DETERMINANTS OF INFLATION WITH SPECIAL REFERENCE TO WAGES IN NEPAL

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Abstract

With a view to study whether the wage increases are the most significant sources of cost-push inflation, price equations inclusive of different forms of commonly available money wages along with other relevant variables are estimated across the different regions of the country. Carpenter's wage in Kathmandu and agricultural laborer's wage in Terai were found to be significant wage variables to exert pressure on the movement of the national prices. Granger Bivariate Causality Test done to see the cause and effect relationship between money wages and rate of inflation revealed the unilateral causation effect running from the rate of inflation to masonry wage in Kathmandu and agricultural labor wage in Terai while the reverse course was seen running from the industrial laborer's wage to the rate of inflation.

Nepalese Labor Market

Labor market in Nepal has been characterised by an imbalance between increase in labor force and job opportunities. High growth rate of population is inducing corresponding growth in the labor force. Majority of the increased labor force has to join the agriculture sector, since the employment opportunities in other productive sectors of the economy is limited. Labor market in Nepal is typically beset with the problem of underemployment than that of unemployment. During 1985, only 3.1 percent of total labor force was estimated to be openly unemployed wherein 63 percent of the total unemployed labor force

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in rural areas and 44 percent of the force in urban areas, was unemployed.[1] It shows that the degree of lack of employment opportunities is more in rural areas than in urban areas. That is, unemployment problem is much severe in agriculture sector than in non-agriculture sector. The need to shift population from agriculture to non-agriculture sectors has been realized for a long time. The Seventh Plan had, therefore, aimed to generate increased opportunities for productive employment through increasing investment in projects and through improving the quality and skills of indigenous labor force. Likewise, the Eighth Plan has mainly emphasized to promote skilled manpower required for development by creating congenial environment for both national and foreign employment opportunities. The ultimate aim of the Plan was to phase out the unemployment and underemployment situation existing in the country through maintaining balance between demand for and supply of labor. The Ninth Plan has also followed the same policy of making investment in development projects so that employment opportunities in the rural areas can be extensively increased. It has also laid emphasis to create environment for increasing opportunities for self employment and encourage private sector participation in such programs.

Labor Production, Employment and Wage Rate

As per the population census of 1991, the total number of economically active population was 7.3 million. Agriculture was the single largest sector which provided employment to 5.9 million people. On the assumption of an increment of labor force by 250 thousand every year after 1991, the labor force is estimated to grow by additional one and half million by the year 1997. Because of limited existing facilities for skill development in labor force, the total number of skilled and semi-skilled labor produced by the institutions such as the Department of Small and Cottage Industries, the Small Industries Development Board and the Department of Labor are estimated at seven thousand annually which is 3.5 percent of the new labor force that enters into the market annually. The results of the 1995/96 Nepal Living Standards Survey (NLSS) show that the rate of unemployment[2] in the country is 4.9 percent. The survey also reveals that the unemployment rate in Kathmandu is the highest i.e. 14.7 percent followed by other urban areas at 10.7 percent. The unemployment rate in the rural Hills ranges between 2.6 percent to 3.0 percent while in the rural Terai it is 3.9 percent to 7.5 percent. Of those employed in the country, over 82 percent spent the majority of their time in agriculture wherein 72

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1 The unemployed labor force may be more than the estimated figures. The problem lies with the definition of the term 'unemployment'. The Approach Paper to the Ninth Plan has estimated 14 percent of the total labor force as unemployed.

2 A person is defined as " unemployed " if he or she did not work during the previous seven days, and was available and looked for work or did not look for the following reasons : awaiting reply from an agency, waiting to start a new job," there is no work ", " don't know how to look. "

percent engaged as self-employed farmers and 11 percent as agricultural wage laborers. Likewise, the remaining 18 percent are employed outside agriculture of which 10 percent are working as wage earners and eight percent as self employed. Although, exact information about the underemployed labor force are not currently available, it is guessed that the labor force in agriculture and service sectors -the two largest employing sectors, is underemployed massively. The NLSS data indicate that 21.5 percent of those classified as employed worked less than 20 hours a week, 25.5 percent worked between 20 and 39 hours while 53 percent for more than 40 hours.

