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Does Bangladesh Benefit from a Preferential Liberalisation? Some Ex Ante Evidence from BIMSTEC FTA

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Abstract

Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), a regional grouping of South and Southeast Asian countries, is heading towards forming a free trade area (FTA). This paper examines some ex ante effects of the FTA by standard Global Trade Analysis Project (GTAP) model. Results suggest that Bangladesh would incur a net welfare loss, but BIMSTEC derives net gain. The overall intra-bloc export is likely to increase, although Myanmar's potential exports are not that encouraging. The group comes up with a trade deficit. These imply that there is a need for designing a compensation package and extending technical support for Bangladesh to cope with adverse effects.

Keywords: *BIMSTEC, welfare effect, allocative efficiency, trade balance, GTAP*

1. Introduction

Regional cooperation, whether market-driven or policy-induced, is a catalyst of economic integration. Free trade maximises global welfare but such a Pareto optimal state is impossible in practice due to multiple distortions, which leads to economic regionalism. Regionalism has become so widespread that at present

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sixty per cent of world trade is conducted among the members of the blocs.[1] At the advent of new regionalism, countries are forming the complex web of regional trading arrangements (RTAs). The body of theoretical and empirical literature suggests that economic regionalism is beneficial for trade flows and welfare gains (*e.g.*, Baldwin, 1993), but some studies find it as a stumbling block for multilateral liberalisation efforts (such as Bhagwati and Panagariya, 1996; Panagariya, 2000). Now, there are two fundamental questions pertaining to regional groupings: *First*, is there any significant scope of expanding intra-grouping trade, which can serve as an economic incentive behind such efforts? *Second*, does a preferential liberalisation within the regional arrangement result in any non-trivial mutual gains?

This paper tries to answer these questions in the context of an emerging regional bloc, Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC)[2]. Initially it intended to promote cooperation between economic sectors, trade and investment. The group is now heading towards an FTA vis-à-vis the schemes of sectoral cooperation. The potential of intra-BIMSTEC trade remains untapped due to tariff and non-tariff barriers, and to the absence of agreements on services and investment. According to IMF's Direction of Trade Statistics database, the main import sources and export destinations of most of the BIMSTEC countries remain outside the bloc although the recent trend in trade growth is higher within the group than that with the world. As the World Bank (2008) observes, some of the countries initiated trade reforms in the recent past although the markets are normally restrictive in the group except for Myanmar and Thailand.

Only two studies have been conducted so far to the best our knowledge. Bhattacharya and Bhattacharyay (2007) assess the trade potential of BIMSTEC countries that contextualise a BIMSTEC-Japan FTA. They calculate trade gains of BIMSTEC countries as well as of Japan using gravity model and find significant trade gains in different scenarios, in which the most preferable one is a free trade regime. Strutt (2008) makes projections for 2001-2020, which demonstrate that Bangladesh incurs a net revenue loss although BIMSTEC's total export and

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1 The attraction and recent phenomenal growth of preferential trading arrangements (PTAs) may be largely due to a preference for manufacturing industry and the prospect of greater foreign direct investments in the member countries (Ahmad, 2008).

2 The idea of BIMSTEC was first mooted by Bangladesh, India, Sri Lanka and Thailand which came out as a regional grouping in the Bangkok Declaration of June 1997. Myanmar, Nepal and Bhutan joined BIMSTEC after 1997.

import, as proportions of those of the world, as well as intra-bloc trade, will increase.

This paper works out the possible effects of economic integration for preferential tariff elimination scenario of BIMSTEC FTA in Global Trade Analysis Project (GTAP) model especially to examine Bangladesh's potential gains and losses. GTAP is a global computable general equilibrium (CGE) model, which is widely used to analyse the possible effects of regional trade agreements and economic integration. The rest of the paper is organised as follows. Following the introduction, Section 2 briefly discusses the intra-BIMSTEC trading pattern. The basic structure of GTAP is described in Section 3. The empirical estimates of various effects are presented in Section 4. Finally, concluding remarks have been made in Section[3].

2. Intra-BIMSTEC Trade: An Overview

Amongst the members of BIMSTEC, India is the biggest economy in terms of its macroeconomic indicators while Bhutan is the smallest in the bloc. In between these two, only Thailand can be noticed as an influential country in the group. The combined gross domestic product (GDP) of BIMSTEC member economies is nearly US$1.6 trillion with a population of around 1.44 billion as of 2007. Currently the countries are at different levels of economic and industrial development (Table 1).

The intra-BIMSTEC trade potential remains untapped due to tariff and non-tariff barriers, and to the absence of agreements on liberalisation of services and investment. The economies are also incurring significant loss in terms of its volume and share in the economy due to the existing tariff structure. Kee *et al.* (2008) demonstrate that the linearly approximated deadweight loss (DWL) associated with the existing tariff structure ranges between 0.43 to 0.71 per cent of the total GDP of important member countries.[4] The proportion of estimated DWL is much lower in more liberalised East Asian countries, such as Japan (0.02 per cent), South Korea (0.09 per cent) and Indonesia (0.11 per cent).

