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Impacts of BIMSTEC Free Trade Area: A CGE Analysis

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Abstract
This paper examines the impacts of BIMSTEC FTA on its member countries. GTAP model and database are used to evaluate the effects. Since most of the BIMSTEC member countries are in general labor surplus country with high unemployment of unskilled labor, to capture this fact in the analysis, the paper performed two simulations considering both neo-classical full employment situation and unemployment situation. The results suggest that a complete removal of import tariffs among the member countries generate significant welfare gains for its members. The results also imply that some of the BIMSTEC member countries experience some adverse impact in case of terms of trade, industry output,, balance of trade etc. However, the most encouraging fact is the opportunities of employment generation after full implementation of BIMSTEC FTA. Since poverty is a common phenomenon in majority of the BIMSTEC countries, employment in unskilled labor might reduce poverty within the bloc.
Keywords: BIMSTEC FTA, Trade liberalization, GTAP, CGE Model.

1. Introduction

The process of a sub-regional cooperation among South and South East Asian nations was first initiated in June 1997 by establishing Bangladesh, India Sri Lanka and Thailand Economic Cooperation (BIST-EC). Myanmar joined this organization in December 1997 and it was renamed as Bangladesh, India, Myanmar, Sri Lanka and Thailand Economic Cooperation (BIMST-EC). In 2004, Nepal and Bhutan became the members of this group. Subsequently, the name of this organization further revised as the Bay of Bengal Initiative for Multi-Sectoral, Technical and Economic Cooperation (BIMSTEC). This sub-regional group was initiated with the goal to combine India's look east policy and Thailand's look west policy. As such it provides a unique link between South Asia and South East Asia. According to the Bangkok declaration on the establishment of BIST-EC, the aims and purpose of this sub-regional cooperation are to create an enabling environment for rapid economic environment, accelerate the economic growth and social progress in the sub-region, promote active collaboration and mutual assistance on matters of common interest, promote assistance in the form of training and research facilities, supporting and complementing national development plans in the member states. The declaration also envisions cooperation with national and regional organizations and in projects that can be dealt with most productively on a sub-regional basis and that makes best use of available synergies. The BIMSTEC decided to co-operate in thirteen priority sectors viz., (i) trade and investment (ii) technology (iii) energy (iv) transport and communication (v) tourism (vi) fisheries (vii) agriculture (viii) cultural cooperation (ix) environment and disaster management (x) public health (xi) people-to-people contract (xii) poverty alleviation and (xiii) counter-terrorism and transnational crimes. The priority sectors for cooperation have clearly been identified keeping in view the complementarities of the regions and the means to exploit these effectively by establishing road, rail, air and shipping networks (Batra 2010, p. 8). In February 2004, the framework agreement of BIMSTEC Free Trade Area (FTA) was signed in order to strengthen economic, trade and investment cooperation among the member countries.

World trade under regional and bilateral trading arrangements has been increasing over time and now around 60 percent of world trade covered by regional trading arrangements. However, South Asian countries are the weakest in the world, next to Sub-Saharan African countries in terms of successful formation of regional trading arrangement. The intra-regional trade among the member countries of South Asian Free Trade Area (SAFTA) is hovering round 4–4.5 percent per annum (Bhattacharya 2007, p.3). It is believed that compared to SAFTA, BIMSTEC FTA will be more promising because unlike SAFTA all the BIMSTEC members are purely guided by economic interests rather than by political interests (Banik 2007, p. 2). Existing literature on possible impacts of BIMSTEC FTA are very limited. Among these limited studies very few studies (see Bhattacharya, 2007; Strutt, 2008; Gilbert, 2008; Kabir and Selim 2010) use the quantitative methods to assess the possible outcomes of BIMSTEC FTA. Therefore, it is important to carry out further research on this issue. In this backdrop, the main objective of this paper is to examine the possible outcome of BIMSTEC FTA, using computable general equilibrium (CGE) model, on member countries in general and on Bangladesh in particular.

The rest of the paper is organized as follows. Section 2 discusses the features of the framework agreement on BIMSTEC FTA. A brief picture of intra-BIMSTEC trade scenarios is presented in Section 3. Methodological aspects and data sources are discussed in Section 4, while simulation results of alternative scenarios are examined in Section 5. Finally, concluding remarks are made in Section 6.

