Trade liberalization and Regional Development in BIMSTEC Region: Does Geographical Characteristics Matter?

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Nilanjan Banik*

Abstract

There is a general consensus that trade positively affect growth. A way to augment trade flow is to liberalize external sector. In the present paper we looked at the role of geographical characteristics of a region under a liberalized trade regime in complementing trade flows. Using simultaneous-equations modeling framework, involving the demand and supply of imports and exports for countries in BIMSTEC region and Japan, we found geographical characteristics have an important role in facilitating trade. However, favorable geographical characteristics without proper infrastructure facilities might undermine its beneficial effect on trade. There is a scope to develop infrastructure facilities in the BIMSTEC region. Japan can gain substantially by investing in infrastructure in the BIMSTEC region.

1. Introduction

BIMSTEC was formed in 1997; and presently has Bangladesh, India, Myanmar, Sri Lanka, Thailand, Bhutan and Nepal, as its member. It was formed with the idea of imparting greater socio-economic cooperation among the member nations in the area of technology, transport and communications, energy, tourism, agriculture, fisheries and human resources development. In addition to sectoral cooperation, BIMSTEC also wanted to strengthen cooperation in the areas of trade and investment.

For the present analysis we looked at the trade part; specifically examining the hypothesis whether geographical characteristics in the BIMSTEC region will help to complement trade in this region. Most of the BIMSTEC member countries have initiated external sector liberalization starting early nineties.[1] There is a general consensus in the literature that trade volume, both exports and imports, increase following external sector liberalization (Agosin, 1991; Bertola et al., 1991; Kohli, 1991; Clarke et al., 1992; Joshi et al., 1996).[2] Others such as, McCombie and Thirlwall (1997), Paulino (2002) and Paulino and Thirlwall (2004), have studied the impact of trade liberalization on export and import growth from a region. However, what has not been examined is the effect of geographical characteristics of a region in complementing trade flows following external sector liberalization.

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[1] The only exception being Thailand undertaking external sector liberalization during early seventies and Sri Lanka initiating liberalization starting 1977.

[2] In the trade literature, external sector liberalization is also known as trade liberalization. It means reduction in tariff barriers, phasing out of non-tariff barriers, like quotas, import license, etc., export promotion and a move towards a market determined exchange rates.

As the literature on gravity model of trade demonstrates, geography is a powerful determinant of bilateral trade (Linneman, 1966; Frankel et al., 1995; and Frankel, 1997). The present study tries to fill this void by incorporating geographical characteristics of a region and estimating simultaneous-equations model involving the demand and supply of imports and exports for the sample consisting BIMSTEC member countries and Japan. Although we understand other factors, such as presence of non-tariff barriers, low product coverage by preferential tariffs, and low preferential margins, will have an effect on trade flows; such factors will be overlooked in the present context as they are covered in other studies (Kelegama, 2001; Mukherji, 1997).

Another contribution of this study is the use of unbalanced panel data set. Earlier studies done in the area of trade liberalization have used balanced panel data set. For the present study we use the approach outlined by Baltagi and Chang (2000) to obtain the estimator for the unbalanced panel data sets. Based on their Monte Carlo experiments, Baltagi and Chang (2000) concluded that 2SLS and 3SLS estimators "perform quite well with incomplete panels and are recommended in practice." (p.269) Moreover, they cautioned applied economists to avoid 'balancing' data as the "loss in root mean squared error can be huge." (p.278)

2. Background

Both the imports and exports of a country tend to increase with external sector liberalization. Under small country assumption a fall in tariff barriers reduces the price of imports and cause imports to rise. Exports also increase and this is true whether the economy has a fixed, or, flexible exchange rate regimes. Under flexible exchange rate regimes when the economy opens up, first its imports rise. An increase in imports causes a relative increase in the supply of domestic currencies vis-à-vis the foreign currencies. This happens because foreign currencies are used to finance imports. With flexible exchange rates the value of domestic currency is market determined; an excess supply causes it values to depreciate. This means the price of exports for this economy falls; causing exports to rise.

