

Understanding the Structural Shift and Trade Elasticities with Bordering Nations of India

Nazira Mazumder and Avijit Debnath

Abstract

The impact of liberalization on macroeconomic variables has remained a subject of debate in several forums, and volume of trade is not an exception. Though, most research studies have shown that liberalization had positive effects on India's trade performance. But these studies are mostly aggregated studies in the sense that they have considered total volume of trade. It is very difficult to find studies which examine the impact of liberalization on India's trade with the bordering nations. Another limitation of the previous studies is that while inspecting the impact of liberalization they have exogenously targeted '1991' as the year of shift. In order to remedy these neglects, this article attempts to examine the presence of endogenous shift, if any in exports and imports data during the study period. By realizing this objective we will come to know whether there is any impact of liberalization policies on India's trade. Another objective is to examine whether bilateral trade elastic ties (price and income) are significantly different between trading partners. This will help us to understand whether a single trade policy to enhance trade is justified or not. The study is conducted for the period 1980-2012 collecting data from International Monetary Fund and National Accounts of United Nations.

Key Words: Liberalization, Endogenous break.

I. INTRODUCTION

THE impact of liberalization on macroeconomic variables has remained a subject of debate in several forums, and volume of trade is not an exception. On the theoretical ground, [12] offer an extensive survey of the macroeconomic effects of trade tariffs based on different theoretical frameworks, including the income-expenditure approach, the monetary approach, and the inter-temporal approach. The authors maintain that the effect of trade liberalization on the trade balance is not unambiguous.

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The effect depends on the behavior of real wages and exchanges rates, on the values of a variety of elasticities, the degree of capital mobility, and whether the tariff shock is perceived as temporary or permanent. The impact of trade liberalization on the trade balance, therefore, needs to be investigated empirically. But despite this necessity, there are very limited studies in India on impact of trade liberalization on export and import. Most empirical studies on trade liberalisation in India adopt the narrow approach of analysing its impact on output (GDP) growth, without considering whether growth is sustainable and consistent with long- run balance of payments (BOP) equilibrium. It is very difficult to find studies which examine the impact of liberalization on India's trade with the bordering nations. Since the impact of trade with bordering nations on the domestic economy is thought to have more spillover effects compared to trade with non bordering nations particularly when those trades with bordering nations are executed through road and water ways, therefore, a study on impact of liberalization on trade with bordering nations seems interesting and highly warranted. Another limitation of the previous studies is that while inspecting the impact of liberalization, they have exogenously targeted '1991' as the year of shift. I believe that such approach of exogenously targeting a particular year in order to examine the affect of a policy change is not very scientific. Since, economic variables have lag effects, therefore the impact of liberalization may be realized after a span of time is passed. Moreover, such span of time may itself be different for trade with different nations. Thus, there is a need to examine the impact of liberalization on trade using an endogenous approach. In order to remedy these neglects, this article attempts to examine the presence of endogenous shift, if any in exports and imports data during the study period. By realizing this objective we will come to know whether there is any impact of liberalization policies on India's trade. Another objective of the present study is to examine whether

bilateral trade elasticities (price and income) are significantly different between trading partners. This will help us to understand whether a single trade policy to enhance trade is justified or not. After this introductory note, section 2 deals with theoretical literature on price and income elasticity of trade. The details of data source and methods used in the present study are reported in section 3. In section 4, findings and its analysis have been described. Conclusion obtained from the study is reported in section 5.

II. CONCEPTUAL FRAMEWORK

A. Relationship between Exchange rate and Trade

Exchange rate is the domestic currency price of the foreign currency. In economics, the term currency appreciation and currency depreciation describes the movements of the exchange rate induced by the market fluctuations. Appreciation or Revaluation means decrease in the domestic price of the foreign currency. Generally, an appreciating currency is good for an economy's importers as they import more goods with the same nominal amount as before. In other words, an appreciating country hurts a country's exporters as foreign countries will need to use more of their own currencies to acquire the same amount of goods and services. On the other hand, Depreciation or Devaluation means increase in the domestic price of the foreign currency. Depreciation can positively impact the overall economic development. It boosts competitiveness through lower export costs and secures more income from exported goods. On the contrary, depreciation makes import more expensive and discourages purchases of imported goods stimulating demand for domestically manufactured goods. However, the effectiveness of devaluation in improving trade balance depends on whether the Marshall-Lerner condition holds. According to the Marshall-Lerner condition, devaluation will be successful in improving trade balance if the sum of the price elasticities of the demand for exports and demand for imports is greater than unity. Since a devaluation or depreciation of the exchange rate implies a reduction in the price of exports, the quantity exported will increase. At the same time, the price of imports will rise and their quantity demanded will diminish. The net effect of these two phenomena – greater quantities of exports at lower prices and diminished quantities of more expensive imports – depends on import and export price elasticities. If exported goods are price elastic¹, their

¹ Demand is said to be relatively elastic when the percentage change in demand is more than percentage change in price. This means that the

quantity demanded will increase proportionately more than the decrease in price, and total export revenue will increase. Similarly, if goods imported are elastic, total import expenditure will decrease. However, the effect will be different if the goods are price inelastic². The short run and long run effects of devaluation can be different; the immediate impact of devaluation is the rise in import value of the economy in domestic currency, while export value will remain unchanged and therefore, in the short run trade balance will deteriorate. Over a longer period of time, the export and import volumes will react to the changes in the relative prices and will result in an improvement in trade balance. Thus, a devaluation of the exchange rate will affect trade balance through price and volume effects, the former effect of the devaluation leads to the deterioration of the trade balance, and the latter effect contributes to the improvement of trade balance—generating the famous “J-curve” effect³. At the same time, the high export elasticity means higher prospects for success of the real devaluation for generating the export revenues [14].