Regarding the wage rates, the government has arranged the fixation of the monthly minimum wages in industrial establishments. After the revision in the labor law in 1992, the monthly minimum wages in 1993/94 were fixed at Rs. 1150, Rs 1200, Rs. 1310 and Rs. 1500 for unskilled, semiskilled, skilled and highly skilled industrial laborers respectively. All of these categories are entitled to get Rs. 150 as dearness allowance on top of the wages. Effective September,1997 wage rates are revised and the new rates are respectively Rs. 1300, Rs. 1350, Rs. 1460 and Rs. 1650 for unskilled, semiskilled, skilled and highly skilled laborers. The wage rate for minors (age between 14-16 years) is fixed at Rs. 1025. A dearness allowance of Rs. 500 on top of that has been added while for minors an allowance of Rs. 375 is provisioned. It is believed that the actual monthly minimum wages of those laborers are much more higher than the government stated ones in private industrial establishments.

The foregoing discussion manifests that labor market in Nepal is in infant stage of development and there is a need for government intervention at different stages. The minimum wages fixed for workers of different levels of skill, are by and large at par with the salaries of the lower level employees in the government service. Since general wage level in the public sector jobs is supposed to be lower than the ones in the private sector, the recommended minimum wages are also lower than the prevailing wages in the market. The wage rates of other types of laborers such as masons, carpenters, agri-laborers and general laborers are, however, determined in the market itself. So far no government intervention has been observed. Thus, the Nepalese labor market can be considered as an imperfect labor market.

Some Theoretical Concepts about Money Wage and Inflation

Money wages tend to rise in response to the pressure of excess demand in the labor market. Wage increases are probably one of the most significant sources of cost-push inflation. This is so because in modern economies, full employment policies have been actively pursued by the governments. The relationship between excess demand in the labor

market and wage inflation was empirically examined by A.W. Phillips in 1958. He obtained an inverse relationship between the rate of unemployment and the rate of change in nominal wages and the curve derived from it is now widely known as Phillips Curve. Here the reciprocal of the rate of unemployment is assumed a proxy for the excess demand for labor.

Some economists believe that the trade-off between wage (or prices) changes and unemployment is only a transitory phenomenon. In the long run, the trade-off relation is held not to exist. In other words, a negatively slopped Phillips Curve exists only in the situation of unexpected price changes. Another version of the inflationary expectation hypothesis emphasizes the imperfection of labor markets. It is argued that there exists a certain amount of 'search unemployment' at any moment of time since the labor markets are beset by incomplete information of both laborers and employers concerning current wage rates elsewhere in the economy. Starting from an equilibrium situation wherein the actual rate of wage increase is equal to the expected rate of wage increase, an increase in aggregate demand results in a higher rate of wage increase relative to expectations of the wage increase elsewhere.

World Inflation and Wage

There are a number of channels for transmission of the world inflation into the domestic economy. Exchange rate is one of them. As the price of imported goods rise in the world market, their prices in domestic currency also rise in a country that maintains fixed exchange rate. In an economy wherein wealth and substitution effects combine to cause exchange rate changes to influence real output in the short-run, the responsiveness of wages to external price shocks greatly reduces the ability of exchange rate changes to insulate the domestic economy from such shocks. Various wages not only increase the sensitivity of domestic prices to foreign price shocks, but cause flexible exchange rates to exacerbate the influences of foreign prices of the domestic economy. Flexible exchange rates provide, at best, only partial price insulation from foreign price increases (Purvis, 1979).

Applicability of Phillips Curve in LDC Context

Past studies have analyzed inflation in the context of monetarist and structuralist viewpoints. The applicability of Philips Curve in the LDC context is, however, controversial. It is because that empirical findings under the theoretical framework of Phillips Curve were mostly found to be negative which were attributed mainly to:

a) measurement errors which are likely to be greater in LDCs ;
b) specification errors which arise from the problems of omitted relevant variables such as weather, exchange rate, terms of trade etc. ;
c) greater instability of prices, money supply etc., and,
d) simultaneous equation bias.

Nevertheless, it is proposed that the theoretical framework of Phillips Curve be applied in Nepalese context so as to see the behavior of price movements in relation to the changes in unit labor cost.

