children were suffering from chronic malnutrition and 6percent have acute malnutrition. The 1997 Family Health Survey showed that 48.4percent children were suffering from chronic malnutrition and 11.25percent were acute malnutrition. Nutritional surveys were also conducted in 2001 and 2006. Both of these surveys showed the nutritional status of people especially children are in alarming situation. Nepal Living Standard Survey 2003/04 and Demographic and Health Survey, 2006 have similar results in context of malnutrition.

Table 7: Poverty and nutrition insecurity in Nepal.

Region	Poverty Rate (percent)	Population not getting minimum calorie (percent)	Stunting among children below 5 year (low height) (percent)		Underweight children below 5 years (percent)		Wasting (low weight for height) among under 5 years) (percent)	
			2001	2006	2001	2006	2001	2006
Ecological regions								
Mountain	32.60	45.20	61.40	62.30	45.10	42.40	5.30	9.40
Hill	34.50	41.80	52.40	50.30	41.40	33.20	5.90	8.40
Terai	27.60	37.40	47.30	46.30	48.40	42.30	13.30	16.60
Development Regions								
Eastern	29.30	37.60	47.60	40.30	43.40	32.90	9.10	10.10
Central	27.10	39.90	50.00	50.00	44.70	38.20	10.80	13.80
Western	27.10	37.20	50.40	50.40	43.40	38.50	8.90	10.90
Mid-Western	44.80	44.30	57.90	57.90	49.00	43.40	8.80	11.60
Far-Western	41.00	44.90	52.50	52.50	48.90	43.70	8.80	16.70
Nepal	30.80	39.90	50.40	49.3	45.2	38.6	9.6	12.6

(Source: WFP, CBS and WB, 2006, USAID, MOHP, 2007)

Above table shows that near 40percent people are consuming less than 2240 Kcal in 2003/04 which is a minimum requirement. Stunting among the children below 5 years age have remained more or less from periods 2001 to 2006, however, the underweight situation has significantly declined in same periods from 45percent to 37percent. The wastage had grown in these periods and variation in malnutrition especially Kcal was more in Mountain and Hill areas. The Nepalese Terai area has severe problems and Mid-Western and Far-Western regions have more serious problems as compared to other regions.

There are various factors which play vital role of nutrition on children. The other factors are valance, illiteracy, sanitation knowledge, health status, role of woman in household (generally woman care children more), food distribution practices at home, fertility rates, family size and structure of family. The cultural practice of Nepal has another problem on nutrition because the role and place of woman in society is lower than their male counterparts. Similarly woman and children generally eat food after the turn of family head and male person.

Conflict and food insecurity

The 11 year long armed conflict (From Year 1996 to 2007), called Communist Party of Nepal (Maoist), destroyed infrastructure and contributed 13,326 human lives in Nepal. The internal displacement of people, blood-shed war, regular strikes and blockades of transportation, schools and colleges strikes, offices, industry and trade disturbance by different political parties and other

rival groups, restrictions on the movement of people, commodities, extortion of money, conscription of young people in armed (militant) and instable government are the main causes of food insecurity in Nepal. Since the conflict was guided by political ideology; victims were all people who had not supported them by wealth and other resources. Although, the slogan of the war was 'poor kind' but poor and working class people badly suffered much by the so-called peoples' war. Different regions and different class people experienced the severity of the problems as the area most affected had already a food problem. The Nepalese Society, already suffering from caste conflict, gender conflict, that is structural and cultural conflict, badly affected by food problem especially women and children. Many conflicts were in existence during the war of Communist Party of Nepal Maoist (CPN, Maoist). Different efforts and attempts have been made to identify the problems added by the CPN, Maoist, with regard to food security in Nepal, even though, Nepal has food insecurity before the CPN, Maoist war.

The conflict intensity varied one region to another. The people especially from Mid-Western, and Far-Western Development Region suffered more from the conflict. The rival group had established centres in the Hill and Mountain villages in the Mid-Western and Far-Western regions, therefore, the people of these areas adversely affected by the food insecurity. Furthermore, the government forces insurgent in these area and local people got dual pressure from rebels and government. The conflict made food insecurity in different ways such as (a) decrease in food production (b) less income and employment opportunities (c) loss of productivity of land and households (d) inter-migration, displacement (e) reduction in food stock (f) increase in child malnutrition and food price (g) destruction of infrastructure and basic services (h) decrease in natural assets (i) reduced social safety and community trust (j) less supply of food from government and other bodies.