There are numerous scholars who have worked on the effects of exchange rate appreciation on export. In this context, the econometric analysis by [9], [17] are very popular. They all have observed that real exchange rate appreciation negatively affects India's aggregate merchandise exports.

B. Relationship between Partners' Income and Domestic Country's Trade

International Business Cycle Transmission theory shows that in a world with increasing open economies like today's world, changes in macro economic variables in one nation cause changes similar kind of variables to change in other nations, thereby transmitting inflation, economic growth and others of one nation to its partner nation. This transmission portrays that nations are linked together by trade with each other e.g., a home nation experiencing economic expansion increases income of its trading partner. Rising domestic income increases the demand for goods

quantity demanded responds to a greater extent than the given change in price. Luxury goods have relatively elastic demand.

² Demand is said to be relatively inelastic when the percentage change in demand is less than percentage change in price. This means that the quantity demanded responds to a lesser extent than the given change in price. Necessary goods e.g., sugar, salt, wheat etc are seen to be relatively inelastic.

³ The deterioration before a net improvement in a country's trade balance resulting from a depreciation or devaluation.

and services, which spills over into increased demand for cross-border goods and services. In satisfying, this demand, trading partner increased their exports, resulting in rising income in their respective domestic economies. The degree of transmitted expansion depends on its strength in the home country, higher demand for imports and in their volumes. Likewise, the economic expansion in trading partners causes an increased demand for foreign goods and services which not only extends to other trading partners but also feeds that to the home country, further stimulating its economic expansion. Similarly, an economic contraction in one nation is also transmitted through international trade. To illustrate this let us consider there are two nations A and B, where the National Income (NI) identity for nation A is given by

$$Y = C + I + X - M \quad (1)$$

Where,

Y is the National Income, C is Consumption level, I is Investment, X is export and M is the import and the NI identity for nation B is given by

$$Y' = C' + I' + X' - M' \quad (2)$$

Where,

$$C = a + bY \text{ and } M = c + dY = X';$$

$$C' = a' + b'Y' \text{ and } M' = c' + d'Y' = X'$$

Now, putting the value of X , C and M in (1), we get

$$Y = a + bY + I + c' + d'Y' - c - dY$$

$$\text{Or, } Y - bY + dY = a + I + c' - c + d'Y'$$

$$\text{Or, } Y(1 - b + d) = a + I + c' - c + d'Y'$$

$$\text{Or, } Y(1 - b + d) = K + d'Y'$$

Where, $K = a + I + c' - c$

$$\text{Or, } Y = 1/(1 - b + d) \{K + d'Y'\}$$

$$\text{Or, } Y = K_D + m_1Y' \quad (3)$$

Where, $K_D = K/(1 - b + d)$ and $m_1Y' = (d'Y')/(1 - b + d)$

Again, putting the value of C' , X' and M' in (2), we get

$$Y' = a' + b'Y' + I' + c + dY - c' - d'Y'$$

$$\text{Or, } Y' - b'Y' + d'Y' = K_1 + dY$$

$$\text{Where, } K_1 = a' + I' + c - c'$$

$$\text{Or, } Y'(1 - b' + d') = K_1 + dY$$

$$\text{Or, } Y' = K_1 / (1 - b' + d') + dY / (1 - b' + d')$$

$$\text{Or, } Y' = K_F + m_2Y \quad (4)$$

From (3) and (4) we can clearly see that Y depends positively on Y' . This is because as nation A's NI increases, this will lead to increase in demand for importable goods by A. To meet their demand nation B has to export. Thus, to export nation B requires investment. Because of this increased investment NI in B will increase. So, this is how increase in NI in A leads to an increase in NI in B. Similarly, Y' depends positively on Y . Thus, the process is equally operational for a decline in autonomous investment in nation A. The resultant fall in Y has a negative impact on Y' . In this case, nation B has to share the misfortune of its partner. However, the degree of transmission which portrays how nations are linked together by trade with each other actually depends on whether the demand for good is income elastic⁴ or income inelastic⁵.