2. Features of the Framework Agreement on BIMSTEC FTA

The framework agreement on BIMSTEC FTA was signed in 2004 but still it is not fully operational. Unlike many FTA agreements, the framework agreement on BIMSTEC FTA provides more scope for cooperation, going beyond trade in goods to bring trade in services and promote investment cooperation. In such a situation BIMSTEC FTA is relatively more attractive to its member. It provides clear and well-defined deadlines for various stages of economic integration among the member countries. When the framework agreement was signed, a number of issues like modalities of tariff reduction and elimination, size of the negative list, criteria for rules of origin, mechanism of dispute settlement, safeguard measures, customs operations and negotiations on the agreements on service and investment were left out. The member countries establish the institutional arrangement for conducting negotiations to finalize these issues, as stipulated in the framework agreement. For this purpose, it establishes Trade Negotiating Committee (TNC) for conducting negotiations, which reports to the BIMSTEC Trade/ Economic Ministers through the Senior Trade and Economic Officials Meeting on the progress and outcome of its negotiations. In order to achieve the objective of BIMSTEC FTA, the framework agreement has set the following instruments.

2.1 Trade Liberalization Program

The schedule of tariff reduction is described in Article 3 in the agreement. According to this article, all products, except those included in the negative list would be subject to tariff reduction or elimination. Tariff reduction was to be undertaken following two product schedules, namely fast track product schedule for the least sensitive products and normal track product schedule for the less sensitive products. For both fast track and normal track product, the agreement provides different timeframe for tariff reduction for Non-LDC and LDC member countries. When the framework agreement of BIMSTEC FTA was signed in 2004, the member countries decided to establish a free trade area for transaction of goods from July 2006. But due to political reasons and non-cooperation of some of the member countries, the enforcement of BIMSTES FTA was delayed. Accordingly, in 19th BIMSTEC TNC meeting, timeframe for tariff reduction and elimination was amended.

Table 1 illustrates the time schedule of tariff reduction and elimination according to framework agreement of BIMSTEC FTA as well as its amendment by the 19th BIMSTEC TNC meeting. The table shows that, according to framework agreement (its amendment by 19th TNC meeting), for fast track product, the Non-LDC member countries reduced/eliminated tariff imposed on LDC member countries by 30 June 2007 (30 June 2013) and tariffs among themselves by 30 June 2009 (30 June 2015). The LDC member countries are committed to reduce/eliminate tariffs among themselves by 30 June 2009 (30 June 2015) and tariff imposed on Non-LDC member countries by 30 June 2011 (30 June 2017). For normal track product, Non-LDC member countries are required to reduce/eliminate tariff for the products of LDC member countries within 30 June 2010 (30 June 2016) and tariffs for the products among themselves within 30 June 2012 (30 June 2018). The LDC member countries are required to do the same within 30 June 2015 (30 June 2021) among themselves and within 30 June 2017 (30 June 2023) for Non-LDC member countries.

Table 1: Time Schedule of Tariff Reduction under BIMSTEC FTA

Countries	For India Sri Lanka & Thailand	For Bangladesh, Bhutan, Myanmar & Nepal
Fast Track Product Schedule		
India, Sri Lanka & Thailand	1 July 2006 to 30 June 2009 (1 July 2012 to 30 June 2015)	1 July 2006 to 30 June 2007 (1 July 2012 to 30 June 2013)
Bangladesh, Bhutan, Myanmar & Nepal	1 July 2006 to 30 June 2011 (1 July 2012 to 30 June 2017)	1 July 2006 to 30 June 2009 (1 July 2012 to 30 June 2015)
Normal Track Product Schedule		
India, Sri Lanka & Thailand	1 July 2007 to 30 June 2012 (1 July 2013 to 30 June 2018)	1 July 2007 to 30 June 2010 (1 July 2013 to 30 June 2016)
Bangladesh, Bhutan, Myanmar & Nepal	1 July 2007 to 30 June 2017 (1 July 2013 to 30 June 2023)	1 July 2007 to 30 June 2015 (1 July 2013 to 30 June 2021)

Note: Figures in parentheses show the amended timeframe of tariff reduction and elimination by 19th BIMSTEC TNC meeting.
Source: BIMSTEC (2004) and BIMSTEC (2011)

The modalities of tariff reduction and elimination were also finalized in the 19th BIMSTEC TNC meeting. For goods under fast track, member countries have exchanged their lists of items to be eliminated under the fast track schedule, comprising 10 percent of tariff lines at HS 6 digit level (HS 2007). For tariff reduction/elimination under normal track schedule goods under normal track are divided into two categories, normal track elimination and normal track reduction which are 48 percent and 19 percent of tariff lines at HS 6 digit level. Other than that

of fast track and normal track, some of the goods are placed on the negative list, to which tariff reduction will not be granted at this point. The number of goods under negative list is subject to maximum ceiling which is 23 percent of HS 6 digit level and mutually agreed upon by the member countries. The negative list and the normal track reduction lists would be subject to a periodical review every two years from the date of entry into force of the Agreement of Trade in Goods.