The Model

Nugent and Glezakos (1982) argued that the Phillips Curve's existence, although valid for developed countries, should not be expected to apply to LDC's and they found rather an inconsistent relationship between inflation and unemployment. On the backdrop of this argument, a model based on 'Expectation Augmented' Phillips Curve is proposed in general, where excess demand as proxy for unemployment has been included as one of the explanatory variables. That is,

$$P = a + bM + cC + d\,(W-p) + fR + gS + e$$

where, P = price level
M = money supply
C = total consumption
W = money wage
p = labor productivity
R = degree of regulation
S = degree of market structure
e = error term

The difficulty in using the above equation is the absence of relevant data and measurement proxies which necessarily happen in the underdeveloped countries. As such, no significant relationship could be empirically expected between price change and national consumption. In other words, as is common, the consumption is at a very low level and the increased income is absolutely used in consumption and also, in many cases, the consumption is maintained even by dissavings. Corollary, the consumption tends to be inelastic to the inflationary changes. The time series data are not available to compute labor productivity and degree of regulation and is also difficult to measure them. The

proxy to measure degree of market structure as imports to GNP is expected to hardly bear influential impact on overall price changes as National Consumer Price Index do not contain the prices of majority of goods imported from third countries. The alternative price equation is, therefore, proposed here for our cause to estimate the relationship between price changes and wage changes :

$$P = ao + a1\ GDPR + a2\ M + a3\ W + a4\ PI + a5\ PE + e$$

where,

	P	=	annual inflation rate as measured by CPI
	GDPR	=	real output growth
	M	=	change in money supply
	W	=	change in money wages
	PI	=	change in imported price
	PE	=	change in price expectation
	e	=	error term.

For the purpose of this study, the above equation is estimated using real output, alternative forms of money supply, wholesale prices of India as imported prices, different forms of money wages and price expectation. While using the different forms of money supply, narrow money, narrow money averaged during the fiscal year, narrow money plus savings deposits averaged at the end of the period are the principal variables that are considered in regressing the price equation. Likewise, four forms of money wages such as wages for agricultural laborers, carpenters, masons and industrial workers are selected based on the criteria that the related time series data are easily available and are very common form of money wages prevalent in the country. Giving insight into the nature of movement of these variables, it is , however, noticed that except for money wages for masons and carpenters, other forms of money wages show either erratic movements (for agricultural laborers) or movements not responsive to market demand (for industrial laborers). Since there is abundant practice of using family labor as agricultural labor as well as on labor exchange basis with the friends and relatives, the changes in money wages for this group are non-responsive to the market demand and highly erratic in nature. Likewise, as wages for industrial workers are fixed by the government and very infrequent changes have been made by the government in money wages for industrial laborers revealing clearly that movements in money wages for industrial labor are far from the market demand. Considering these factors, growth in money wages for masonry and carpentry are therefore, selected as the desired variables indicative of genuine representative of the labor market in Nepal. The wholesale price index of India (WPII) is chosen as another relevant independent variable because the movement in WPII not only

affects the movement in CPI in Nepal but also it affects the movements in money wages due to its implicit impact on migratory behavior of these laborers leading to changes in the labor charges accordingly.

With regards to the choice of domestic output, gross domestic product at constant price denotes real output. In case of money supply variable, three alternative forms of it i.e. narrow money at the end of the period, narrow money annual averaged and narrow money plus savings deposits annual averaged are selected. Broad money is not chosen for estimation procedure against the backdrop that better performance has been shown by narrow money over broad money in the price equation estimated in the past studies (Khatiwada,1994; Mathema,1996). And finally expected rate of inflation is measured in terms of the difference between one year lagged inflation and current year inflation. The national CPI has been chosen for measuring the rate of inflation though it could have been substituted by CPI for Kathmandu and CPI for Terai region. As all the variables except the money wages are on aggregative basis, it is felt plausible to select national CPI for the required estimation procedure.

Annual data for the period between 1978/79 and 1995/96 are used for the purpose of the study. Based on the assumption that behavior of wages with respect to price changes may vary across the capital city and the Terai regions because of the principal differences in the type of major activities and therefore the requirement or demand for different kinds of labor, separate price equations are tested for Kathmandu and Terai. The Hills region is avoided as no data series on unit labor cost are available for the Hills. All the dependent and explanatory variables are used in the form of annual percentage changes. Besides, annual averages of month-end values for narrow money are also exercised to see the relationship between inflation and various forms of money supply. Before embarking on the estimating procedure which is the Ordinary Least Square technique, Unit Root Test is done to test the stationarity of the variables chosen for the estimating procedure.