III. METHODOLOGY

A. Structural Breaks/ Change

We used multiple structural break tests as developed by [3]. Their method is as follows: The first step is to test for a single structural break taking the entire sample. If the test rejects the null hypothesis that there is no structural break, the corresponding year is taken as the candidate break date and the sample is split into two sub-periods around that year. The test is reapplied to each sub-sample. If we find a break date in any of the samples, the entire sample is split around this new candidate break-date and two new subsamples are tested for structural breaks. This sequence continues until each subsample test fails to find evidence for a break. To illustrate, let us suppose the growth rates of Export and Import may be estimated using the exponential function

$$LX_t = a + gt + U_t \quad (5)$$

Where, LX , g , t and U denote the log of export and import, growth rate, time trend and random disturbance term, respectively. The subscript t denotes time. The parameters of the above regression model- a

⁴ Income is said to be relatively elastic when the percentage change in demand is more than percentage change in income. This means that the quantity demanded responds to a greater extent than the given change in income. Luxury items are seen to be relatively income elastic goods.

⁵ Income is said to be relatively inelastic when the percentage change in demand is less than percentage change in income. This means that the quantity demanded responds to a lesser extent than the given change in income. Necessary goods e.g., sugar, salt, wheat etc are seen to be relatively income inelastic.

and g - would vary from one growth regime to another, making it necessary to identify the change point. Therefore, we first estimate the break dates of the above model for the growth rates of the export and import and accordingly partition the data to estimate the period wise growth rates. The methodology for estimating the break dates is explained in detail below.

The exponential growth model containing $m+1$ growth regimes and m break dates ($T_1 \dots T_m$) can be written as follows:

$$\begin{aligned} \ln X_{t_1} &= a_1 + g_1 t + U_{t_1}, & t = \dots T_1 \\ \ln X_{t_2} &= a_2 + g_2 t + U_{t_2}, & t = T_1 + 1 \dots T_2 \end{aligned} \quad (6)$$

.....

$$\ln X_{t_m} = a_{m+1} + g_{m+1} t + U_{t_m}, \quad t = T_m + 1 \dots T$$

Here we adopt the convention that $T_0 = 0$ and $T_{m+1} = T$ the total number of observations. The number of break points m and the break dates ($T_1 \dots T_m$) are treated as unknown and estimated from the data.

B. Export and Import function

The trade performance of a given country depends on, among other things on competitiveness which is measured as price of the country's exports (or imports) relative to foreign price of related goods and the level of international income. According to standard economic theory, the export demand function relates the quantity of export demanded to foreign income and real exchange rate. By assuming price and income elasticities of demand are constant, the export demand function may be written as:

$$X_t = A(REXC)_t^{\alpha_1} (GDP)_t^{\alpha_2} \quad (7)$$

Taking log in both sides, (7) can now be written as

$$\ln X_{t_1} = \ln A + \alpha_1 \ln(REXC)_{t_1} + \alpha_2 \ln GDP_{t_1}$$

$$\text{Or,} \quad \ln X_{t_1} = C + \alpha_1 \ln(REXC)_{t_1} + \alpha_2 \ln GDP_{t_1} \quad (8)$$

Where

X_{t_1} is the real export of India to bordering country at time t , A is constant, $REXC_{t_1}$ is the Bilateral Real Exchange Rate between India and selected countries at time t and GDP_{t_1} is the real Gross Domestic Product of i th country at time t .

Orthodox economic theory predicts that price elasticity of demand for export is positive (α_1) and income elasticity of demand for export is positive (α_2)⁶

⁶ See Marshall (1923) for details

Following the same procedure we can also calculate import elasticity.

C. Data

The present study is based on data collected from secondary sources. These sources are "International Monetary Fund" and "National Accounts of United Nations". The study is conducted for a period of 33 years from 1980-2012, which covers both pre and post reforms periods. In order to arrive at real figures of the variables, all nominal values are normalized by GDP deflator. It may further be noted that out of nine bordering nations, we have excluded Afghanistan and Myanmar from our analysis due to inconsistent data for exchange rate⁷. Similarly, we could not include Bhutan in our analysis due to non availability of trade data prior to 1991.

IV. RESULTS AND ANALYSIS

A. Growth of India's Export: A Comparative Analysis

This section takes a look at the trend of growth of India's export with bordering nation's vis-à-vis non bordering nations which have evolved since 1980.

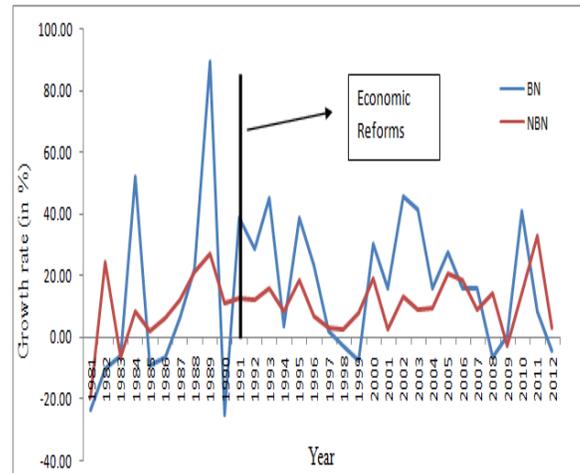


Fig 1 Growth of India's Export: Bordering vs Non-Bordering Nations

The growth rate of India's export to bordering nations was -23 percent in 1981 which has increased to 52 percent in 1984. After 1984, the value has drastically fallen up to 1987. Since 1988, the value of India's export growth rates to bordering nations has improved and it has been increasing except for 1990, 1998-99 and 2008. As against bordering nations, the growth rate of export to non bordering nations was -19 percent in 1981 which has increased to 25 percent in 1982. The value of