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3 DWL is divided into three components associated with the contributions of import-weighted tariff, tariff variance, and the covariance between tariffs and import demand elasticities. A positive contribution of the covariance indicates that countries impose higher tariffs on more elastic imports.

4 The detailed decomposition of the multi-region EV is given in Huff and Hertel (2001), pp.29-45.

The share of intra-BIMSTEC trade remains meagre in the world trade (Table 2.1). In 1997, the intra-bloc import was 2.81 per cent of the world import, which increased to 4.42 per cent in 2007. The figures for export were 2.80 and 5.27 per cent, respectively. However, there is an implicit positive trait in the trading pattern, which is missing in the recent literature, such as Bhattacharya and Bhattacharyay (2007) and Strutt (2008). After the formation of BIMSTEC, there has been a proportionate increase in the intra-group trade compared to trade with the world. This can be expressed in terms of increase in individual member's trade with BIMSTEC compared to their trade with the world during 1997-2007. All the member countries experienced a higher increase in both imports from and exports to the group.

Table 1 : Key Characteristics of BIMSTEC Member States

	Bangladesh	Bhutan	India	Myanmar	Nepal	Sri Lanka	Thailand
1997							
Population (million)	131.52	0.52	965.43	44.29	22.76	18.37	58.83
GDP (US$ billion)	42.32	0.37	410.92	..	4.92	15.09	150.89
GDP per capita (US$)	322	721	426	..	216	821	2,565
GDP growth (annual %)	5.39	5.31	4.05	5.65	5.05	6.41	-1.37
Shares of GDP							
Agriculture	25.78	32.48	26.12	59.45	41.43	21.87	9.45
Manufacturing	15.61	10.04	16.38	7.10	9.45	16.41	30.17
Services	49.07	34.36	47.11	30.28	35.70	51.23	50.39
% of World Trade	0.10	..	0.68	0.04	0.02	0.09	1.11
Trade per capita (US$)	82	..	78	90	90	540	2,098
2007							
Population (million)	158.57	0.66	1,124.78	48.78	28.11	20.01	63.83
GDP (US$ billion)	68.42	1.10	1,176.89	..	1,0.32	32.34	245.35
GDP per capita (US$)	431	1,668	1,046	..	367	1616	3,844
GDP growth (annual %)	6.43	19.11	9.06	..	3.19	6.78	4.75
Shares of GDP							
Agriculture	19.24	20.86	18.11	..	33.58	11.69	11.42
Manufacturing	17.77	5.12	16.32	..	7.72	18.50	34.83
Services	52.37	36.26	52.38	..	49.32	58.38	44.68
% of World Trade	0.10	..	1.66	..	0.01	0.06	1.01
Trade per capita (US$)	213	..	491	..	170	1,044	5,246
Membership							
GATT	1972	No	1948	1948	No	1948	1982
WTO	1995	Accession	1995	1995	2004	1995	1995

Note: .. Data not available. GATT and WTO stand for the General Agreement on Tariffs and Trade and the World Trade Organisation, respectively.

Source: World Bank. *World Development Indicators* (online, http://ddp-ext.worldbank.org); *World Trade Indicators* (online, http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/TRADE).

Table 2.1 : Intra-BIMSTEC Trade Flows (US$ million)

IMPORTS

From / To	Bangladesh		Bhutan		India		Myanmar		Nepal		Sri Lanka		Thailand	
	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007
Bangladesh	--	--	4.14	10.43	795.62	2,646.58	2.66	29.66	10.99	15.67	9.25	13.45	86.00	442.02
Bhutan			--	--										
India	53.65	211.05	18.50	129.44	--	--	212.30	757.76	87.43	768.52	33.95	566.81	224.28	2,930.53
Myanmar	0.42	6.35			50.16	186.85	--	--	0.00	0.00	0.00	0.56	0.00	1,054.64
Nepal	7.70	4.93			435.80	1,838.55	0.00	0.00	--	--	1.60	0.20	28.60	41.87
Sri Lanka	2.00	10.92			560.00	2,610.14	6.00	5.49	5.00	0.08	--	--	153.00	230.81
Thailand	14.02	14.37			594.00	2,085.01	0.00	2,315.38	0.04	0.73	30.23	36.61	--	--
BIMSTEC	77.78	247.62	22.64	139.86	2,435.58	9,367.13	220.96	3,108.30	103.45	784.99	75.02	617.63	491.88	4,699.86

EXPORTS

To / From	Bangladesh		Bhutan		India		Myanmar		Nepal		Sri Lanka		Thailand	
	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007
Bangladesh	--	--	0.33	4.85	37.22	209.71	0.38	5.77	0.93	4.48	3.91	10.15	10.77	12.70
Bhutan			--	--										
India	807.13	2,405.98	15.48	146.48	--	--	48.28	169.86	168.93	1,671.41	486.25	2,372.86	369.78	1,895.47
Myanmar	2.41	26.97			168.62	688.87	--	--	0.00	0.00	5.45	4.99	0.00	2,104.89
Nepal	8.70	14.25			91.60	698.65			--	--	0.10	0.07	0.00	0.66
Sri Lanka	11.00	22.75			44.00	515.28	0.00	0.51	2.00	0.18	--	--	34.00	44.70
Thailand	127.04	511.00			294.48	2,664.12	0.00	958.76	19.41	38.06	147.76	273.55	--	--
BIMSTEC	956.28	2,980.95	15.81	151.33	635.92	4,776.64	48.65	1,134.91	191.27	1,714.14	643.47	2,661.62	414.55	4,058.42

Note: The total value of exports and imports shows discrepancy, which is due to exclusion of transport and other costs of trade from the exports data.
Source: IMF. *Direction of Trade Statistics* (online).