Under fixed exchange rate regimes, increase in exports happen in a different way. First, because of liberalization imports increase. However, market price of domestic currency does not fall as it is fixed now. An increase in imports release resources from the import competing sectors. A considerable portion of these resources find their use in the export sectors. As a result production of exports increases. Exports price falls, partly because of increase in production and partly because inputs prices are cheaper with more coming from the import competing sectors. Exports increase.

Higher trade volume, resulting from external sector liberalization, is expected to bring higher growth in the region. Trade effects growth in three primary ways. First, trade encourages flow of resources from low productive to high productive sectors, leading to an overall increase in output. Second, with unemployed resources, an increase in export sales lead to an overall expansion in production and a fall in unemployment rate. Third, international trade also allows for the purchase of capital goods from foreign countries and exposes an economy to technological advances of the developed countries.

Like external sector liberalization geographical characteristics of a region can also affect growth. Although a country's geographical characteristics are not influenced by government policies, but

those can have important effect on a country's income by its influence on trade. Thus countries' geographical characteristics can be used to obtain instrumental variables of trade's impact on income, and certainly should be considered while examining trade flows in a liberalized trade regime.

For instance, we can argue one of the reasons for Nepal to be poor (per capita wise) relative to Thailand is because the former is mountain-locked and have no coastline in comparison to the latter. We argue if geographical characteristic is a significant factor in explaining trade, then it is necessary for the BIMSTEC member countries to invest resources for development of infrastructure. However, many of the BIMSTEC member countries, like Bangladesh and Nepal, are economically poor; and lack adequate resources to invest in infrastructure. During 2003, annual per capita GDP (measured in constant 2000 US $) for Bangladesh and Nepal were $395 and $241, in comparison to, $2276 and $921 for Thailand and Sri Lanka, respectively (World Bank, 2004). Japan can play a positive role by investing in infrastructure for the economically backward regions in BIMSTEC.

Two basic measures of geographical characteristics are used for this study. The first measure is the miles of coastline. Our assumption is that a country with larger coastline will have a greater chance to trade relative to countries with smaller coastlines. The second measure is the area of land as a percentage of total surface area that a country shares border with other countries. Our assumption is that a country with more border land area as a percentage of its total surface area will trade more relative to countries having less border-land area as a percentage of total surface area. Implicit in these assumptions is the notion that a larger coastline will have more number of ports; and countries sharing a larger border-land area with others will have more ports of entry.

3. Model

The literature generally agrees about the empirical specifications of the demand and supply functions for imports and exports (Leamer and Stern, 1970; Magee, 1975; Goldstein and Khan, 1985). The demand for imports (*M*) is a function of domestic real income (*GNP*), the price of imports in domestic currency (P_M) relative to the domestic prices (*P*), and the ratio of reserves (*R*) to imports lagged one period. There is considerable evidence available that many developing countries' capacity to import is constrained by the stock of real international reserves and hence the idea behind inclusion of reserves as an explanatory variable (Khan and Knight; 1988). It is expected to have a positive coefficient, as higher international reserves increase the ability of the country to import more. The relative price variable is expected to have a negative sign; a higher price implies a lower amount of imports demanded. The variable domestic real income is expected to have a positive coefficient; demand for imports are expected to increase with an increase in domestic real income.

Under assumption that world supply of imports is infinitely elastic we need not have to specify the supply function of imports (Khan and Knight; 1988). The foreign demand for exports is determined by the world real income (GNP_W) and the ratio of exports price (P_X) to the price of foreign substitute (P_W). The coefficient on world real income is expected to have a positive sign; demand for exports is expected to increase with a stronger world real income. Similarly, the coefficient on the price variable is expected to have a negative sign; foreign demand for exports will fall when the price of exports increase.

The supply of exports will depend on price of foreign substitute (P_W) relative to domestic price (*P*), stock of fixed capital (*K*) and a term representing the role of imports in exports supply ($M.P_M/P_X$). Exporters are willing to supply more when exports price increase. Accordingly, the price variable in the export supply equation is expected to have a positive coefficient. Similarly, more capital stock, and more importable inputs used for exports, means a higher supply of exports. Hence, the coefficients of these two variables are expected to have positive coefficients.