Analysis of the Estimated Results

Unit Root Test

Time series data requires to be tested for knowing whether the series in question satisfy the condition of stationarity. As the non-stationary variables give rise to so called spurious relationships thereby leading to incorrect statistical inference, the test is also required to develop stationary time series data. With a view to identifying the stationarity of the data used in the regression, a Unit Root Test is done of the variables like annual rate of changes in Consumer Price Index (CPI), narrow money at the end of the

period (M1), average narrow money at the end of the period (AM1), narrow money plus savings deposits annual average (AMS1), real output (GDPR), wholesale price index of India (WPII), agricultural labor wage for Kathmandu (AL), industrial labor wage for Kathmandu (IL), carpenters' wage for Kathmandu (MC), masonry wage for Kathmandu (ML), agricultural labor wage for Terai (ALA), industrial wage for Terai (ILA), carpenter wage for Terai (MCA) and masonry wage for Terai (MLA). The selected method of unit root test is the augmented Dickey-Fuller (ADF) - 1981 method based on the arbitrarily chosen lag lengths. The results of ADF test for unit roots are presented below.

Table 1
Unit Root Test Results

Series	Constant/Trend	No. of Lags	ADF 't' Statistic
CPI	Constant	1	-3.0521**
GDPR	Constant	1	-3.8877*
M1	Constant	1	-3.0521**
D(AM1)	Constant	1	-3.9228*
D(AMS1)	Constant	1	-3.0659**
PT	Constant	1	-3.8877*
WPII	Constant	1	-3.8877*
AL	Constant	1	-3.9228*
IL	Constant	1	-3.1222**
MC	Constant	1	-3.0659**
ML	Constant	1	-3.9635*
ALA	Constant	1	-3.0659**
D(ILA)	Constant	1	-3.9635*
MCA	Constant	1	-2.6745***
MLA	Constant	1	-3.0659**

* Significant at 1 percent level
** Significant at 5 percent level
*** Significant at 10 percent level

The ADF regressions are run using the intercept variable. The results show that the series GDPR, PT, WPII, AL and ML are stationary at 1 percent level of significance. The series CPI, M1, MC, IL, ALA and MLA are stationary at 5 percent level of significance. The series AM1, AMS1 and ILA are found non-stationary at their level values and therefore the ADF regressions are run for these series in their first order difference form. It is found

that first order difference of the series AM1 and ILA are found stationary at 1 percent level of significance while that of AMS1 at 5 percent level of significance. Thus, all the series in question except AM1, AMS1 and ILA are integrated at zero order while the above mentioned three series AM1, AMS1 and ILA are integrated at first order.

Confirming the stationarity of the dependent variable and selected explanatory variables, the OLS technique is used for various regressions in time series data covering eighteen years period. As the two forms of monetary variable i.e. AM1 and AMS1 and the unit labor cost of industrial labor (ILA) in Terai are found non-stationary while the dependent variable CPI and other prominent variables are found to show their mean, variance and co-variances constant over time in their level values, co-integration test is purposively avoided to see the establishment of long run relationship within the time-series data. As such, the regression function of AM1, AMS1 and ILA are done with first-order difference technique. After going through regression results of a number of equations, four relevant forms of price equations are selected to explain the determinants of prices with special reference to the wage variable.

The regression results show that of the four types of prominent variables chosen for unit labor costs, money wage of carpenter for Kathmandu turns out to be significant variable to explain the movement of prices in the country. The equation is estimated using real output, narrow money, price expectation and money wage for carpenter in Kathmandu as the explanatory variables, the empirical result of which is given below :

$$CPI = 2.50 + 0.09\,GDPR + 0.27\,M_1 + 0.37\,PT + 0.20\,MC \text{ ------(1)}$$
$$(0.71) \quad (0.45) \quad (1.90)^{***} \quad (3.10)^{*} \quad (2.25)^{**}$$

Adjusted $R^2 = 0.60$ F-statistic = 7.46 DW = 1.79

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* Significant at 1 percent level