Table 2.2 : BIMSTEC's Trade with the World (US$ million)

IMPORTS

From / To	Advanced Economies		Euro Area		Emerging & Dev. Economies		Developing Asia		Central and Eastern Europe		Middle East		Western Hemisphere		World	
	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007
Bangladesh	3,381.6	6,516.5	585.3	1,087.2	2,766.0	10,583.5	2,273.6	6,897.2	37.2	163.8	260.0	2,376.9	101.0	377.7	7,129.6	18,476.3
Bhutan																
India	24,060.2	110,110.0	7,914.2	34,348.6	16,779.4	76,842.6	3,607.8	44,697.8	312.6	2,001.2	8,706.9	14,215.4	577.6	6,100.6	40,896.6	249,566.0
Myanmar	1,552.2	1,723.2	166.8	235.4	1,296.7	4,673.6	1,266.4	4,578.7	15.1	2.7	11.7	12.6	0.2	2.4	2,861.5	5,520.1
Nepal	856.7	356.2	58.2	90.7	737.1	2,435.2	569.5	2,341.9	0.8	3.2	148.7	71.8	15.4	1.2	1,640.4	3,123.3
Sri Lanka	3,159.0	5,050.6	453.0	768.0	2,094.0	6,173.1	1,259.0	4,534.0	19.0	84.5	569.0	1,471.3	183.0	43.0	5,282.0	11,301.0
Thailand	45,884.5	76,185.9	6,823.2	9,556.9	16,368.2	62,594.6	9,157.5	37,954.4	879.2	418.2	4,365.8	18,113.7	1,155.2	2,373.7	64,127.3	141,346.0
BIMSTEC	78,894.2	199,942.4	16,000.6	46,086.9	40,041.4	163,302.5	18,133.8	101,003.9	1,263.9	2,673.5	14,062.1	36,261.7	2,032.2	8,898.8	121,937.4	429,332.7

EXPORTS

To / From	Advanced Economies		Euro Area		Emerging & Dev. Economies		Developing Asia		Central and Eastern Europe		Middle East		Western Hemisphere		World	
	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007	1997	2007
Bangladesh	3,133.5	9,743.5	1,081.6	4,375.3	474.9	1,180.1	194.3	465.4	44.3	266.1	124.4	179.0	25.1	101.8	3,627.6	12,718.9
Bhutan																
India	23,051.6	81,392.6	6,651.2	23,774.3	11,149.1	71,234.2	4,108.1	28,483.0	443.7	3,784.3	3,367.4	22,619.8	630.2	5,269.7	34,624.4	153,130.0
Myanmar	615.6	823.8	107.0	255.2	498.2	3,841.4	333.3	3,443.4	1.3	13.7	14.1	49.6	17.1	49.1	1,132.1	4,753.7
Nepal	286.7	235.5	160.2	90.0	102.5	748.1	100.8	733.0	0.4	7.6	0.0	3.7	0.6	2.4	396.9	1,008.5
Sri Lanka	3,601.0	5,417.4	619.0	1,312.3	925.0	1,943.9	210.0	827.9	129.0	131.5	321.0	593.4	67.0	135.6	4,629.0	7,740.0
Thailand	44,008.7	91,448.3	6,821.6	15,075.5	13,635.9	60,490.9	10,177.0	42,415.0	517.1	2,569.4	1,635.0	6,733.8	659.8	3,909.9	59,302.9	152,460.0
BIMSTEC	74,697.1	189,061.1	15,440.6	44,882.7	26,785.6	139,438.6	15,123.5	76,367.6	1,135.9	6,772.6	5,461.9	30,179.4	1,399.8	9,468.5	103,712.8	331,811.1

Note: The total value of exports and imports shows discrepancy, which is due to exclusion of transport and other costs of trade from the exports data.
Source: IMF. *Direction of Trade Statistics* (online).

Bangladesh's intra-bloc trade increased substantially from 1997 to 2007, and the rate of increase has been higher than that with the rest of the world (ROW). Its value of imports from BIMSTEC was US$3.16 billion in 2007, which was 17.09 per cent of that from the ROW. Its imports from the bloc increased by 275 per cent compared to that of 1997, whereas it increased by 180 per cent with the ROW. Its volume of exports to the group was US$247.67 million in 2007, which was 1.95 per cent of exports to the world. The amount was meagre because the main export destination of the country was the advanced economies (Table 2.2). Still, the increase in its export to the bloc during the same time period was higher (307 per cent) than that to the ROW (283 per cent). Most of its intra-bloc trade increase could be explained by its trade with India.