We assume that the adjustment of import demand, export demand and export supply to changes in prices and income are not instantaneous, so we included lagged endogenous variables for the dynamic specification of the system. One advantage of such specification is that allows us to distinguish between short and long run elasticities.[3]

The other modification of this basic model is the introduction of our measures of geographical characteristics in the import demand and the export supply equations. Our assumption is that the geographical characteristics variables, namely, miles of coastline (*C*) and proportion of border-lands (*L*), will facilitate trade and hence expected to have positive signs. We do not introduce these variables in the export demand equation, as the foreign demands for any country's exports depend upon relative price competitiveness and not on the country's geographical characteristics.

The model is log linear, with price and income coefficient reflecting the respective elasticities. There are two reasons for specifying the equations in logarithms: (1) it allows endogenous variables to react in proportion to rise and fall in the explanatory variables; and (2) on the assumption of constant elasticities, it avoids problem of drastic changes in the elasticity as endogenous variables changes (Khan, 1974).

Thus the equations can be written as:

Import Demand:

$$Log(M)_{it} = \alpha_2 Log\left[\frac{P_M}{P}\right]_{it} + \alpha_3 LogGNP_{it} + \alpha_4 LogM_{it-1} + \alpha_4 Log(\frac{R}{M})_{it-1} + \alpha_5 Log(C)_{1i} + \alpha_6 Log(L)_{1i} + z_{1i}^{'}\alpha_1 + u_{1it}; \quad (1)$$

Export Demand:

$$Log(X)_{it} = \beta_2 Log\left[\frac{P_X}{P_W}\right]_{it} + \beta_3 LogGNP_W + \beta_4 LogX_{it-1} + z_{2i}^{'}\beta_1 + u_{2it}; \quad (2)$$

Export Supply:

$$Log(X)_{it} = \gamma_2 Log\left[\frac{P_W}{P}\right]_{it} + \gamma_3 LogK_{it} + \gamma_4 LogX_{it-1} + \gamma_5 Log(M.P_M/P_X)_{it} + \gamma_6 Log(C)_{2i} + \gamma_7 Log(L)_{2i} + z_{3i}^{'}\gamma_1 + u_{3it}, \quad i = 1,\ldots,N; t = 1,\ldots,T. \quad (3)$$

[3] In the export demand equation, the short run price and income elasticities are β_2 and β_3 respectively; and the long run elasticities are $\beta_2/(1-\beta_4)$ and $\beta_3/(1-\beta_4)$ respectively.

Table 1: Import and Export Growth Incorporating Geographical Characteristics

	2SLS	3SLS	Within 2SLS	Within 3SLS
Import Demand (M)				
Intercept	-0.12241 (-1.10)	-0.09221 (-0.91)	_	_
$Log\left[\frac{P_M}{P}\right]$	0.004609 (0.27)	0.005326 (0.32)	-0.03415 (-1.36)	-0.04155** (-1.76)
$LogGNP_{it}$	0.045657** (1.80)	0.045517** (1.86)	0.789564* (4.93)	0.760677* (5.34)
$LogM_{it-1}$	0.969939* (46.38)	0.968645* (47.69)	0.591720* (10.60)	0.565527* (11.45)
$Log(\frac{R}{M})$	0.051200* (3.73)	0.049496* (3.72)	0.054299* (2.09)	0.063339* (2.87)
$Log(C)$	0.008768** (1.76)	0.006747 (1.37)	_	_
$Log(L)$	4.846605** (1.84)	4.485214** (1.72)	_	_
$AdjR^2$	0.98938		0.82433	
Export Demand (X)				
Intercept	-4.65571 (-1.33)	-2.83225 (-1.44)	_	_
$Log\left[\frac{P_X}{P_W}\right]$	-1.72556* (-1.99)	-2.61554* (-2.16)	-2.75512* (-2.05)	-2.78969* (-4.27)
$LogGNP_W$	1.93037 (1.52)	1.76217** (1.74)	0.277090 (1.64)	0.295826* (4.17)
$LogX_{-1}$	0.999639* (122.64)	0.998686* (123.00)	0.940630* (15.76)	0.907469* (20.02)
$AdjR^2$	0.98905			
Export Supply (X)				
Intercept	0.085843 (0.50)	0.086899 (0.88)	_	_
$Log\left[\frac{P_W}{P}\right]$	-0.02381** (-1.93)	-0.00369 (-0.51)	-0.033357 (-1.31)	-0.00065 (-0.06)
$LogK$	0.017314* (2.70)	0.006845* (2.07)	0.084963 (1.04)	0.043583 (1.08)
$LogX_{-1}$	0.846173* (28.68)	0.936902* (48.34)	0.766956* (12.11)	0.904406* (20.30)
$Log(M.P_M/P_X)$	0.158352* (5.29)	0.062520* (3.35)	0.208463* (3.72)	0.085001* (2.64)
$Log(C)$	0.015179* (3.37)	0.004225* (1.81)	_	_
$Log(L)$	4.535949* (2.11)	2.395974* (1.98)	_	_
$AdjR^2$	0.99273		0.79913	

