Sensitivity of the Trade Openness in Nepal

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Abstract

In this paper, Openness Growth Monitoring (OGM) Model is applied to examine the various aspects of trade openness like vulnerability, sensitivity and harmonization as well as the impact of trade openness on per capita income growth for the period of 1990/91 to 2010/11. The results suggest that overall trade openness vulnerability of Nepal is low with the manufacturing and service sector being more open in comparison to the agriculture and energy sectors. While there is strong performance of the openness growth rate for the review period, the average ratio of the openness growth and per capita income growth both with nominal income, is negative. The results indicate low sensitivity of per capita income growth to the trade openness growth. The findings reveal that the productivity benefits from additional trade are higher for the trading partners of Nepal than itself. Hence, it is argued that Nepal has liberalized trade without introducing appropriate internal policies and institutions.

JEL classification: A11, C12

Key words: External sector, sensitivity, trade liberalization, vulnerability

I. INTRODUCTION

The impact of trade liberalization on a country's development has been a controversial topic and a concern of debate among the economists around the world, particularly in developing countries. Reviewing the literature suggest that the experience of many countries with free trade leads to enhancement of the efficiency of resource allocation, international competitiveness and also increases the volume of trade, which in turn enhances the growth rate of exports. Therefore, trade liberalization is an important component of any strategy seeking to increase growth. On the other hand, the skeptics argue that freer trade would adversely affect the poor in both short and long run, are internal contradictions in new economic policy packages. Despite this, most of the countries around the world have moved towards greater trade liberalization initiatives, with Nepal a land locked LDC, not being an exception.

Prior to 1990, Nepal followed a inward looking trade strategy. However, the market-oriented economic reforms undertaken in early 1990s, resulted in trade liberalization

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which led to intensification of integration with the world economy. This is evidenced from the fact that Nepal's trade openness ratio which is the ratio of trade volume with national income increased substantially over the last two decades from about 23 percent during 1980s to more than 40 percent by the end of 1990s. During the 1990s, there was a distinct rise in the ratio of merchandise export to GDP. Exports growth during the period (1991-1994), was driven mainly by export of manufacturing growth (Karmacharya, 2004: 366). Then after, it did not regain the peak as in the early 1990s except in 1999 and 2000.

The essence of external sector discussion is that macroeconomic policies followed by one country, in a globally integrated world, do not affect the economy of that country alone but also have repercussions on the economies of other countries.[1] In such scenario, one important question that Nepal has to face is 'what is the role of trade liberalization in economic growth?' Therefore, it is essential to know the sensitivity of external sector and its impact on the growth of the domestic economy, so that a better trade policy would be formed to diversify trade by identifying, developing, and producing new exportable products through identification of new markets and making export trade competitive and sustainable. In this paper, Openness Growth Monitoring (OGM) Model has been applied to examine the vulnerability, sensitivity and harmonization of the trade openness. The model has been supported by the findings of a first order difference regression equation, for examining the impact of trade openness growth on the per capita income growth in Nepal.

The rest of the paper has been organized as follow. The next section describes the post liberalization assessment of Nepal's external sector followed by methodology in section three. Section four and five describes the model and empirical results respectively. Section six concludes the paper.

II. NEPAL'S EXTERNAL SECTOR: POST-LIBERALIZATION ASSESSMENT

The share of Nepal's trade in GDP has registered an impressive figure in recent years. The average trade share was 32.35 percent of the GDP during 1990-94 and increased to 39.21 percent in during 1995-99 (Table 1). In FY 2010/11, it has remained 33.89 percent of the GDP. On average, it remained about 36 percent during post liberalization period. Clearly, the trend of Nepal's trade towards global economic integration is gathering momentum. In skeptic term, it can also be concluded that dependency of Nepal has been increasing on the world economy. During 1990-94, the average share of merchandized export to GDP was 8.63 percent and it went up to 11.84 percent during 2000-04. After that, average value faces a declining trend. In 2010/11, the share of merchandized export