Some further characteristics of intra-BIMSTEC trade can be revealed from complementarity, intra-industry trade (IIT) and concentration indices. Chakraborty (2007) demonstrates that trade complementarity index is lower for Bangladesh and Sri Lanka than that of India and Thailand, which indicates highly skewed trade baskets of these countries towards a few product lines. The overall IIT index is low for Bangladesh with the other partners, which implies a lower trade across industry categories including intermediate products. Conversely, the higher IIT between Thailand and Sri Lanka and between Thailand and India indicates a greater trade within same product categories among them. However, the export and import concentration indices are substantially higher than that of the bloc's trade with the ROW, which suggests that the group's trade is skewed towards a few product categories in the trade basket. Thus, the preferential tariff elimination in the major traded items would increase intra-bloc trade of the existing items substantially.

3. The GTAP Model

GTAP is a multi-region competitive CGE model comprising a system of linear equations. It is suitable for a comparative-static analysis of the preferential liberalisation among the BIMSTEC countries. Tariff and other distortions often have ramifications beyond the sector wherein the distortions take place (Gilbert, 2001). The CGE approach is capable of examining the appropriate feedback and interaction effects more appositely, particularly where the distortions are manifold that cannot be captured in the gravity or partial equilibrium models. It attempts to represent the main structural elements of interdependent open economies, using modern economic theory as a guide to equation specification through a large number of simultaneous equations. The model is widely used to estimate the

effect of an FTA by simulating the impact of eliminating tariffs on trade flows between FTA member countries (deRosa & Gilbert, 2005).

3.1 Basic Structure

For the present analysis, the standard GTAP model is adopted because most of the application adopts the standard model (Huff & Hertel, 2000). The effect of complete tariff elimination has been analysed for BIMSTEC keeping the external tariff of the individual members at the previous level. The examination of possible effects includes decomposition of welfare effect, trade balance and, the effect on the growth of real GDP on the member countries.

The standard GTAP model has been described in Hertel (1997). In the model, all markets are assumed to be perfectly competitive. Regional government can drive wedges between prices of the producers and consumers by imposing taxes and subsidies on commodities and factors. Buyers differentiate between home-grown and imported goods, and also different sources of imports by region of origin. Investment in each region comes from a global pool of savings wherein each region contributes a fixed proportion of its income. Investment allocation is made according to the existing relative rates of return (Siriwardana & Yang, 2008).

Formally, the production in sector i in region r uses labour, capital and intermediate inputs to produce output according to the following Leontief production technology:

$$Y_{i,r} = \min\left[\frac{INT_{j,i,r}}{a_{i,j,r}}, \left(K_{i,r}^{\beta_r} L_{i,r}^{1-\beta_r}\right)\right]$$

where $Y_{i,r}$ is the output of sector i good in r, $K_{i,r}$ and $L_{i,r}$ are capital labour respectively used to produce sector i good. $INT_{j,i,r}$ indicates an intermediate input originated in sector j in r but used to produce sector i good in r; $a_{j,i,r}$ is the coefficient that gives the amount of sector j intermediate input of r used to produce the sector i good in r; and β_r indicates the share of capital income in sectoral output in r. In case of agricultural sector, additional inputs are land and natural resources.

For region r, the output of good i is represented by the following function:

$$Y_{i,r} = [\delta_{i,r} YD_{i,r}^{\eta_{i,r}} + (1-\delta_{i,r}) X_{i,r}^{\eta_{i,r}}]^{1/\eta_{i,r}}$$

where $Y_{i,r}$ is the output supplied to home region or elsewhere, $YD_{i,r}$ is the domestic sales of output, $X_{i,r}$ implies exports of good i from r, $\delta_{i,r}$ indicates the

share of domestic sales of gross output, and $\eta_{i,r}$ is the elasticity of transformation between domestic sales and exports.

The domestic supply of goods comes from domestic sales and imports. A CES aggregation of imports and domestic supplies constructs the absorption of *r* as follows:

$$A_{i,r} = [\mu_{i,r} YD_{i,r}^{\sigma_{i,r}} + (1-\mu_{i,r}) M_{i,r}^{\sigma_{i,r}}]^{1/\sigma_{i,r}}$$

where $A_{i,r}$ is the Armington aggregation of domestic and imported goods, which implies that imports come from all regions with their share depending on import prices; $\sigma_{i,r}$ is the elasticity of substitution between domestic and imported items; $\mu_{i,r}$ indicates the share of domestic production in Armington product; and $M_{i,r}$ is *r*'s imports.

The value of *r*'s imports is equal to value of exports of other region and transportation costs of trade. Transportation services, $T_{i,r,s}$, are proportional to trade from *r* to another region *s* ($M_{i,r,s}$):

$$T_{i,r,s} = \tau_{i,r,s} M_{i,r,s}$$

Where $\pi_{i,r,s}$ is the transport cost per unit $M_{i,r,s}$.