growth rate has decreased to -6 percent in 1983. From 1984 onwards the value has improved and it has been increasing except for 2009. However, if we look at figure, we would observe that growth of export is on the higher side to both types of nations during post reforms period. Infact, it has been found that while growth rate of export during pre reforms period (1980-1991) was around 12 percent and 9 percent with bordering and non-bordering nations respectively, these rates have substantially jumped to 18 percent and 12 percent respectively. Thus, it is established that growth of export with bordering nations has always dominated that with non-bordering nations irrespective of the regimes concerned.

Having examined the graphical trend, let us now examine the growth rate of export more objectively. To do this, the following regression models have been estimated.

$$LX_t = \alpha + \beta t + U_t \quad (9)$$

X_t is the level of real export or import of India, t is the time trend, α is constant and “ L ” indicates natural logarithm.

This model is estimated three times separately for trade with bordering nations, non bordering nations and world as a whole. Moreover, the model has been estimated for three different time periods: pre reform period (1980-1991), post reform period (1992-2012) and finally, the entire period (1980-2012). The estimated results are depicted in table 1⁸.

TABLE I
ESTIMATED GROWTH RATES OF EXPORT: OLS RESULTS

Partner Nation	1980-2012	1980-1991	1992-2012
Export with Bordering Nations	15%***	9%***	15%***
Export with Non Bordering Nations	10%***	9%***	10%***
World	11%***	9%***	11%***

Source: estimated by authors

Note: (i) ***, ** and * are Significant at 1%, 5% and 10% levels, (ii) Autocorrelation has been corrected by PW method.

During the pre-agreement period, the growth rates of export to bordering, non-bordering and all trading partner nations taken together was 9 percent, but this rate has increased substantially especially for bordering nations (see column 4). However, if we consider the whole period i.e., from 1980-2012, the growth rate of

⁷ India shares its border with Afghanistan, Bangladesh, Bhutan, China, Maldives, Myanmar, Nepal, Pakistan and Srilanka.

⁸ Note that growth rate has been calculated by multiplying the coefficient of time variable of equation (9) by 100.

export to bordering nations was 15 percent while the growth rate with non bordering nations and world was around 10 percent. Thus, table I reveals that on an average the growth rate of India’s export to bordering nations was higher than non bordering nations and world.

B. Estimation of Export Break Dates

The estimated break dates are presented in Table II. The break date has been estimated allowing for a shift in the intercept alongside a change in the slope coefficient, the case of a pure structural change. It is observed that growth rate of India’s export to bordering nations has experienced structural breaks except for Maldives and Pakistan. However, the date of those breaks is not uniform across nations. As we can see, the growth of export has experienced structural break in two different years for Bangladesh: 1984 and 1995.

TABLE II
STRUCTURAL BREAKS IN INDIA’S EXPORT
(BAI- PERRON TESTS OF L+1 VS L SEQUENTIALLY DETERMINE BREAKS)

Nation	Break date
Bangladesh	1984, 1995
China	1988
Maldives	NIL
Nepal	1990
Pakistan	NIL
Srilanka	1991

Source: estimated by authors

For China, 1988 has been diagnosed as the break year. Similarly, for Nepal and Srilanka, the break dates are 1990 and 1991 respectively. Thus, we have clear evidence that barring Bangladesh, growth of India’s export does not show structural break in the post 90s. This result may be interpreted as the poor impact of New Economic Reforms on India’s export growth to bordering nations.

C. Determinants of Export Demand Function

In order to explore the determinants of export demand functions, (8) is estimated by using Ordinary Least Square (OLS) technique. The result is reported in Table 3.⁹

Before we analyze the estimated results, it is important to note that the values of adj. R square are satisfactory in all the models. The same is true for F-statistic: it is significant at beyond the one percent level

⁹ Times series property (not reported here) of these variables justify use of OLS. These results are available on demand.

in all the models attesting to the overall strength of the model. The null hypothesis of no auto correlation could not be rejected at any conventional level of significant, barring the case of Nepal, as evident by Breusch-Godfrey (BG) statistic which makes hypothesis testing reliable. As it is evident from the BG value, export demand function estimated for Nepal suffers from auto correlation. Therefore, we have corrected the values of the coefficient by PW method. The values of the

coefficient reported here are corrected values. Turning to analysis, column (2) presents the estimated value of Ex_{t-1} . We find that the estimated coefficient of Ex_{t-1} has a positive sign but it is statistically significant only for China, Nepal and Srilanka. Thus, it implies that last year's export has a positive impact on current year's export for all the nations except Bangladesh, Maldives and Pakistan.