** Significant at 5 percent level

*** Significant at 10 percent level

The explanatory power of this equation is at the acceptable level i.e. 60.0 percent. The coefficient of narrow money is statistically significant at 10 percent level. It implies that the current level of money supply and CPI do not have strong relationship with each other. Rather it verifies the notion that prices in Nepal are affected by money supply mostly after a certain lag of time (See, Inflation in SEACEN countries: Its Causes and Management- Nepal Chapter, 1996). It also suggests that a ten percent change in narrow money causes 2.7 percent in the rate of inflation. Likewise, the inclusion of expected rate of

inflation as the explanatory variable has shown the evidence of strong relationship between price expectation and inflation rate. The variable PT is significant at 1 percent level and the coefficient on it suggests that a ten percent change in price expectation brings about 3.6 percent change in the rate of inflation.

One most relevant variable as underlined in the objective of the study is change in the unit labor cost of carpenter in Kathmandu. Among the four labor cost variables such as for agricultural labor, industrial labor, mason and carpenter, unit labor cost of carpenter is found to establish significant relationship with the rate of inflation at 5 percent level of significance. The coefficient on money wage of carpenter shows that a 10 percent change in it brings 2 percent change in the rate of inflation. It supports the contention that changes in the unit labor cost do have significant effect on the movement of prices. The insignificant and wrong sign on the coefficient of real output supports results of the past studies that domestic output in Nepal has not been successful to exert a dampening effect on domestic prices.

The inclusion of wholesale prices of India as imported prices in the second equation did not improve the quality of the estimation. The estimated equation is as follows :

$$CPI = -0.05 + 0.07\ GDPR + 0.34\ M1 + 0.33\ PT + 0.19\ WPII + 0.18\ MC \quad ..(2)$$
$$\qquad\quad (-0.01) \qquad (0.33) \quad (2.17)^{**} \quad (2.60)^{*} \qquad (1.05) \qquad (1.98)^{***}$$

Adjusted $R^2 = 0.61$ F-statistic = 6.24 DW = 1.90

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* Significant at 1 percent level

** Significant at 5 percent level

*** Significant at 10 percent level

The explanatory power of the equation is hardly improved to 61 percent. The coefficients on both real output and wholesale prices of India show insignificant relationship with the rate of inflation. As in the previous equation (1), the coefficients on expected rate of inflation and narrow money are significant at 1 percent and 5 percent respectively. An increase or decrease in the effects in absolute terms has been noticed in both the coefficients of narrow money and price expectation in the second equation. As such, a 10 percent change in narrow money brings about 3.4 percent change (up by 0.07 points) in the rate of inflation while a 10 percent change in price expectation causes 3.3 percent change (down by 0.04 points) in the rate of inflation.The coefficient on unit labor cost of carpenter is significant at 10 percent. A 10 percent change in the unit labor cost of carpenter will induce 1.8 percent change in the rate of inflation.

Thus the inclusion of WPII variable in the group of explanatory variables has not resulted in improvement in the explanatory power of other variables in broad sense. However, the insignificant coefficient of WPII indicates that the effect of changes in WPII could have been absorbed by money wages of carpenter as the open border with India along the southern, western and eastern parts of Nepal having free mobility of goods and services across the border would accordingly allow money wages to move in the direction WPII moves.

The significant impinge exerted by money wage variable (Kathmandu) on the rate of inflation is also due to the broad nature of activities that carpenters do. The carpenters are engaged throughout the year in the main market centers of the country and their services are utilized not only in the construction activities but also for furniture requirements of public and private offices, and households too. This enables unit labor cost for carpenters to move in accordance with the market demand and thus possess significant bearing on the movement of prices in Nepal.

Several regressions were run using different forms of money supply as one of the explanatory variables in the price equation. The best result was obtained only with narrow money (M1) as the intermediate monetary variable. The results of other price equations using AM1, AMS1 as the monetary variables are therefore considered not important for their implication on price changes.