The utility function in *r* is represented by a CES or Cobb-Douglas aggregation of final consumption of available in *r*. The total domestic demand is divided between household and consumption. Household consumption is a Cobb-Douglas aggregation of sector *i* commodities over all regions:

$$U_r = \prod_{i,r} C_{i,r}^{\gamma}$$

where U_r is *r*'s utility and $C^{y}_{i,r}$ its total consumption of *i*. Conversely, households earn factor income and receive transfers from their governments. Thus, the income of the representative household in *r*, I_r, can be presented by

$$I_r = \sum_i w_r L_{i,r} + \sum_r r_r L_{i,r} + RV_r$$

where w_r and r_r are wage and interest rates, and RV_r is the transfer received by the representative household in *r*.

A Cobb-Douglas aggregate also presents the government's consumption demand for all *i* commodities in region *r* as follows:

$$G_r = \prod_{i,r} GD_{i,r}^{\gamma}$$

where $GD^{y}_{i,r}$ represents the government consumption of commodities i in region r. This consumption is accommodated by its total revenue (G_r) from various sources:

$$G_r = \tau_k r_r \bar{K}_r + \tau_w w_r \bar{L}_r + \tau_{i,r} P_{i,r} Y_{i,r} + \tau_{N,r} P_{i,r} INT_{j,i,r}$$

where τ_k, τ_w, $\tau_{i,r}$ and $\tau_{N,r}$ represent the tax rates on capital, labour, intermediate income and intermediate inputs, respectively, and $P_{i,r}$ is the price vector.

Now, the market clearing condition for goods market is

$$Y_{i,r} = \sum_r C_{i,r} + \sum_{r,j} a_{i,j,r} INT_{j,i,r}$$

The global capital market clearing condition is

$$\sum_r \bar{K}_r = \sum_{i,r} K_{r,ri}$$

And labour market clearing condition for r implies

$$LS_r = \sum_i LS_{i,r}$$

3.2 Implications of Tariff Reform

A reduction in the bilateral tariff on imports of i from r reduces its price. Domestic consumers immediately substitute away from competing imports. The composite price of imports of sector j also reduces, thereby increasing the aggregate demand for imports. Cheaper imports also help reduce the composite price of the $INT_{j,i,r}$, which leads to excess profits at current prices. This results in increased output and creates an expansion effect in the economy, which increases the demand for primary factors. All these transmit the shock to other sectors in the liberalising region (Hertel & Tsigas, 1997).

3.3 Welfare

In the basic analysis of welfare changes, the standard GTAP model features a representative household of a region (country). Its behaviour is governed by an aggregate utility function, which is specified over private household consumption, public expenditure and savings per capita. The GTAP simulations compute the welfare change variable as the percentage change in aggregate per capita utility for a region due to a domestic policy shock. The changes in region r's money-metric equivalent variation (EV) of utility change (du_r) and any change in population (n_r) can be written as

$$dEV = 0.01\left(1 - (\Phi_{EV} / \Phi)\right) Y_{EV}\, n + 0.01(\Phi_{EV} / \Phi)(Y_{EV} / Y) D$$

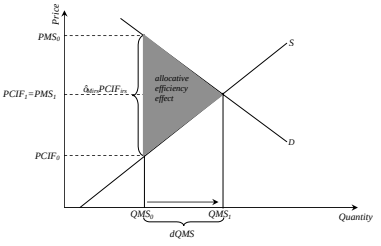
where y and x are the percentage change in regional total and per capita expenditure respectively, and p is the percent change in general price level to convert the nominal income and expenditure into real. Φ is the elasticity of expenditure with respect to utility in the regional demand system, which captures the impact of non-homothetic preferences for private consumption on a region's per capita utility. The region's total real income (D) is $D = Y(y - p)$ and $u\ \Phi = (x - p)$. And Y_{EV} is the expenditure required to obtain the new level of utility at initial prices due to a policy shock (Huff & Hertel, 2001).

For GTAP multi-region model, the decomposition of the *EV* is similar to that of the single region, wherein the main differences involve additional terms arising from the presence of import and export tariffs and the effect of changes in regional terms of trade.[4] The other important difference is the added regional dimension of the decomposition. Thus, changes in welfare in the multi-region model are attributed to

i. the interactions between taxes (both pre-existing and newly introduced taxes) and quantity changes taking place, expressed in the allocative efficiency gain (or loss),
ii. changes in the region's terms of trade, and
iii. changes in the relative prices of investment (capital goods) and savings (I-S effect).

Figure 1 displays the allocative efficiency effects of a region from preferential tariff elimination, where $\tau_{Mirs}PCIF_{irs}$ is the per unit tariff revenue on imports of good i from exporting region r into importing region s, associated with the *ad valorem* tariff rate τM_{irs}. It is multiplied by $dQMS_{irs}$, the change in the imports of i from r into s. The "Harberger triangle" is depicted by the shaded area in the Figure, which is the outcome of the tariff elimination. Both the base ($\tau_{Mirs}PCIF_{irs}$) and the height ($dQMS_{irs}$) are considered to evaluate the area of this triangle, and then add its value to the aggregate welfare measure (Hertel *et al.*, 2007).