TABLE III
DETERMINANTS OF EXPORT DEMAND FUNCTION, 1980-2012

	Coefficient					Diagnostic Statistics		
	Const	Ex_{t-1}	RER_t	GDP_t	Break date	Adj R^2	BG	F
BGD	-39.89*** (-5.19)	0.16 (0.95)	0.95*** (4.64)	2.19*** (5.29)	1996 {-0.31** (-2.09)}	0.97	0.33	283.81***
CHN	-28.23*** (-3.29)	0.27* (1.78)	0.97** (2.42)	1.35*** (3.60)	1991 {0.91** (2.35)}	0.95	0.14	144.75***
MDV	-18.36*** (-3.25)	0.10 (0.60)	0.47* (1.68)	1.41*** (3.93)	NIL	0.89	0.32	83.55***
NPL	-5.80 (-1.09)	0.59*** (4.52)	0.54 (0.82)	0.53* (1.95)	2000 {0.58*** (2.77)}	0.92	8.93**	66.78***
PAK	-67.32*** (-4.08)	0.27 (1.60)	-0.06 (-0.32)	3.09*** (4.14)	NIL	0.98	2.29	547.97***
LKA	-14.59** (-2.13)	0.49*** (3.55)	0.50*** (3.04)	0.97** (2.69)	1999 {0.34*(1.98)}	0.97	2.66	297.42***

Source: estimated by authors

Note: (i) ***, ** and * are Significant at 1%, 5% and 10% levels, (ii) Autocorrelation has been corrected by PW method

Secondly, the coefficient of RER, as reported in column (3) assumes significantly positive sign in case of Bangladesh, China, Maldives and Srilanka. The positive and significant sign of coefficient of RER indicates that real depreciation of Indian currency in respect of partner country's currency results in higher export of India to partner nation. This indicates that demand for Indian goods is price elastic. However, it is insignificant in case of Nepal and Pakistan indicating that demand for Indian goods is price inelastic for these two nations. Thirdly, the coefficient of partner nation's GDP is estimated to be positive and statistically significant for all the nations. The positive and significant coefficient of GDP indicates that India's export to partner countries is positively determined by their levels of incomes. This further indicates that Indian goods are income elastic for these nations. Finally, we report the coefficient of time dummy variable in column (5). We can see that the dummy variable is found to be statistically redundant for Maldives and Pakistan, while for other four nations the

variable is found to be statistically significant¹⁰. But interestingly, the coefficient of dummy variable is estimated to be negative for Bangladesh. This shows that export demand function has experienced a negative shock for Bangladesh in post reform era. For Nepal and Srilanka, the shock has been positive which occurred in late 90s. However, it is difficult to give credit to economic reforms for this positive shock because 1991 is too early to be a candidate for reform's effect.

D. Growth of India's Import: A Comparative Analysis

Fig 2 shows a comparison of import growth rates to Bordering and Non Bordering Nations during 1980-2012.

¹⁰ A variable is said to be redundant if it is not empirically belongs to the model in concern. Technically, inclusion of a redundant variable in the model reduces the value of Adj R^2 .

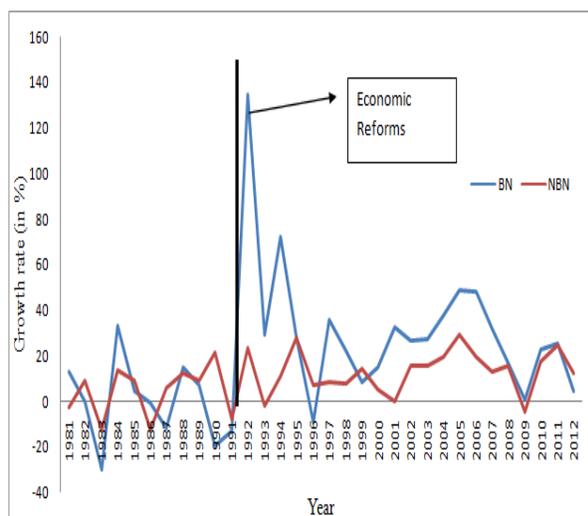


Fig 2 Growth of India's Import: Bordering vs Non-Bordering Nations

The growth rate of India's import from Bordering Nations was 13 percent in 1981 which has fallen to -30 percent in 1983. After 1983, the value has slightly improved (i.e., 4 percent) but it has fallen up to 1991. Since 1992, the value of India's import growth rates from Bordering Nations has improved and it has been increasing except for 1996. As against Bordering Nations, the growth rate of import from Non Bordering Nations was -19 percent in 1981 which has increased to 9 percent in 1982. The value of India's export growth rate has decreased to -12 percent in 1983. In 1984 the value has slightly improved and then again the value has sharply fallen up to 1991. Since 1992, the value of import has improved and it has been increasing. However, if we look at figure, we would observe that growth of import is on the higher side to both types of nations during post reforms period. Infact, it has been found that while growth rate of import during pre reforms period (1980-1991) was around -0.34 percent and 4.32 percent with bordering and non-bordering nations respectively, these rates have substantially jumped to 31.23 percent and 13.55 percent respectively. Thus, a glance at fig 2 reveals that on an average there is a positive trend of growth of import from both the types of nations.