Notes: #Figures in parentheses ( ) are *t*-ratios. ** Indicates that a coefficient is significant at the 10% level and *significant at 5% level.

where, *i* denotes countries; *t* denotes time periods; $z_i'\alpha_1$, $z_i'\beta_1$ and $z_i'\gamma_1$ represents individual country specific effects for each of the three function; u_{jit} denotes the general equation specific errors.

If z_i is observed for all countries, then the entire model can be treated as an ordinary linear model and fit by least squares. For the purpose of estimation we consider the classic pool model and the within transformation model. If z_i contains only a constant term, then the ordinary least squares estimation provides consistent and efficient estimates of the common intercept terms and the slope vectors. This is a classic pool model (also known in the literature as least square dummy variable model). Another variant of the fixed effects model is within transformation model. Here the pooled regression is re-formulated in terms of deviation from the series means leading to disappearance of the intercept terms and the dummies. This model is more efficient than models with dummy variables as it gives *n* degrees of freedom (corresponding to relevant dummies and the intercept term) back with same parameter estimates.

For estimation, we have data for 7 countries covering the period between 1990 and 2002. However, for the entire time period (1990-2002) not all the variables could be found for all the sample countries, leading to unbalanced panel data set. In total we have 73 data points.
To avoid possible heteroscedasticity in errors all the quantitative variables are expressed in *per-capita* terms. Precise definitions of variables are given with data sources in the appendix. There are three endogenous variables in the system, which are $Log(X)$, $Log(M)$ and $Log(P_X)$. Table 1 summarizes estimates of all of the parameters, using classic pooled 2SLS, classic pooled 3SLS, within transformed 2SLS and within transformed 3SLS.

4. Results and Analysis

All the estimates have theoretically estimated signs, except in one case where the coefficient of $Log\left[\frac{P_W}{P}\right]$ has come out with negative sign. Importantly, the geographical characteristics variables have statistically significant coefficient in three out of four cases, suggesting that they have important role in facilitating trade. Based on the within estimates, we find the income elasticity for the demand for exports are 1.93 (2SLS) and 1.76 (3SLS) respectively. Similarly, long run price elasticity demand for exports are -1.72 (Classic Pooled 2SLS) and -2.61 (Classic Pooled 3SLS). Hence, both world income and price competitiveness of exports are important factors in determining exports performance of this group of countries.

A statistically significant price coefficient might imply that trade in the region will flourish provided the products are price competitive, and there is no market access problems related to non-tariff barriers. As the literatures on monopolistic competition suggest a way to make the product price competitive is to take advantage of economies of scale in production and to introduce product varieties (Helpman and Krugman, 1985; Leamer, 1984). Since early nineties, Indian exports industry is enjoying economies of scale (Barua and Chakraborty, 2004). India's trade with other developing countries like Brazil, Sri Lanka and Thailand are on the rise. Because these countries share a similar exports profile they also face same types of non-tariff barriers; and

hence share a similar negotiating stance for removing these barriers. When it comes to trade among themselves, these countries are less likely to face any market access problem for their exports. Although the present intra-BIMSTEC trade is low, trade in the region is likely to flourish in the future.