Figure 1: Allocative efficiency effects from tariff elimination



4 The detailed decomposition of the multi-region EV is given in Huff and Hertel (2001), pp.29-45.

4. Results and Implications

An analysis of preferential liberalisation of BIMSTEC ideally involves analysing implications of the policy instruments on the structure of production at various levels. Tariffs exert direct and indirect influences on the relative prices of commodities. Demands for factors of production also change because of the changed product mix. The changes of relative prices of both outputs and inputs due to a trade liberalisation within BIMSTEC will be transmitted to the industries and input markets of the members as well as the other trading partners. A robust analysis of the possible welfare consequences of BIMSTEC FTA requires contextualisation of interactions among different sectors of the group. The GTAP model allows these changes within and between sectors in output mix and factor demands (Jallab *et al.*, 2007).

4.1 Welfare Effects

Based on GTAP database 7, the money-metric decomposition of welfare effect in the standard GTAP model of BIMSTEC FTA is depicted in Table 3. The simulation is carried out after aggregating the data of 57 sectors into 10 broad sectors.[5] The net welfare effect is the sum of allocative efficiency, terms of trade and I-S effects, which is US$972.7 million in BIMSTEC. The results demonstrate that Bangladesh is net loser in forming BIMSTEC FTA, which amounts to US$ 213.8 million from full tariff elimination. The other countries derive net welfare gain from the preferential liberalisation, although the amount varies depending on the extent of various effects. Thailand derives the highest net gain, which is US$ 582.2 million, followed by India, Sri Lanka and Myanmar.

Table 3: Decomposition of welfare effects of BIMSTEC FTA (measured by Equivalent Variation) ($US million)

	Allocative Efficiency	Terms of Trade	IS	Total
Bangladesh	-95.1	-119.2	0.5	-213.8
India	18.5	318.8	57.8	395.1
Sri Lanka	-2.1	117	25.6	140.5
Myanmar	-13.5	80.4	1.7	68.6
Thailand	112.2	540.1	-70.1	582.2
ROW	-364.6	-4.4	-0.2	-1,321.7

Source: GTAP simulation

[5] The base year of the data is 2004. See, Narayan and Walmsley (2008) for details on the atabase.

The ROW incurs loss in allocative efficiency in almost all the sectors with very small gain in extraction and transport sectors. However, its loss of terms of trade takes place in all the sectors. The amount of loss is reported in Table 3.

The welfare gain for Thailand is due largely to allocative efficiency improvements. For Bangladesh, the overall welfare impacts are negative, much of which can be attributed to adverse terms of trade effects.

Among the BIMSTEC members, only Bangladesh incurs terms of trade loss, which is significant. The order of terms of trade gain for the other countries is the same as net welfare gain. I-S effect is negative for Thailand and Bangladesh. Thailand and India derive allocative efficiency gains while the other members reveal loss.

Table 4 : Commodity decomposition of welfare effects

	Bangladesh	India	Myanmar	Sri Lanka	Thailand	ROW
Allocative Efficiency						
Grains Crops	22	10.6	9.8	0.8	2.9	-34.1
Animal and Meat	-0.4	1	0.1	0	0.4	-6.6
Extraction	-5.3	9.7	1	-4.8	53.5	0.3
Processed Food	-1.3	-5.1	0.1	0.1	10.3	-40.9
Textiles & Wearing Apparel	-74.3	-7.8	-9.4	-3	5.8	-88.1
Light Manufacturing	5.5	10.2	-1.9	-1.1	24.3	-48.6
Heavy Manufacturing	-44.6	-5.6	4.3	-4.6	9.1	-70.8
Construction Services	1.1	6.4	3.5	-0.1	18	-70.8
Transport & Communication	-0.3	1.1	-4.3	-0.9	-5.5	2.9
Other Services	2.5	-2	-5.3	0.1	-6.6	-15.3
Terms of Trade						
Grains Crops	-6.7	6.8	11.5	41	18.2	-64.3
Animal and Meat	0	3.6	0.1	1.1	3.9	-8.9
Extraction	4.4	14.4	4.2	13.4	-10.8	-30.3
Processed Food	-4.1	18.4	5.4	13	39.2	-73.2
Textiles & Wearing Apparel	-115.1	59.2	43.1	3.2	44.5	-38.9
Light Manufacturing	-1.7	65.6	1	3.1	91.1	-160
Heavy Manufacturing	-2.7	55.2	12	1.5	206.1	-270.6
Construction Services	0	1.2	0.6	0	2	-3.9
Transport & Communication	1	33.1	28	2.2	99.5	-163.8
Other Services	5.7	61.3	11.1	1.9	46.4	-127.6

Source: GTAP simulation.

The results support the findings of Strut (2008) who conducted simulation of BIMSTEC FTA based on database version 6 in recursive dynamic model projected for the year 2020. The findings reveal a net welfare loss for Bangladesh, amounting to US$ 267 million, which includes loss of terms of trade, capital and equity, although a meagre gain of allocative efficiency (US$ 3 million) is found in the net welfare effect. The other countries derive significant welfare gain from full tariff elimination within the bloc. This indicates that BIMSTEC FTA is beneficial for the members except Bangladesh although there is a possibility of a small efficiency gain for the country in the long run when all the sectors of the economy are taken into account.