Even though, the war is over but the villagers still have fear from rebel groups, conflict groups and other militants. People are still moving in more safe area from Hill and Mountain. The prices of food crops are high in present by which lower income level people cannot afford it. Displaced people cannot afford green vegetable or sufficient rice or other cereal grains to feed own children. The main alarming areas are conflicted area where children are suffering from lack of education too. More than 90percent of children in conflict area are seriously suffered from malnutrition. The nutrition projects, government schemes are phasing out from these areas (Newar, 2005). The 70 percent death rate of Nepalese Children is especially caused by malnutrition. The 63 percent Nepalese Children are not getting enough-protein-energy food to maintain physical and mental functions. The 52 percent children have stunted growth and suffer from learning disabilities (Newar, 2005).

Problems and Policies

The global burning issue, climate change, is compounding these systematic problems and adding many alarming signals on food security. The government's policy of reducing involvement in developing infrastructures is main reasons for declining agricultural production in recent years. In addition, agricultural production is constrained by the lack of irrigation, fertilizers and seeds. There are no effective mechanisms to control and monitor the quality of these inputs. The main priority of government in the 1970s era was to uplift the agriculture sectors and one third annual budget had covered from agriculture. The same amount reduced by 16 percent in 1980s, 12 percent in 1990s and 2.5 percent (amount NRs 5.9 billion out of NRs 285.9 billion) in 2000s. The donors' investment is adding pace on Nepalese agriculture sector. In 1990s-1995s, 10 percent of the foreign aids were allocated in agricultural sector. In early of 2000s, it was reduced to 4.1 percent. The government of Nepal is investing little bit more amount compared to past years (Economic Survey, 2010).

The Agricultural Prospective Plan (APP) 1996 brought 20 years ambitious target to increase agricultural production through massive investment in irrigation, research and input supply. But

this policy partially implemented due to lack of resources. The government of Nepal launched another Agricultural Policy in 2004 with the main aim was to increase production by replacing the subsistence based production with professional and commercial agricultural system to make Nepalese farmers more capable to compete. In 2009, the government tried to make change on the policy to provide subsidy on fertiliser but it has not been implemented.

Most of the Nepalese farmers have small size of farm. About 60 percent of households can produce food for six months only (National Planning Commission. 2008. Three Years Interim Plan) another 25 and households are landless (Adhikari, 2008). The distribution of land is unequal and the overall available land in Nepal is not managed scientifically. The land reform policy in Nepal has been a politically contentious issue since there is debate regarding the modalities of land reform. A large size of marginal farmers in Nepal either cultivate for others or work as semi-bounded or bounded labours and cultivate for others or as rental basis. The rent charge is higher than half of production and is lack of tenure security.

One of the department The Agricultural Information and Communication (AIC) of the Ministry of Agriculture and Cooperative works for information through media about nutrition and another department of Food Technology and Quality Control (DFTQC) is responsible to get quality of food through establishing quality standards and monitoring compliance with these. Furthermore, DFTQC generates food quality in terms of nutrition and safety. There are other departments such as Department of Agriculture, Department of Livestock, Department of Cooperatives and Centres for Research and Seed. The main aims of these departments are to contribute on nutrition.

The policies of other bodies are summarised below:

SNV Nepal has focused on to reduce poverty by selecting cash crops with high returns and employment potentiality for marginalised persons, increasing social and environmental responsibilities and to enable effective social inclusion by addressing the needs of the disadvantaged and socially excluded groups within selected value chain.

WFP and MOAC carried out a joint mission to assess the crop situation and to look at its implication to household food security. WFP is providing life-saving food for more than 3.5 million vulnerable people in 60 districts out of 75 district of Nepal. WFP is distributing food to 2.7 million people who are affected by conflict and have no purchasing power under food assistance programme. Furthermore, internally displaced people (IDPs) and children associated with armed groups and armed forces are also getting food assistance to ease return and reintegration into own communities. The programme foundation for healthy minds and bodies' programme of WFP is more effective by providing fortified food to vulnerable women and children through school feeding and maternal and child healthcare. Incentive to girls for regular school attendance is another important and effective programme where WFP is providing them cooking oil, cooking utensils with food. More than 102,000 Bhutanese refugees are benefitted through WFP since 2001 in Nepal. The mission and objectives are:

- To verify the summer crop production estimates through field mission in different regions of the country.
- To analyse the impacts on national food supply situation as well as household food security; and
- To recommend appropriate policy and programme recommendations to Govt. of Nepal.

WFP Nepal made a target to feed 1.6 million people in 2010 providing 45,000 M. Tons foods in twenty-six food insecure districts. The operation aims to target the most food-insecure populations

affected by conflict, high food prices and/or natural disasters and to provide a social safety net while supporting to create economic opportunities and productive assets to restore livelihoods. The targeted districts are mostly in the Mid and the Far- Western Hills and Mountains with a few districts in the Eastern Hills and Mountains.