1 For example, in 2001, two treaties came into effect in the USA, namely the African Growth and Opportunity Act and Caribbean Basin Trade Partnership, which grants producers in sub-Saharan Africa and the Caribbean preferential access to the USA market. This can be considered as negative policy shocks for Nepal. In fact, the country which depends heavily on export demand for a sustained growth in its GDP has to rely heavily on the trade related policies of the trading partners at present.

to GDP is 5.11 percent only. Its average value for the whole review period is found to be 9.25 percent. On the other hand, the average share of import for the whole review period is 26.68 percent. Thus, during these two decades of trade liberalization, the share of Nepal's export to its GDP has not changed much; while the share of import has shown a drastic jump. Further, the recent figures of share of export to GDP have shown a declining trend.

Table 1 : Nepal's External Sector Indicators (5 years average), 1990 – 2010

(as % of GDP)

Indicators	1990-94	1995-99	2000-04	2005-09	2010/11	Average	Volatility
Merchandized Export	8.63	9.76	11.84	7.58	5.11	9.25	0.27
Merchandized Import	23.72	29.45	25.38	27.73	28.78	26.68	0.12
Total Trade	32.35	39.21	37.22	35.31	33.89	35.93	0.11
Trade Deficit	-15.10	-19.69	-13.54	-20.15	-23.67	-17.43	0.25
Balance on Goods & Services	-9.64	-10.10	-12.39	-21.35	-24.30	-13.89	0.42
Current Account Balance	-5.97	-4.38	3.11	1.35	-0.88	-1.44	3.0

Source: Economic Survey (various issues), Ministry of Finance, GoN.

The average share of trade deficit was only 15.1 percent of GDP during 1990-94 which reached to 23.67 percent in 2010/11. Thus, the gap between total export and total import values is large and it signals supply constraints that Nepal has been facing. This also signals a loss of competitiveness by domestic companies in the international market. It seems true to some extent as unionized strike, road blockade and increasing load-shedding have caused rise in the cost of production. As a result, the export competitiveness of the Nepalese product has decreased in the international market. According to a report of World Bank (2007:16), initially Nepalese exports were affected by the dampened external demand following the world-wide economic downturn after September 11. Nepalese exports were then hurt by the unfavorable terms of the 2002 Trade and Transit Treaty with India through which India imposed quantitative restrictions on four key Nepalese goods. Subsequently, Nepalese goods have been losing out in the international marketplace due to increased competition, and the phase out of the Multi-Fiber Agreement (MFA).

The deficit of balance on goods and services is a crucial matter for developing countries as it is the extent to which the country is dependent on the outside world. For Nepal, it was about 10 percent of the GDP during 1990-94. In two decades of trade liberalization, it has increased to 24 percent of the GDP in FY 2010/11. For Nepal as a developing country, it is not a new thing, but of course, it is not a good sign. In the 1980s and 1990s, many developing countries had resource gaps equivalent to 20-30 percent of GDP. In 1997 Lesotho's was around 85 percent of GDP though it was down to below 50 percent in 2001 (Guide to Economic Indicators, 2006: 138).

III. METHODOLOGY

The present work follows a two-step procedure. First, the Openness Growth Monitoring (OGM) model has been applied for studying various aspects of the trade openness like vulnerability, sensitivity and harmonization. In the second step, multiple regressions have been run using the first differences of the variables to examine the impact of trade openness on per capita income.

A. Openness Growth Monitoring (OGM) Model

The OGM-Model is based on the following steps in its application:

Step-1: Measurement of Degree of Trade Openness by Sectors (Oi)

The trade openness (total trade divided by GDP) of Nepal has been divided into four basic sectors, viz. (i) Agriculture (Oa), (ii) Manufacturing (Om), (iii) Energy (Oe), and (iv) Service (Os). Where, Oi (for i = {a,m,e,s} is the sum of Exports (X) and Imports (M) of the 'i' sector divided by the Gross Domestic Product (GDP). This indicator shows the comparative openness by sectors.