In case of price equation fitted with unit labor cost in Terai as the money wage variable, unit labor cost of agricultural labor is found to show better relationship with the national price indices. The result of the price equation estimated using real output, narrow money, price expectation and unit cost of agricultural labor in the Terai is as follows :

$$CPI = 3.93 - 0.28\ GDPR + 0.19\ M1 + 0.15\ WPII + 0.44\ PT + 0.27\ ALA \quad ..(3)$$
$$(1.03) \quad (-1.25) \quad (1.22) \quad (0.81) \quad (3.81)^{*} \quad 2.26^{**}$$

Adjusted $R^2 = 0.63$, F. Statistic = 6.87, DW = 1.43

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* Significant at 1 percent level.

** Significant at 5 percent level.

The explanatory power of the equation has improved further to 63 percent. The coefficient of GDPR has the expected negative sign though it is not statistically significant. The constraint in the degree of freedom might have attributed to this

insignificant result. As usual, it can be asserted that a meager growth in real output during most of the years of review period is responsible for being unsuccessful to exert dampening effect on domestic price.

The coefficients of M1 and WPII are also found to be insignificant owing to the causes explained earlier. Only the significant coefficients are of PT and ALA which show significant relationship with the rate of inflation at 1 percent and 5 percent level respectively. The results indicate that a 10 percent change in price expectation will bring 4.4 percent change in the rate of inflation.

The coefficient on unit labor cost of agricultural laborer (Terai) suggests that a 10 percent change in it would induce 2.7 percent change in the rate of inflation. The significant relationship with the rate of inflation shown by this variable can be attributed to the fact that agricultural laborers are marketed frequently in the Terai region because of big farmsize and demand for them during different phases of production from land preparation to the harvesting period. In addition, the demand for agricultural labor during the cropping season across the border in India also brings remarkable fluctuations in the wages ultimately impinging the pressure on prices. That is, money wage for agricultural laborer in Terai is more or less determined by the demand and supply position of the market. From this, it is revealed that the money wage for agricultural labor in Terai has a strong bearing on the movement of prices.

Following the same concept as realized earlier that withdrawal of wholesale price index of India as the explanatory variable from the price equation would improve the quality of the price equation with money wage as the main explanatory variable, another form of price equation is estimated which is shown below:

$$CPI = 6.13 - 0.29\,GDPR + 0.12\,M1 + 0.48\,PT + 0.30\,ALA \quad \ldots\ldots (4)$$
$$(2.32)^{**} \quad (-1.35) \quad (0.95) \quad (4.69)^{*} \quad (2.66)^{**}$$
$$\text{Adjusted } R^2 = 0.64,\ \text{F- Statistic} = 8.65,\ DW = 1.25$$

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* Significant at 1 percent level.

** Significant at 5 percent level.

Adjusted R^2 of the equation (4) is 0.64 revealing a further improvement in the explanatory power of the equation. As observed in the past equations, the coefficients on real output and narrow money are statistically insignificant. The coefficient on price expectation is significant at 1 percent level suggesting that a 10 percent change in price expectation can induce 4.8 percent change in the rate of inflation. The coefficient on

agricultural labor wage (Terai) shows significance at 5 percent level. It also suggests that a 10 percent change in wage for agricultural labor would bring 3 percent change in the rate of inflation. The significant coefficient of constant term at 5 percent level indicates that the equation is probably lacking in some additional relevant variables that would exert pressure on the prices.

Similar equations replacing unit labor cost of agricultural labor by industrial labor, carpenter and masonry are also estimated. However, the price equations do not show any significant relationship between these three selected forms of unit labor cost and the prices. It can be argued that since industrial labor wage is fixed and determined by the government, it has no competitive power to affect the prices in general. Similarly, carpenters and masonries are not employed throughout the year in Terai and there is less demand for their services even in the on seasons. Movements of money wages of these groups are very rare and so are their effects on general prices. So, unit labor cost of agricultural labor is the only wage variable which can exert pressure on the rate of inflation in Terai.

Causality Test

In a bid to identify the causal relationship between different forms of unit labor costs and consumer price index, the Granger Bivariate Causality Test is carried out in eight combinations of (i) CPI and AL (ii) CPI and IL (iii) CPI and ML (iv) CPI and MC (v) CPI and ALA (vi) CPI and ILA (vii) CPI and MLA and (viii) CPI and MCA. Two time series data on the growth rates of AL, IL, ML, MC, ALA, ILA, MLA, MCA and consumer price index (CPI) for the period 1978/79 - 1995/96 are used for the test. The test for looking at causal relationship between CPI and other explanatory variables in question are omitted as the related study is already done in the past (Inflation in SEACEN Countries : Its Causes & Management - Nepal Chapter, 1996).