Table 2: India's Trade with BIMSTEC countries

India's exports to BIMSTEC member countries and Japan#					
	2000-01	2001-02	2002-03	2003-04	2004-05
Bangladesh	874.41 (37.29)*	1005.59 (15.00)	1179.05 (17.25)	1743.36 (48.03)	1589.41 (-8.93)
Nepal	141.07 (-6.83)	215.19 (52.55)	351.27 (63.23)	671.13 (91.06)	729.94 (18.76)
Sri Lanka	630.48 (26.15)	633.48 (26.15)	923.37 (45.86)	1322.70 (43.25)	1356.51 (2.56)
Thailand	528.69 (17.51)	635.29 (20.16)	713.04 (12.24)	833.89 (16.95)	857.82 (2.87)
Japan	1782.20 (5.74)	1515.58 (-14.96)	1868.86 (23.31)	1713.82 (-8.31)	1981.63 (15.63)
India's imports from BIMSTEC member countries and Japan					
	2000-01	2001-02	2002-03	2003-04	2004-05
Nepal	231.08 (22.37)	357.16 (54.56)	282.49 (-20.91)	286.80 (1.52)	340.71 (18.80)
Sri Lanka	44.84 (1.25)	67.61 (50.77)	91.06 (34.69)	195.25 (114.42)	365 (86.93)
Thailand	314.97 (-4.02)	424.53 (34.79)	379.98 (-10.49)	610.67 (60.79)	835.18 (36.77)
Japan	1835.52 (-27.70)	2153.76 (17.34)	1841.10 (-14.52)	2674.75 (45.28)	3012.09 (12.61)

Notes: # Figures are in millions U.S. dollars, * Figures in bracket are percentage change over previous year
Source: Foreign Trade and Balance of Payments, Centre for Monitoring Indian Economy (2005).

For the long-term objective of trade growth, the BIMSTEC group of nations should also put emphasis on efficient production methodology. Overall growth is a result of microeconomic efficiency and allocative efficiency. While the former means producing same quantity of output with less input; the latter in the Pareto sense means it is not possible to increase the output of any good without reducing the output of at least one other good. As liberalized regime encourages private participation, the role of the government can be that of a facilitator; creating infrastructure for human capital, and providing funds for research and development. In the BIMSTEC and Japan context, the latter fits well in terms of providing technological know-how and resources to the former group; a necessary component for building competitiveness.

We also found coefficients on geographical characteristics to be statistically significant. Accordingly, individual governments can form a common agenda for developing infrastructure in the BIMSTEC region. A country with miles of coastline without any port facilities will not be much different when compared with countries without any coastlines. Here, infrastructures are seen as a factor complementing to geographical characteristics of a region.

There is an added advantage of investing in infrastructure. The rate of return on saving is falling. When it comes to capital accumulation government can follow two routes. The first is to encourage saving by cutting taxes. And the second is financing budget deficit through printing money. The latter process, although will create inflation and therefore is a disincentive for savings, can be used to build infrastructure. However, as already noted some of the BIMSTEC member-countries are resource poor. The additional required amount can always come from relatively capital abundant Japan.