Step-2: Measurement of Harmonization of Trade Openness (HO)

Harmonization of trade openness is equal to the maximum value minus the minimum value of the trade openness by sectors in the same year divided by the trade openness vulnerability (OV), i.e.

$$HO = (Max\ Oi,t - Min\ Oj,t)/OV \quad \ldots\ldots (1)$$

where 'Oi' and 'Oj' are the trade openness of two different sectors ($Oi \neq Oj$) in the same year 't'. The trade openness vulnerability is the average trade openness of a sector. In our case, OV = (Oa+Om+Oe+Os)/4.

HO shows the trend of the liberalization process in any country from a global perspective. HO is useful in the policy making that help to improve the harmonization of different production sectors.

(i) If HO is equal to 3, trade openness is considered to be proportional, which indicates a good openness in all sectors of productions.

(ii) If HO is equal to 2, then its trade openness is acceptable, that is, a good performance, but no harmony to open all sectors in the same level.

(iii) If HO is equal to 1, then its trade openness is non-proportional, that is, a non-balance in the openness of the different sectors.

Step-3: Measurement of Trade Openness Growth (ΔOG)

Trade openness growth is the proportional change in the value of trade openness vulnerability in a given time period (t) in reference to preceding period (t-1). Mathematically,

$$\Delta OG = (OV_t - OV_{t-1})/OV_{t-1} \quad \ldots\ldots (2)$$

Hence, the trade openness growth (ΔOG) is an approximation of the changes that a country may experience in the evolution of its economic liberalization. Its value is based on the results of the trade openness vulnerability (OV). It can demonstrate strong or weak openness in a specific period of time. If ΔOG is positive (+), then the country experiences strong trade openness growth and if ΔOG is negative (-), then the country experiences weak trade openness growth.

Step-4: Sensitivity Analysis

The ratio of trade openness growth (ΔOG) to the per capita income growth (ΔPCI) measures sensitivity of foreign trade. The indicator can be used to test whether trade openness growth influences per capita income growth. For this, a graph showing the trends of trade openness growth and per capita income growth is drawn, being both measured along Y-axis. The trend of both the variables is then compared simultaneously. If ΔOG and ΔPCI, both move in the same direction (either increase or decrease), then economy has high sensitivity to trade openness growth. If ΔOG and ΔY move in the opposite direction, then economy has low sensitivity to trade openness growth.

B. Regression Model

The regression model applied here is a supportive model for the verification of the finding of the sensitivity analysis. Basic theme of the sensitivity analysis is to measure the effect of trade openness on per capita income, i.e. PCI=f(OPEN). However, this functional relation shows a direct impact of openness on PCI. Openness may also influence indirectly through investment rate. Further, the level of PCI may also depend on the level of the development of the economy. Hence, an interaction term (lnGDP*lnOPEN) has been introduced in the equation (3) to test whether the impact of trade openness varies by the level of development by testing the statistical significance of the coefficient β_4. The point estimate of the direct impact of trade openness on per capita income growth is given by ($\beta_3 + \beta_4 lnGDP$) in the following equation:

$$lnPCI = \beta_0 + \beta_1 lnGDP + \beta_2 lnIR + \beta_3 lnOPEN + \beta_4 (lnGDP*lnOPEN) \quad \ldots\ldots (3)$$

where PCI is the GDP per capita; IR is the investment rate (as percentage of GDP) and OPEN is the trade openness, all measured in the natural logarithm.

C. Data

The paper uses annual data for the period from 1990/91 to 2010/11 obtained from Economic Survey and Population Monograph. The population estimates have been made

through extrapolation and interpolation when there was absence of data. The variables have been transformed to natural log while using in the econometric analysis make coefficient more meaningful.