A unit root test is also carried out to test for the stationarity in the series before launching on causality test. Selection of lag length in the causality test is, however, done on arbitrary basis. As a matter of fact, the selection of the lag length is of prime importance in causality tests. The reason is that too many lags may reduce the number of effective observations while too few lags may affect the size of the test. The conclusions can be reversed with the size of the lags used in the test. In general it is better to use more lags rather than fewer lags, since the theory is couched in terms of the relevance of all past information. Considering the possibility of resulting in overlooking the existence of significant impact due to premature truncation of the lag length, the autoregressive least square estimation is limited arbitrarily in lag length one as the data used for estimation

procedure are annual data. The Granger Causality Test results based on the arbitrarily chosen lag length are presented in Table 2.

Table 2
Bivariate Granger Causality Test Results

Null Hypothesis		No. of lags	F–Value	Significance Level
1.	CPI → AL	1/1	0.446854	0.5147
	AL → CPI	1/1	0.138763	0.7151
2.	CPI → IL	1/1	0.016821	0.8991
	IL → CPI	1/1	5.366590*	0.0408
3.	CPI → ML	1/1	4.665397*	0.0486
	ML → CPI	1/1	1.066844	0.3192
4.	CPI → MC	1/1	0.049214	0.8276
	MC → CPI	1/1	2.229796	0.1576
5.	CPI → ALA	1/1	3.100593**	0.1001
	ALA → CPI	1/1	0.003517	0.9536
6.	CPI → ILA	1/1	1.145933	0.3025
	ILA → CPI	1/1	4.707688*	0.0477
7.	CPI → MLA	1/1	0.009705	0.9229
	MLA → CPI	1/1	2.091009	0.1702
8.	CPI → MCA	1/1	0.251178	0.6240
	MCA → CPI	1/1	0.727118	0.4082

* Significant at 5 percent level.
** Significant at 10 percent level.

The results of Granger's causality test reveals that there is no direct causal relationship between agricultural labor wage of Kathmandu and consumer price indices (CPI). Similar results are noticed between carpenter wage of Kathmandu and CPI,

masonry wage of Terai and CPI and carpenter wage of Terai and CPI. The unidirectional causality is, however, detected from industrial unit labor cost of Kathmandu to CPI at 5 percent level of significance. The same is detected from industrial labor cost of Terai to CPI at 5 percent level of significance. There is also an unidirectional causation running from CPI to masonry wage of Kathmandu at 5 percent level of significance while from CPI to agricultural labor wage of Terai at 10 percent level of significance.

The analysis of the results of Granger's causality test suggests that the increase in wages of industrial labor both in Kathmandu and the Terai assists in the prediction of the rate of inflation. This is practically true in the sense that the minimum wages of industrial labor in Nepal are fixed by the government. Whenever the government revises the wages of the industrial labor it has direct speculation effect on the movement of prices. The unidirectional causation running from CPI to masonry wages indicates that the change in the national price indices do create the base for the changes in masonry wages. This assertion could hold true in case of causation effect to carpenter wage (Kathmandu), which has shown rather weak significance at 20 percent level. The increase in the degree of freedom could have improved the result. That is, it can be fairly concluded that the movement in the monetary wages of mason and carpenter in Kathmandu can be predicted with the movement in the prices. However, it can also be inferred that no cost-push impact of wage hike on inflation could be realized (as shown by unidirectional relationship between inflation and wage rate) due to existence of very small market of masonry in the country.

The causality test with the money wages in Terai and CPI brings us to a strong conclusion that the agricultural labor wage in Terai add significantly to the explanation of the movement in consumer price indices. This conclusion can be supported by the fact that the increase in the money wages of agricultural labor across the border would create less supply of the agricultural labor in the domestic labor market. This would raise the wage prices of the agricultural labor and therefore will have upward impact in the cost of production. The consequent effect is the rise in the prices of the agricultural commodities. As the weight of the agricultural commodities–particular foodgrain in the composition of consumer price indices is very high (around 30 percent) the rise in the prices of foodgrains would induce increase in overall prices.