Commodity decomposition of the allocative efficiency effect helps identify the sectors which incur loss and pull off gains. The results reported in Table 4 indicate that six broad sectors out of ten end up with loss. Bangladesh incurs substantial allocative efficiency loss in the textiles and wearing apparel sector, which is followed by heavy manufacturing. Indeed, the textiles sector is the major strength of the Bangladesh economy which earns more than three quarters of its export receipts and employs around 2 million labourers. A substantial loss in this sector implies significant adverse effect of the FTA on the economy. Conversely, grains crops achieve notable gains, followed by light manufacturing and some other sectors. But these cannot offset the losses and the country ends up with significant allocative efficiency loss as depicted in Table 4. India, Sri Lanka and Myanmar also go down in textiles but these are small compared to that of Bangladesh.

4.2 Effects on Intra-BIMSTEC Trade

The country level changes in sector-wise exports are interesting. Bangladesh's exports to Sri Lanka and Thailand increase in most of the sectors, and majority of the sectors would increase exports to India and Myanmar. The textiles and apparel sector, which faces substantial allocative efficiency and terms of trade loss, witnesses a notable increase in exports except to Sri Lanka. Exports of heavy manufacturing also increase notably, except to Myanmar. Overall, BIMSTEC FTA opens up a significant potential export market for Bangladesh in India and a reasonably prospective market in the other countries.

India's exports to Sri Lanka increase in all the sectors, while decrease marginally in a few sectors like construction, transport and other services in Bangladesh, Myanmar and Thailand. Conversely, Myanmar's exports to Bangladesh demonstrate notable reduction in sectors that include agriculture, extraction, textiles, manufacturing and services. Its export to India and Sri Lanka also decreases in five to six sectors but significant loss takes place in livestock.

Table 5 : Changes in intra-BIMSTEC exports (per cent)

	Bangladesh					India				
	India	Sri Lanka	Myanmar	Thailand	ROW	Bangladesh	Sri Lanka	Myanmar	Thailand	ROW
Grains Crops	127.13	23.17	26.37	36.05	3.92	70.1	108.78	18.87	59.06	-2.64
Animal and Meat	148.87	11.35	30	43.27	8.45	19.78	267.47	88.08	129.76	-3.77
Extraction	-12.64	-20.53	-23.57	18,260.17	-23.61	300.42	231.91	24.79	1,304.2	-3.03
Processed Food	173.86	57.77	52.22	640.08	2.81	48.85	83	25.38	93.81	-1.94
Textiles & Wearing Apparel	189.87	12.86	182.17	579.76	9.45	235.2	4.04	89.59	262.67	-2.64
Light Manufacturing	139.88	63.55	31.89	17.55	0.84	210.96	54.57	18.53	23.21	-1.89
Heavy Manufacturing	106.99	120.41	9.3	112.85	1.47	127.49	38.15	8.2	67.65	-1.46
Construction Services	-1.77	5.21	-1.28	-0.97	-2.85	0.93	6.34	-0.22	0.1	-1.8
Transport & Communication	-0.97	3.97	-0.3	0.16	-1.71	-1.04	4.07	-0.19	0.25	-1.6
Other Services	-1.56	2.88	-1.63	-0.62	-2.18	-1.26	3.31	-1.22	-0.21	-1.77

	Myanmar					Sri Lanka				
	Bangladesh	India	Sri Lanka	Thailand	ROW	Bangladesh	India	Myanmar	Thailand	ROW
Grains Crops	-18.26	123.14	41.25	10.1	-38.02	76.76	428.52	28.56	79.18	-6.95
Animal and Meat	-43.46	-37.62	-39.39	-14.75	-39.58	217.1	1558.21	-34.75	-12.84	-13.92
Extraction	-28.04	63.39	-6.66	-11.73	-11.59	465.12	159.64	-28.98	4,548.83	-28.29
Processed Food	107.11	119.85	-1.14	-11.48	-26.7	116.12	302.56	-5.31	502.48	-4.32
Textiles & Wearing Apparel	-24.69	-7.38	-8.21	66.77	-4.37	349.98	148.5	136.29	473.44	-9.94
Light Manufacturing	68.62	97.22	30.49	5.35	-10.49	193.1	145.72	389.73	8.97	-1.74
Heavy Manufacturing	144.08	201.94	46.03	12.28	-12.21	132.17	161.27	40.66	69.72	-6.99
Construction Services	0.21	-1.42	5.58	-0.62	-2.51	-8.39	-9.86	-9.42	-9.13	-10.85
Transport & Communication	-5.46	-5.28	-0.57	-4.22	-5.99	-9.95	-9.77	-9.16	-8.77	-10.45
Other Services	-7.54	-7.44	-3.26	-6.56	-8.02	-10.29	-10.19	-10.25	-9.33	-10.75

	Thailand				
	Bangladesh	India	Sri Lanka	Myanmar	ROW
Grains Crops	133.31	371.86	146.97	114.57	-1.76
Animal and Meat	128.45	489.13	355.51	-11.76	-3.99
Extraction	49.55	220.45	74.17	18.86	-5.92
Processed Food	146.82	605.33	79.53	21.71	-1.83
Textiles & Wearing Apparel	271.83	165.31	4.16	31.89	-3.87
Light Manufacturing	217.11	147.44	75.92	36.88	-3.04
Heavy Manufacturing	221.44	127.26	68.3	14.48	-2.29
Construction Services	-0.49	-2.08	4.88	-1.59	-3.15
Transport & Communication	-2.65	-2.45	2.4	-1.79	-3.18
Other Services	-2.87	-2.76	1.63	-2.82	-3.36

Source: GTAP simulation.