IV. APPLICATION OF OGM-MODEL AND FINDINGS

Degree of Trade Openness and Openness Vulnerability

In spite of having considerable opportunities for Nepal to improve its trade by exporting hydropower and premium agricultural products such as tea, processed fruits and vegetables and spices, its trade openness in the agriculture and energy sector has been found to be low in the post liberalization period. These sectors share 3 percent and 2 percent only (Table 2). Actually, the benefits of WTO tariff reductions on Nepalese agricultural exports have been marginal given that Nepal is an inefficient producer and has become a net food importing country in recent years. In addition, Most Favored Nations provisions have played a relatively small role in influencing trade and determining the level of protection to import competing sectors to Nepal. This is because of Nepal's heavy reliance on bilateral trade with India. India's tariff regime seems to be quite restrictive compared to other South Asian countries in case of agriculture. The simple average tariff in India on agricultural products is 40.1 percent. The inter-regional trade agreements of SAEs (South Asian Economies) such as the Asia Pacific Trade Agreement (APTA) and the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BMITST-EC) do not embody significant numbers of concessions relevant to agricultural trade. In addition, none of these agreements have explicitly addressed domestic support and export subsidies in agriculture or the use of anti-dumping regulations.

As shown in Table 2, Nepal's trade openness is comparatively higher in manufacturing (20 percent) and service sectors (14 percent). Despite low level of supply elasticity and an early stage of industrialization, liberalization appears to have some impact on industrial structure in Nepal. The results indicate some structural changes in manufacturing output and trade orientation following the liberalization program. Export intensity rose significantly, despite poor productivity performance of export oriented industries in the post-liberalization period. This appears to be due to the lucrative export incentives under the generalized system of preferences (GSP) scheme which did not put real pressure to improve efficiency.

In the services sector, Nepal has made commitments in 11 sectors and 70 sub sectors. Nepal has made horizontal commitment to keep the first three modes of service supply (cross border trade, consumption abroad and commercial presence) generally unrestricted except for some conditions. Further, it has kept the mode 3 horizontal market access unrestricted and has made a further commitment to make the conditions of ownership, operation and juridical form and scope of activity for foreign suppliers no more restrictive.

However, the trade openness vulnerability of Nepal in aggregate is 9.6, which has been considered to be low[2]. The openness vulnerability of Nepal ranges between 6.4 in FY 1990/91 to 12 in FY 1995/95. The low trade openness vulnerability can be attributed to the low share of agriculture and energy sectors in the trade openness.

Further, when these four sectors are observed on the level of volatility, energy sector is the most volatile sector (0.44) followed by service sector (0.37) and agriculture sector. The manufacturing sector is the least volatile sector (0.19). This indicates that the manufacturing and agriculture sectors have been performing with more consistence than others.

Table 2 : Trade openness of various production sectors and Openness vulnerability 1990-2010

	1990-94	1995-99	2000-04	2005-09	2010/11	Average	Volatility
Trade openness	37.4	47.7	36.7	34.1	28.3	38.4	0.19
Agriculture	2.1	3.3	4.2	3.7	3.0	3.3	0.27
Manufacturing	17.9	23.3	20.6	17.1	14.1	19.4	0.19
Energy	0.8	1.5	1.8	2.8	2.7	1.8	0.44
Service	16.6	19.7	10.1	10.5	8.5	13.9	0.37
Openness vulnerability	9.3	11.9	9.2	8.5	7.1	9.6	---

Source: Table 4 given at the annex.

Harmonization of Openness and Openness Growth Rate

During the period 1990-2010, harmonization of the trade openness (HO) for Nepal is found acceptable. This indicates a good performance, but no harmony to open all sectors in the same level. This fact is reflected in Nepal's degree of trade openness by sectors, as trade openness in the manufacturing and services sectors is higher than that in the agriculture and energy sectors (Table 3).