Having examined the graphical trend, let us now examine the growth rate of import more objectively. In order to do this, (9) is estimated. The result is depicted in table 4¹¹.

TABLE IV
ESTIMATED GROWTH RATES OF IMPORT: OLS RESULTS

¹¹ Note that growth rate has been calculated by multiplying the coefficient of time variable of equation (9) by 100.

Partner Nation	1980-2012	1980-1991	1992-2012
Import with Bordering Nations	19%***	-0.78%	23%***
Import with Non Bordering Nations	10%***	4%***	12%***
World	10%***	4%***	13%***

Source: estimated by author

Note: (i)***, ** and * are Significant at 1%, 5% and 10% levels, (ii) Autocorrelation has been corrected by PW method

During the pre-liberalization period, the growth of import from bordering nations was -0.78 percent but it is not statistically significant. It indicates that import from bordering nations during 1980-1991 was almost stagnant. On the other hand, trade with both non bordering nations and world was 4 percent but after the implementation of New Economic Reforms, the growth rates have drastically increased in all the nations especially for bordering nations (see column 4). However, if we consider the whole period i.e., from 1980-2012, the growth of import from bordering nations was 19 percent while the growth rate with non bordering nations and world was only 10 percent. Thus, table 4 reveals that on an average the growth of import from bordering nations was positively higher than non bordering nations and world.

E. Estimation of Import Break Dates

The estimated break dates in India's import are presented in Table V. The break date has been estimated allowing for a shift in the intercept alongside a change in the slope coefficient, the case of a pure structural change.

TABLE V
STRUCTURAL BREAKS IN INDIA'S IMPORT
(BAI- PERRON TESTS OF L+1 VS L SEQUENTIALLY DETERMINE BREAKS)

Nation	Break date
Bangladesh	1994
China	1989, 1993
Maldives	NIL
Nepal	1989, 1993, 2002
Pakistan	1984
Srilanka	1985, 2004

Source: estimated by authors

Note: Import demand function for Maldives has been estimated for the period 1983-2012 due to non availability of data prior to 1983.

It is observed that growth rate of India's import from bordering nations has experienced structural breaks except for Maldives. However, the date of those

breaks is not uniform across nations. As we can see, 1994 has been diagnosed as the break year for Bangladesh. The growth of import has experienced structural break in two different years for China: 1989 and 1993. Similarly, for Srilanka, the break dates are 1985 and 2004 respectively. Moreover, the growth of import has experienced structural break in three different years for Nepal: 1989, 1993 and 2002. For Pakistan, 1984 has been diagnosed as the break year. Thus, we have clear evidence that barring Bangladesh, China and Nepal, growth of India's import does not show structural break in the post 90s. This result may be interpreted as the moderate impact of New Economic Reforms on India's import growth from bordering nations.

F. Determinants of Import Demand Function

This section takes a look at of the determinants of import demand functions of India by estimating (8). The result is summarized in Table VI¹²

Before we analyze the estimated results, it is important to note that the values of adj. R square are satisfactory in all the models. The same is true for F-statistic: it is significant at beyond the one percent level in all the models attesting to the overall strength of the model. The null hypothesis of no auto correlation could not be rejected at any conventional level of significant, barring the case of Maldives, as evident by Breusch-Godfrey (BG) statistic which makes hypothesis testing reliable. As it is evident from the BG value, import demand function estimated for Maldives suffers from auto correlation. Therefore, we have corrected the values of the coefficient by PW method. The values of the coefficient reported here are corrected values. Turning to analysis, column (2) presents the estimated value of Im_{t-1} . We find that the estimated coefficient of Im_{t-1} assumes significantly positive sign for China, Nepal, Pakistan and Srilanka. Thus, it implies that last year's import has a positive impact on current year's import of India from all the nations except Bangladesh and Maldives. Secondly, the coefficient of RER, as reported in column (3) assumes significantly negative sign only in case of Srilanka. The negative and significant sign of coefficient of RER indicates that real appreciation of Indian currency in respect of partner country's currency results in higher import of India from partner nation. This indicates that demand for partner nation's goods in India is price elastic. However, it is insignificant in case of Bangladesh,

China, Maldives, Nepal and Pakistan indicating that demand for partner nation's goods is price inelastic. Thirdly, the coefficient of India's GDP is estimated to be positive and statistically significant for all the nations except China and Nepal. The positive and significant coefficient of GDP indicates that India's import from partner nation is positively determined by India's level of incomes. This further indicates that partner countries' goods are income elastic in India. Finally, we report the coefficient of time dummy variable in column (5). We can see that the dummy variable is found to be statistically redundant for Maldives, while for other five nations the variable is found to be statistically significant. But interestingly, the coefficient of dummy variable is estimated to be negative for Pakistan. This shows that import demand function has experienced a negative shock for Pakistan in post reform era. However, for Bangladesh, China, Nepal, and Srilanka, the shock has been positive which occurred in late 90s. This result may be interpreted as the positive impact of New Economic Reforms on India's import from bordering nations except Pakistan.