Sri Lanka experiences an insignificant loss of exports to Bangladesh and India in service sectors. In addition to these sectors, the loss of exports to Thailand extends to livestock. The notable decrease in the country's exports to Myanmar takes place in livestock and extraction sectors. On the other hand, Thailand's loss is small in exports to Bangladesh and India in services, to Myanmar in services and livestock, and to Sri Lanka in no sector.

In general, Thailand appears to be the most promising export market for Bangladesh, India and Sri Lanka especially for potentially spectacular growth in exports of extraction. These countries are also potentially good export market for Thailand; that is the possible gains are both ways. Thailand has good prospects in grain exports to Myanmar and has the possibility to expand exports in extraction and manufacturing. Myanmar also has good prospects in enhancing export in processed food and manufacturing to Bangladesh, and in grains and extraction in addition to these two sectors to India. Its textiles sector has a good prospect in Thailand.

The countries also incur loss in exports to the rest of the world in all the sectors excluding Bangladesh. The losses are very small for Thailand and India in all sectors, but significant in grains crops and meat for Myanmar and extraction for Sri Lanka. Bangladesh's exports of extraction sector are also affected significantly.

4.3 Trade Balance and Real GDP

The trade balance or net exports, defined to be the difference between the monetary value of exports and imports in an economy over a period of time, is found to be negative for BIMSTEC. At the country level, India will enjoy a trade surplus whereas the other countries will come up with trade deficit due to BIMSTEC FTA. Thailand's loss is the highest among the members, which accounts for most of the negative trade balance of the grouping.

Table 6 : Changes in Trade Balance and Real GDP

	Bangladesh	India	Sri Lanka	Myanmar	Thailand	ROW
Trade Balance ($US Million)	-251.11	389.43	-214.05	-31.91	-1426.33	2,212.94
Value of GDP (% change)	-0.61	0.42	2.09	4.68	0.87	-0.02

Source: GTAP simulation.

Now the question is whether the possible trade deficits are necessarily bad or otherwise. Unbalanced trade flows have two benefits. They shift worldwide production to its most productive location and allow individuals to stabilise their consumption over the business cycles. That the trade balance declines due to BIMSTEC FTA indicates that a member invests in physical capital to take advantage of productive opportunities, which in turn expands the physical infrastructure, strengthen capacity to access natural and human resources, and take advantage of new technologies. This new investment is partly financed by borrowing from foreign sources without reducing the current level of consumption. The trade balance goes into surplus when the country repays the debts. Thus, a trade deficit may be an indication of an emergent and vigorous economy. In addition, it is important for long-term sustenance of the economic development by increasing a country's productive capacity.

Table 6 also portrays the impact of the implementation of BIMSEC FTA on real GDP for the member economies. This reveals clear and substantial gains from liberalisation for the BIMSTEC members except Bangladesh. The LDC member Myanmar is likely to derive substantial growth of real GDP, followed by a developing member Sri Lanka. The average GDP growth for BIMSTEC is also positive and notable. In a dynamic projection in GTAP, Strutt (2008) reveals that Bangladesh's growth of real GDP would be substantial in the long run.

The rest of the world would enjoy a trade surplus, which is just the opposite of the outcome for BIMSTEC. However, the positive growth effect for the grouping may result in an insignificant average economic slowdown outside the bloc.

5. Concluding Remarks

The present paper adopts GTAP model to analyse the possible effects of a preferential liberalisation in BIMSTEC through forming an FTA within the grouping. The analysis indicates that the trade effects are higher for the bigger economies. This has a powerful policy implication for devising a proper design of the compensation mechanism for the smaller economies and extend technical support so that they can recover loss and turn out to be competitive before long in order to make the grouping more promising and prolific. Policymakers should draw lessons from the successes and drawbacks from similar liberalisation schemes and initiate course of actions accordingly.

The analysis reveals that Bangladesh is the only member which would incur a net welfare loss by joining the BIMSTEC FTA. The findings of Strutt (2008) also support the present evidence, which indicate that LDC member Bangladesh would

incur a net welfare loss immediately and in the long run in terms of dynamic projection. The country would incur trade deficit and a negative growth of real GDP. The real outcome would, however, depend on the trajectory of the liberalisation and investment promotion within the scheme, as well as the future dynamics of regional and global economy. Since the bloc's welfare effect is positive, an FTA would have an overall positive impact on the bloc. Keeping in mind the possible net loss of Bangladesh, careful attention has also to be given to the exact nature of the reform particularly in terms of negative list.

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