The openness growth rate of Nepal varies between (-) 17.55 in FY 2010/11 to 25.86 percent in FY 1991/92. Out of 20 observations, the openness growth rate is negative for 9 years and is positive for 11 years. Thus, for 9 individual years the performance of the openness growth rate is weak and for 11 individual years, it is strong. The average openness growth rate of Nepal is found to be just positive (1.19). It indicates that the performance of the openness growth rate is strong during 1990/91-2010/11, but the standard deviation of the variable is very high (σ = 12.44). Therefore, the overall performance of the openness growth rate is highly volatile.

2 Since the trade openness vulnerability is the average openness of a sector, its maximum value should not exceed 25 (100 divided by 4). The openness vulnerability of Nepal is 9.6, which is even below its half value.

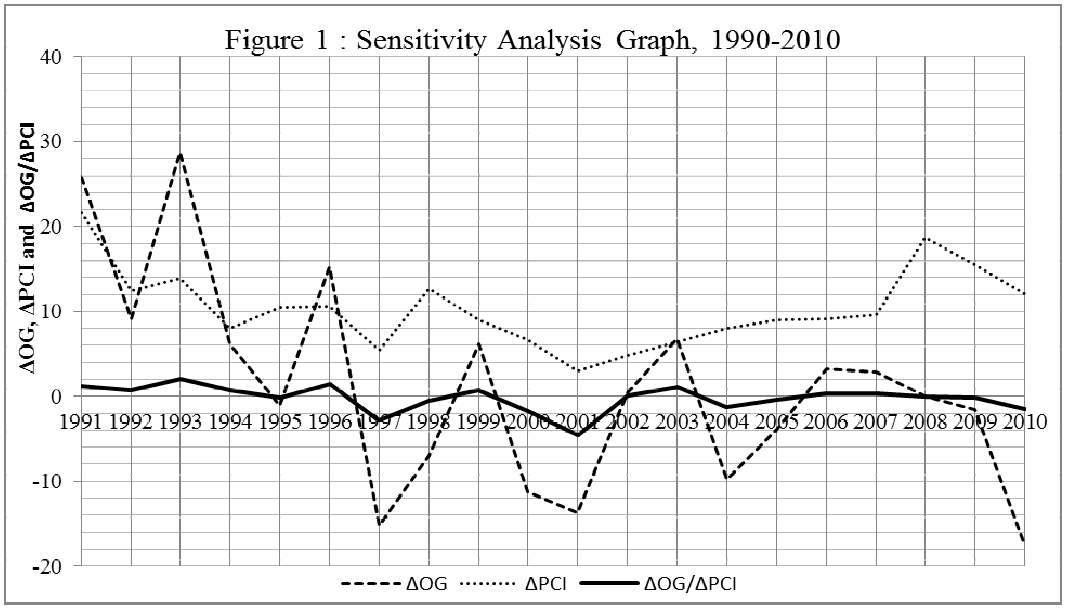
Table 3 : Harmonization of openness, 1990-2010

	1990-94	1995-99	2000-04	2005-09	2010/11	Average
Harmonization of Openness (HO)	1.8	1.8	2.0	1.7	1.6	1.8
Openness Growth rate (ΔOG)	17.46	-0.36	-5.50	0.13	-17.55	1.2
|ΔOG/ ΔPCI|	1.19	1.11	1.71	0.24	1.45	1.08

Source: Given in annex 1.

Sensitivity Analysis (ΔOG/ ΔPCI)

During the review period, Nepal has a satisfactory income growth rate, an average of 10 percent, but it saw negative values in openness growth rate for 9 separate years. Both growth rates move in opposite direction for 9 observations, and move in the same directions for 12 observations (figure 1). The average ratio is found to be negative for the entire period. The ratio, being negative value indicates that the impacts of both the growth rates have moved in opposite direction, hence the indication of low sensitivity of per capita income growth to the trade openness growth. To measure the degree of sensitivity, the absolute value of the ratio has been considered. It is found that the absolute values lie within 2 (table 3), except for two cases[3]. This assures the low level sensitivity[4] of per capita income growth to the trade openness growth.