V. CONCLUSION

In this paper, we have tried to analyze the pattern of India's trade (export and import) with bordering nations in the context of structural shift, price and income elasticities during 1980-2012. Firstly, we have found that on an average there is a positive trend of India's export and import volumes to both bordering and non bordering nations. However, the growth rate of India's trade with Bordering Nations has always dominated that with non-bordering nations irrespective of the regimes concerned. Secondly, in respect of structural breaks, our analysis shows that there exists a poor impact of New Economic Reforms on India's export to bordering nations, while there has been a moderate impact on India's import growth from bordering nations. Thirdly, in examining import demand function, our analysis shows that except Srilanka, demand for partner nation's goods is price inelastic in India. This indicates that goods which we are importing from these nations are mostly necessary in character. It also shows that the partner countries' goods are income elastic in India except for China and Nepal. This further indicates that business cycle position in India significantly affects our imports from these nations.

¹² Times series property (not reported here) of these variables justify use of OLS. These results are available on demand

TABLE VI
DETERMINANTS OF IMPORT DEMAND FUNCTION, 1980-2012

	<i>Coefficient</i>				<i>Diagnostic Statistics</i>			
	<i>Const</i>	<i>Ex_{t-1}</i>	<i>RER_t</i>	<i>GDP_t</i>	<i>Break date</i>	<i>Adj R²</i>	<i>BG</i>	<i>F</i>
BGD	-18.40*** (-3.79)	0.09 (0.41)	-0.30 (-1.05)	1.10*** (5.11)	1994 {1.02(2.01)} **	0.86	1.11	48.02***
CHN	-13.92 (-1.30)	0.71*** (4.93)	0.26 (0.8)	0.67 (1.40)	1992 {0.66(2.50)} **	0.97	1.10	241.51***
MDV	-115.26*** (-5.41)	-0.20 (-0.82)	0.11 (0.25)	4.61*** (5.39)	NIL	0.91	5.59**	69.56***
NPL	9.56 (1.05)	0.65*** (5.52)	0.95 (0.70)	-0.18 (-0.51)	1994 {0.96(2.75)} **	0.85	4.14	45.44***
PAK	-29.56*** (-3.01)	0.37** (2.43)	0.71 (1.65)	1.43*** (3.44)	1993 {-0.61(- 1.70)}*	0.75	3.96	24.78***
LKA	-15.42* (-1.84)	0.49*** (3.73)	-1.38** (-2.50)	0.75** (2.11)	1991 {1.32(2.52)} *	0.91	4.60	80.23***

Source: estimated by authors

Note: (i) ***, ** and * are Significant at 1%, 5% and 10% levels, (ii) Autocorrelation has been corrected by PW method

Fourthly, in estimating export demand function, we have found that Indian goods are income elastic for all the bordering nations. This signifies that as economic condition improves in these nations, exports from India will grow at a faster rate. From the view point of policy, this suggests that close observation of cyclical fluctuations in these nations could identify scopes for strengthening the balance of payments in India, by both securing additional export business and by adjusting macroeconomic policies to meet changed circumstances. Lastly, we have also observed that demand for Indian goods is price elastic in case of Bangladesh, China, Maldives and Srilanka while it is price inelastic incase of Nepal and Pakistan. This indicates that a fall in the price of India's good in these nations will cause our export to grow at a higher pace. Therefore, steps should be taken to reduce the price of exported goods without comprising the quality. In addition to tariff rate adjustment, Government of India should also identify the possible ways through which transportation costs of these goods can be reduced. Moreover, research and development should be encouraged towards better and cost effective techniques of production.

Although income and price elasticities of exports are found to have expected sign for most nations, however, the magnitude of these coefficients are not uniform. For Pakistan, coefficient of income elasticity is found to be highest whereas price elasticity has taken highest value for China. These different elasticities suggest that a single external trade policy, especially

with regard to tariff to improve the external sector will not prove effective. Instead of a uniform approach, a good understanding of the socio economic environment in the partner nations would better assist in enhancing export earnings.

APPENDIX

APPENDIX 1
ESTIMATED EXPORT DEMAND FUNCTION

	<i>Coefficient</i>				<i>Diagnostic Statistics</i>			
	<i>Const</i>	<i>Ex_{t-1}</i>	<i>RER_t</i>	<i>GDP_t</i>	<i>DV₉₁</i>	<i>Adj R²</i>	<i>BG</i>	<i>F</i>
B	-33.8		0.95*	1.93				
G	***	0.17	**	***	-0.08	0.97	2.11	244
D	(-4.3)	(0.9)	(3.8)	(4.5)	(-0.3)			
C	-28.2	0.27	0.97*	1.35	0.91*	0.95	0.13	144
H	***	*	*	***	*			
N	(-3.29)	(1.8)	(2.42)	(3.6)	(2.35)			
M	-18.4	0.03	0.08	1.45	0.63	0.89	0.12	63.1
D	***	(0.9)	(0.17)	***	(1.03)			
V	(-3.3)			(4.1)				
N	-33.8	0.45	0.84	1.90	-0.53	0.89	2.69	63.2
P	***	***	(0.8)	***	(-1.6)			
L	(-2.88)	(2.8)		(3.1)				
P	-67.7	0.27	-0.04	3.11	-0.02	0.98	396.	2.16
A	***	(1.6)	(-0.1)	***	(-0.1)		35	
K	(-3.8)			(3.9)				
L	-20.8	0.45	0.03	1.24	0.39	0.97	0.84	273
K	***	***	(0.11)	***	(1.18)			
A	(-3.01)	(2.5)		(3.9)				