Conclusion

With an aim to examine as to whether the wage increases are the most significant sources of cost-push inflation, a price equation inclusive of different forms of commonly available money wages along with other relevant variables is estimated. The empirical

results of the estimation show that the behavior of wages with respect to the price changes indeed vary across the different regions as hypothesized earlier. It is found from the study that wage for the carpenter in Kathmandu is the most pertinent variable to bring significant change in the consumer price indices while the agricultural labor wage in Terai has been identified as the only significant factor that exerts pressure on the movement of the prices. The study reveals that a 10 percent change in money wages for carpenter in Kathmandu could bring 2 percent change in the rate of inflation. Likewise, a 10 percent change in wages for agricultural labor in Terai will induce 3 percent change in the rate of inflation. The study also suggests that the inclusion of wholesale prices of India as the import prices in the price equation does not hold its importance when the money wages as another relevant variable is included in the equation. The probable reason could be due to the absorption of the effect of changes in WPII by the money wages of laborers in the homeland. This is possible as there is free mobility of goods and services to and from across the open border with India along the southern, western and eastern parts of Nepal which would allow the money wages to move in the direction WPII moves.

It has been somewhat mandatory to see whether the selected series are stationary or not before making any empirical estimation. A unit root test is therefore employed in the study to see the stationarity of the variables in question. The series including CPI as the dependent variable and other relevant explanatory variables are found to be integrated at zero order i.e. I (0). Only the three independent variables such as ILA (industrial labor wage of Terai) and two forms of money supply i.e. AM1 (narrow money averaged at the end of the period) and AMS1 (narrow money plus saving deposits averaged at the end of the period) are found integrated at first order i.e. I (1).

The notion that money wages may or may not increase at the same pace as the rate of inflation increases or vice-versa, is an issue which brings the researchers to see whether there exists cause and effect between them. If it exists, it is interesting to know whether the causation effect is unilateral or bilateral in nature. The results of the Granger Bivariate Causality Test carried out for money wage variables and rate of inflation reveals that causation effects of some forms of money wages are reversed from Kathmandu region to Terai region. It is found from the test that the changes in the wages of industrial labor both in Kathmandu and Terai do assist in creation of the background for the prediction of the rate of inflation. While the changes in the rate of inflation do have causation effect on masonry wage of Kathmandu and agricultural labor wage in Terai. The reverse results obtained in causation effect between industrial labor wage and masonry wage of Kathmandu plus agricultural labor wage in Terai could be attributed to the condition of their mode of determination. As is known to all that minimum industrial

money wage is fixed by the government at certain intervals of time, it creates amicable background to induce the movement in prices. And since masonry wage and agricultural labor wage are purely market determined, the rise in prices could stimulate the increase in money wages.

The policy implication of the above study is that the government needs to recourse the promotion of training institutions required for generating labor force such as masons. This will intensify the production of number of masons so that there does not exist scarce supply of masons for productive construction activities. It will ultimately help in pulling the adverse effect of rise in masonry wages on the rate of inflation. Likewise, the government should be able to either check the movement of agricultural labor across the border or assist in the increase of agricultural labor wage so that the scarcity of agricultural labor during the cropping season can be effectively avoided. The optimum availability of the agricultural labor will have positive impact in maintaining the cost of production at appreciable level. This will in turn, help in containing the prices of the agricultural products and thereafter the national price indices. Alternately, the government should be vigilant to create the environment for increasing the agricultural production activities so that the domestic agricultural labor need not to migrate seasonally across the border.

The practice of fixing minimum wage for industrial labor by the government is not high-sounding as the wage rate is believed to be much below the actual market rate. The insignificant result of regression equation with the industrial labor wage could be attributed to this cause. Moreover, the wage fixation practice generates a speculating background for the upward movement of consumer price indices. The government should, therefore, follow either fixing the minimum wage close to the market rate or abolish the existing practice of fixing the minimum wage by the government. The unilateral causation effect seen running from CPI to masonry wage in Kathmandu and agricultural labor wage in Terai leads us to conclude that if the inflationary pressure is not controlled at the desired level over time, it will generate spiralling effect on money wages of masons and agricultural laborers.

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