3 In FY 1993/94, it is 2.07 and in 1997/98, it is 2.81.

4 If the absolute value < 2, it's low level sensitivity. If it lies between 2 and 4, medium level sensitivity and if it is greater than 4, it is high level sensitivity (Ruiz Estrada, 2005: 26, table 1).

V. FINDINGS OF THE REGRESSION MODEL

Results from Stationarity

We conduct unit root tests for five variables used in the Model. The test results are presented in the table 4. The absolute calculated values are less than the corresponding McKinnon critical values at levels of variables. Hence, the null hypothesis cannot be rejected. However, the null hypothesis is rejected when the first difference of the variables are taken. Thus, all variables are found to be I(1).

Table 4: Unit Root Tests

Series	ADF statistic		Degree of Integration
	Level	First difference	
lnPCI	-2.75	-3.48*	I(1)
lnGDP	-2.08	-3.56**	I(1)
lnIR	-2.06	-4.71***	I(1)
lnOPEN	-3.37	-3.91**	I(1)
lnGDP*lnOPEN)	-3.28	-3.88**	I(1)

***, ** and * indicate 0.01, 0.05 and 0.10 level of significance respectively based on Mackinnon's critical values.

Regression Results

After confirming that all the series are integrated of order one, I(1); equation (3) is estimated using the first differences of the variables. Equation 4 shows the estimate.

$$\Delta lnPCI = -0.01 + 0.99\Delta lnGDP - 0.09\Delta lnIR - 2.32\Delta lnOPEN + 0.18\Delta(lnGDP*lnOPEN) \quad \ldots\ldots(4)$$
$$(-1.10)\ (11.8)^{***}\quad (-3.40)^{***}\quad (-2.34)^{**}\quad (-2.9)^{**}$$
$$R^2 = 0.93 \quad \text{Adj } R^2 = 0.92 \quad F = 56.36^{***} \quad DW = 1.34$$

****& ** indicate statistically significant at 0.01 and 0.05 level respectively.*

The coefficient of investment rate (IR) in equation (4) is negative showing that the indirect impact of trade openness on per capita income is negative. Though, this interpretation is valid statistically, but it does not seem logical. Actually, the impact of trade openness on per capita income through investment rate has been examined by controlling other potentially important factors such as the level of human capital, which is complementary to physical investment, and geographic and institutional factors. This, therefore, might have caused the unexpected behavior of IR.

Next, the interaction term is statistically significant at five percent level and positive, while the coefficient of the trade share itself is negative. This implies that the productivity benefits from additional trade are higher for the trading partners of Nepal than itself. Actually, this situation occurs for an economy that tries to specialize in the export of primary products.

At this moment, it is difficult to conclude the reasons for this perverse switch in the benefits of trade. Nevertheless, two hypotheses come in mind. First, to the extent that trade promotes growth by acting as the conduit of international technology transfer, it is conceivable that the benefits of the trade changed due to changes in the nature of technology being transferred. The nature of technology transfer may have changed to highly complex process, such as information and communication technologies, for which the Nepal lacks the requisite human capital and physical infrastructure. Second, it is possible that in spite of adoption of relatively free trade policies, Nepal may have also adopted a variety of internal growth friendly policies. In order to provide clear policy guidance for the future, further research is clearly required to disentangle these hypotheses.

VI. CONCLUDING REMARKS

Nepal, after trade liberalization policy reforms started in 1990s, has experienced many ups and downs in its economic and political conditions. The findings suggest that Nepal's trade openness in the agriculture and energy sector has been found to be low, 3 and 2 percent respectively, while it is relatively higher in manufacturing (20 percent) and service sectors (14 percent). Despite low level of supply elasticity and an early stage of industrialization, liberalization appears to have some impact on industrial structure in Nepal. The results indicate some structural changes in manufacturing output and trade orientation following the liberalization program. The openness of the service sector is high because of Nepal's horizontal commitment to keep the first three modes of service supply (cross border trade, consumption abroad and commercial presence) generally unrestricted.