APPENDIX2
ESTIMATED IMPORT DEMAND FUNCTION

	Coefficient					Diagnostic Statistics		
	Const nt	Impor t _{t-1}	RER _t	GDP _t	DV ₁₉₉ I	Adj R ²	BG	F
B		0.41						
G	-11.99	**	-0.49	0.71	0.91*	0.9	9.6	45.92
D	(-1.22)	(2.49)	(-1.3)	(1.64)	(1.9)			
C	-1.04	0.82	0.17	0.12	0.92	0.9	2.3	331.2
H	(-0.11)	***	(0.69)	(0.30)	***			
N		(8.84)			(4.24)			
M	-78.6	0.06	-1.04	3.19	1.55*	0.9	0.8	64.28
D	***	(0.32)	(-1.6)	***	(1.99)			
V	(-4.04)			(4.12)				
N	-1.85	0.75	0.62	0.20	0.28	0.8	2.6	34.95
P	(-0.19)	***	(0.40)	(0.52)	(0.78)			
L		(5.90)						
P	-29.7	0.46	1.02	1.40	-0.7	0.7	4.9	23.24
A	**	***	(1.43)	**	(-1.2)			
K	(-2.24)	(2.98)		(2.67)				
L	-15.42*	0.49	-1.4**	0.8**	1.3**	0.9	4.3	80.23
K	(-1.85)	***	(-2.5)	(2.11)	(2.5)			
A		(3.73)						

REFERENCES

- [1] A. Marshall, *Money, Credit and Commerce*. London: Macmillan, 1923
- [2] A. Senhadji and C. Montenegro, "Time series analysis of export demand equations: A cross-country analysis", *IMF working paper*, WP/98/149.37, 1998.
- [3] A. Virmani, "Demand and Supply Factors in India's Trade", *Economic and Political Weekly*, Vol, 26, No. 6, 1991.
- [4] B. Hansen, "The New Econometrics of Structural Change: Dating Breaks in US Productivity", *Journal of Economic Perspectives*, Vol 15, pp 117-28, 2001.
- [5] B. Sodersten, *International Economics*, London: Macmillan, 2nd ed., 1990
- [6] D. Andrews, "Tests for Parameter Instability and Structural Change with Unknown Change Point", *Econometrica*, 61, pp 821-56, 1993.
- [7] D. Andrews and W. Ploberger, "Optimal Tests When a Nuisance Parameter is Present Only under the Alternative", *Econometrica*, 62: 6, 1383-1414, 199.
- [8] D. Salvatore, *International Economics*. India: Wiley, 8th ed., 2004.
- [9] G. C. Chow, "Tests of Equality between Sets of Coefficients in Two Linear Re-gressions", *Econometrica*, 28:3, pp. 591- 605, 1960.
- [10] J. Bai and P. Perron, "Testing for and Estimation of Multiple Structural Changes", *Econometrica*, 66, pp 817-58, 1998.
- [11] Jonathan D. Ostry and K. Rose. Andrew, "An empirical evaluation of the macroeconomic effects of tariffs", *Journal of International Money and Finance*, 11, 3-79, 1992.
- [12] M. Nur., A. Wijeweera and B. Dollery, "Estimation of the Export Demand Function using Bilateral Trade Data The Case of Bangladesh", *South Asia Economic Journal*, 8(2), 249-264, 2007
- [13] N. Hatakhar and A. Dongre, "Structural breaks in India's growth: revisiting the debate with a longer perspective", *Economic and Political Weekly*, 1432-1435, 2005.

- [14] P. Balakrishnan and M. Parameswaran, "Understanding economic growth in India: A prerequisite", *Economic and Political Weekly*, 2915-2922, 2007.
- [15] R. Quandt, "Tests of the Hypothesis that a Linear Regression Obeys Two Separate Regimes", *Journal of American Statistical Association*, 55, pp 324-30, 1960.
- [16] Timothy J. Vogelsang, "Wald- Type Tests for Detecting Shifts in the Trend Function of a Dynamic Time Series", *Econometric Theory*, 13, pp 818-49, 1997.
- [17] V. Joshi and I. M. D. Little, "India: Macroeconomics and Political Economy, 1964-1991", *World Bank and Oxford University Press*, Washington DC and New Delhi, 1994.
- [18] Y.W. Cheung, and R. Sengupta, "Impact of exchange rate movements on exports: an analysis of Indian non-financial sector firms", *Journal of International Money and Finance*, 39, 231-245, 2013.

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