Table 3: Intra-BIMSTEC Trade in 2003#

Exports To:									
	Bangladesh	Bhutan	India	Japan	Myanmar	Nepal	Sri Lanka	Thailand	World
Bangladesh		2.38	55.34	51.49	2.44	2.98	5.80	9.45	6229.40
Bhutan									
India	1358.00	4.00		1976.00	73.00	217.00	957.00	799.00	60641.00
Japan	428.00	10.00	2396.00		125.00	13.00	375.00	16043.00	473911.00
Myanmar	30.21		247.01	126.89			1.36	831.65	2641.70
Nepal	4.42		328.76	6.52			0.22	1.24	649.40
Sri Lanka	11.17		245.05	160.98	0.24	1.66		11.54	5133.30
Thailand	273.00		641.00	11435.00	439.00	28.00	161.00		80521.00
Imports From:									
	Bangladesh	Bhutan	India	Japan	Myanmar	Nepal	Sri Lanka	Thailand	World
Bangladesh		3.84	1494.22	566.70	33.23	4.86	9.24	176.56	9672.30
Bhutan									
India	61.00	29.00		2636.00	259.00	345.00	227.00	706.00	85294.00
Japan	131.00		2174.00		140.00	7.00	193.00	11890.00	383025.00
Myanmar	2.68		76.49	136.96			0.37	483.39	3204.90
Nepal	3.28		228.29	14.43			1.18	30.57	996.60
Sri Lanka	5.64		1076.16	448.13	2.29	0.19		145.89	6671.90
Thailand	30.00		879.00	18266.00	915.00	1.00	8.00		75809.00

Figures are in millions U.S. dollars
Source: Direction of Trade Statistics Yearbook, IMF.

Table 4: Bank Rates in the BIMSTEC and in Japan

	1999	2000	2001	2002	2003
Bangladesh	7.00	7.00	6.00	6.00	5.00
India	8.00	8.00	6.50	6.25	6.00
Japan	0.12	0.07	0.06	0.04	0.04
Myanmar	12.00	10.00	10.00	10.00	9.00
Sri Lanka	16.00	25.00	n.a.	18.00	15.00
Thailand	4.00	4.00	3.75	3.25	2.75

Source: International Financial Statistics Yearbook, International Monetary Fund (2004).

From the policy perspective, investing in infrastructural project in the BIMSTEC region is also a better option for Japan. Rate of return on saving in Japan has hit rock bottom. As Table 4 suggest, for the year 2003 bank rates in Japan is only 0.04 per cent when compared with 5.00 per cent, 6.00 per cent, 9.00 per cent, 15.00 per cent and 2.75 per cent for Bangladesh, India, Myanmar, Sri

Lanka and Thailand. Some of the economies, especially, India, Sri Lanka and Thailand, in the BIMSTEC regions are growing fast. This will certainly require expansion in the existing infrastructural network. Japan, through lending capital, can always take advantage of this situation.

5. Conclusion

We find in a liberalized trade regime, besides price competitiveness and world income, geographical characteristics of a region also play important role in facilitating trade. Although a country's geographical characteristics are not influenced by government policies, but those can have an important effect on a country's income by its influence on trade. We found in the BIMSTEC region geographical characteristics have an important role in facilitating trade. However, favorable geographical characteristics without proper infrastructure facilities might undermine the growth prospect of the region. A country with miles of coastline without any port facilities will not be much different when compared with countries without coastlines. There is a scope to develop infrastructure facilities in the BIMSTEC region. Japan can gain substantially by investing in infrastructure in the BIMSTEC region.

Appendix: Data Definitions and Sources

The sources of data are: (a) IMF, *International Financial Statistics* and (b) World Bank, *World Development Indicators*.

X: *Per capita* nominal exports in (constant 1995 US$); source (b).

M: *Per capita* nominal imports in (constant 1995 US$); source (b).

$(\frac{R}{M})$: Official foreign reserves (constant 1995 US$) divided by nominal imports *per capita*; source (b).

GNP : *Per capita* Gross Domestic Product (constant 1995 US$); source (b).

K : *Per capita* Gross Fixed Capital (constant 1995 US$); source (b).

GNP_W : *Per capita* real GNP for the World; source (b).

P_X : Unit value of exports (US$), 1995 = 100; source (a).

P_M : Unit value of imports (US$), 1995 = 100; source (a).

P_W : Unit value of exports of the continent of the originating country (US$), 1995 = 100; source (a).

P : Domestic Consumer Price Index, 1995 = 100; source (a).

POP : Population; source (b).

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