The overall trade openness vulnerability of Nepal has been found to be low. The value of harmonization of trade openness indicates a good performance, but no harmony to open all sectors in the same level, which is reflected in Nepal's degree of trade openness by sectors. The average openness growth rate of Nepal is found to be marginal positive (1.19), which indicates that the performance of the openness growth rate is strong during the review period, but the standard deviation of the variable is very high. Therefore, the overall performance of the openness growth rate has been concluded to be highly volatile. During the review period, Nepal has a satisfactory nominal income growth rate but it saw negative values in openness growth rate for 9 separate years. Further, the average ratio of the openness growth and per capita income growth is negative, suggesting that the productivity benefits from additional trade are higher for the trading partners of Nepal than itself.

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ANNEX 1 : The Findings of OGM model, 1990-2009

Indicators	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Trade Openness (Oi)	25.7	32.3	35.3	45.4	48.2	47.7	55.0	46.6	43.4	46.0	40.8
Agriculture Sector (Oa)	2.0	2.7	2.2	1.7	2.0	2.4	2.5	3.6	4.0	4.0	3.8
Manufacturing (Om)	12.4	15.8	18.0	21.6	21.7	22.4	27.2	22.2	19.9	24.8	24.1
Mineral Fuel (Of)	0.8	0.7	0.7	0.8	1.0	1.5	1.4	1.6	1.4	1.5	1.6
Service (Os)	10.5	13.1	14.5	21.3	23.4	21.5	23.9	19.2	18.0	15.7	11.4
Openness Vulnerability (OV)	6.4	8.1	8.8	11.3	12.0	11.9	13.7	11.7	10.8	11.5	10.2
Harmonization of Openness (HO)	1.8	1.9	2.0	1.8	1.7	1.8	1.9	1.8	1.7	2.0	2.2
Openness Growth rate (ΔOG)	---	25.86	9.14	28.72	6.15	-1.03	15.27	-15.20	-6.97	6.12	-11.23
Income Growth Rate (ΔPCI)	---	21.70	12.44	13.90	8.02	10.42	10.65	5.42	12.66	8.98	6.65
Sensitivity Analysis (ΔOG/ΔPCI)	---	1.19	0.73	2.07	0.77	-0.10	1.43	-2.81	-0.55	0.68	-1.69

Indicators	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	Average
Trade Openness (Oi)	35.2	35.4	37.8	34.1	32.8	33.8	34.8	34.8	34.3	28.3	38.45
Agriculture Sector (Oa)	4.2	4.3	4.6	4.0	3.9	3.9	4.0	3.6	3.2	3.0	3.3
Manufacturing (Om)	19.5	19.9	20.3	19.0	17.4	17.2	16.4	16.5	17.9	14.1	19.4
Mineral Fuel (Of)	2.1	1.8	1.7	1.9	2.3	2.7	2.7	3.0	3.1	2.7	1.8
Service (Os)	9.4	9.3	11.1	9.2	9.1	10.0	11.7	11.8	10.1	8.5	13.9
Openness Vulnerability (OV)	8.8	8.8	9.4	8.5	8.2	8.5	8.7	8.7	8.6	7.1	9.6
Harmonization of Openness (HO)	2.0	2.1	2.0	2.0	1.8	1.7	1.6	1.5	1.7	1.6	1.8
Openness Growth rate (ΔOG)	-13.73	0.39	6.82	-9.72	-3.94	3.18	2.88	0.09	-1.54	-17.55	1.19
Income Growth Rate (ΔPCI)	3.03	4.78	6.47	8.04	9.06	9.12	9.56	18.73	15.54	12.07	10.36
Sensitivity Analysis (ΔOG/ΔPCI)	-4.5	0.08	1.05	-1.21	-0.43	0.35	0.30	0.00	-0.10	-1.45	-0.21

Source: Economic Survey (various issues), Ministry of Finance, GoN.