The basic infrastructure, such as irrigation and drinking water systems, ponds and water harvest tanks, micro-hydro schemes and storage facilities, small-scale enterprise activities shall establish orchards and cultivate medicinal and aromatic crops to generate income and reduce community vulnerability to food security, climatic variability and food price hikes. In areas prone to floods, disaster risk reduction activities will focus on slope stabilization, soil conservation, and the construction/rehabilitation of dams and river embankments are another project of WFP Nepal.

Government of Nepal the main planning of the Government of Nepal are:

(i) Allocating Budget for livestock planning amount NRs1billion. Micro investment planning will be implemented through small farmer cooperative and small farmer development bank.

(ii) Fund is added in existing budget for "special agriculture programme for Karnali", which contributes on transportation of manure, seeds and irrigation facility.

(iii) NRs 27.5billion budget is granted for the purchase of chemical and biological manure.

(iv) Fifty percent of grant is allotted for the small farmers of Nepal on the purchase of purifying machine of cardamom, ginger, tea, coffee, honey.

(v) Agro-insurance is encouraged and fifty percent grant is allotted.

ActionAid

This organisation has emphasised on the farmers' right on agriculture and has provided food rights, education rights for school children, health cooperation on different regions of Nepal. The major rights are:

(i) Right to traditional knowledge relevant to plant genetic resources for food and agriculture,
(ii) Right to equitable participation in sharing benefits that arise from the utilisation of plant.
(iii) genetic resources for food and agriculture
(iv) Right to participate in making decisions, at the national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture, and
(v) Rights to save, use, exchange and sell farm-saved seed/propagating material, which can be stated as right to seed including the right to compensation (ActionAid, 2004).

Nepal Food Corporation (NFC)

NFC has transported 73,882 Quintal rice in 2005/06 in different areas of Nepal. Similarly, the supply of food by NFC was 109750.11 quintals in 2006/07, 111755.28 in 2007/08, 175140.49 in 2008/09, 183310.26 in 2009/10 and 120552.42 in 2010/11 (preliminary).

In 1974/12/02, The Government of Nepal established Nepal Food Corporation with following objectives:

(i) To implement food policy of government.

(ii) To purchase food crops, collection and transportation of food, construction of warehouses in different parts, sale and disbursement of food.

(iii) To keep required balance of food.

(iv) To establish mills and factories for the purification of food items.
(v) To manage grant food from other countries.
(vi) To import and export of food items.

Government of Nepal has been providing large subsidy to NFC to supply food for remote areas for effective distribution. Even though this brings heavy financial burden to these areas' people where no transportation facility. The question always arises whether the real benefit is reached to insecure households or not supplied by NFC. In 1975, Jumla was hit by famine and government has supplied food by air lifting. Karnali is known as most alarming zone and subsidy is allotted 40 to 50 percent. The subsidised food in Karnali either taken by politicians or wine makers. The government of Nepal supplied food for teachers and people in 1998 with 60 percent subsidy. Rice supplied in Karnali is not sufficient to meet the demand of people (Khadka, 1999). In the late 1990s, government subsidised NRs 250 million for the food transportation in Karnali and NFC has been receiving less than NRs 225 million to transport food in whole country. The local production of is, however, expensive than government food that's why people are not interested in food production due to cheaper subsidised food.

Summary

Food insecurity is the main problem of the present world. Developing and under –developed countries are facing the problem more than developed countries however, these under-developed or developing countries have the agro-based economy. The Mountain and Hill area have alarming situation of food security compared to Terai region in Nepal. The low productivity employment, shrinking land size due to internal migration, climate change, unequal distribution of land, traditional farming system, small size of farm land, dependent on natural rain for the harvest are the major food problems in Nepal. In addition, the political situation of the country is worsening after the revolution at year 1989. The 11 years civil war in Nepal destroyed infrastructure and life of more than 13, 000 general civilians. Most of people in the affected area of so-called civil war suffered from homelessness situation and the fertile land converted into barren and it decreased food production. In addition to this, the regular strikes, blockades of transportation, school, college, industries, private organisations, extortion of money, conscription of youth in armed forces and instable government are the main causes of food insecurity. It is seen that the government of Nepal is not seriously planning and implementing agriculture policies rather than the fight for the political chair. The government based organisation NFC is distributing edible rice in some more food unsecured areas but the amount is not considerable enough. Most of the agro-based problems are increasing year to year and causing more food insecurity in Nepal.

International non-government organisations especially WFP is playing main role to overcome the problem in Nepal after 2005. WFP has invested huge amount of money and has some ambitious planning in Nepal to solve the food insecurity problem. The other INGOs including SNV, Action - Aid Nepal, Oxfam, FAO, UN-Food security department, World Bank, Asian Development Bank are acting to solve the poverty as well social problems.

Nepal Rastra Bank