2.2 Rules of Origin

Rules of origin are one of the most powerful trade policy instruments in any FTA. In case of BIMSTEC FTA, the rules of origin are not complex. The member countries had agreed upon the specific issues of rules of origin such as domestic value addition, regional cumulation and product specific rules at 18th TNC meeting held in June 2009 (Lynch 2010, p.144). In order to get preferential treatment under BIMSTEC FTA, products, that are not wholly produced or obtained, must satisfy the criteria of change in tariff sub-heading at HS 6 digit level and at least a local value addition of 35 percent of fob value. There is a concession of value addition criteria for LDC members which are 30 percent of fob value. Under Rule 8 of rules of origin, regional cumulation, if aggregate BIMSTEC content of the final goods (value of such inputs plus local value addition in further manufacture in the exporting member country) is not less than as the local value added content mentioned above are eligible for preferential treatment. In that case, the change in tariff sub-heading is only applicable on all non-BIMSTEC originating materials. In addition, member countries of BIMSTEC agreed on product specific rules for a list of 147 products at HS 6 digit level.

2.3 Dispute Settlement Procedures

There is a specific agreement on dispute settlement procedures and mechanism of the framework agreement on the BIMSTEC FTA with specific time table. Bilateral consultation shall be held within 30 days upon a request made by any member. If the consultation failed to settle the dispute within the period of 60 days the complaining member may proceed directly to request for the constitution of an arbitral tribunal. The arbitral tribunal shall have three members. The complaining member shall appoint an arbitrator to the arbitral tribunal within 20 days after making the request for constitution of the arbitral tribunal. The complained member shall appoint an arbitrator within 30 day of its receipt of such request. The members to the dispute shall endeavor to agree on a third arbitrator, who will function as the Chair of the arbitral tribunal. The findings and recommendation of the arbitral tribunal shall be limited to the rights and obligations of the members provided in the framework agreement. The arbitral tribunal shall submit its final report within 120 days from the date of its composition. The member concerned shall promptly comply with the findings and recommendation of the arbitral tribunal. Each member to a dispute shall bear its own expenses and legal costs. The costs incurred on the Chair of the arbitral tribunal shall be borne in equal parts by the members to the dispute.

2.4 Safeguard Measures

BIMSTEC safeguard measures permit member countries to withdraw the tariff concession to protect domestic industry from serious injury due to increase in import form free trade under BIMSTEC FTA. This safeguard measures are not applicable against a product originating in a member as long as its share of imports does not exceed three percent, and that all other members with less than three percent import share collectively account for not more than nine percent of the import share of importing country. BIMSTEC safeguard measures are not applicable against any products of LDCs if the import of a product from an LDC does not exceed five percent, provided that LDC members with less than 5 percent import share collectively account for not more than 15 percent of the import share of importing country.

2.5 Cooperation and Mutual Assistance in Customs Matters

The member countries of BIMSTEC through their customs administrations shall provide each other administrative assistance for the proper application of customs law, for the prevention, investigation, legal proceedings and combating of customs offences and for cooperation and technical assistance. According to the Article 3 of the Agreement on Cooperation and Mutual Assistance in Customs Matters for BIMSTEC FTA, the scope of the customs assistance includes:

a) Exchange information to be used in administering and enforcing Customs laws;
b) Cooperate in the prevention, suppression and investigation of Customs offences, including smuggling and fraudulent activities;
c) Cooperate in the exchange of intelligence for combating illicit trafficking in narcotics, psychotropic substances, fire arms, ammunition and explosives, articles of historical, artistic, cultural and archaeological value;
d) Cooperate in the research, development and evaluation of new Customs procedures and in the training of personnel or technical assistance;
e) Collaborate in simplifying and harmonizing Customs procedures; and
f) Undertake measures in order to facilitate and expedite cross-border movement of goods.

Requests for assistance under this Agreement shall be communicated directly between the customs administrations concerned. Each customs administration shall designate an official Nodal Point for this purpose and shall provide details thereof to all the BIMSTEC member customs administrations.

3. Intra-BIMSTEC Trade Scenarios

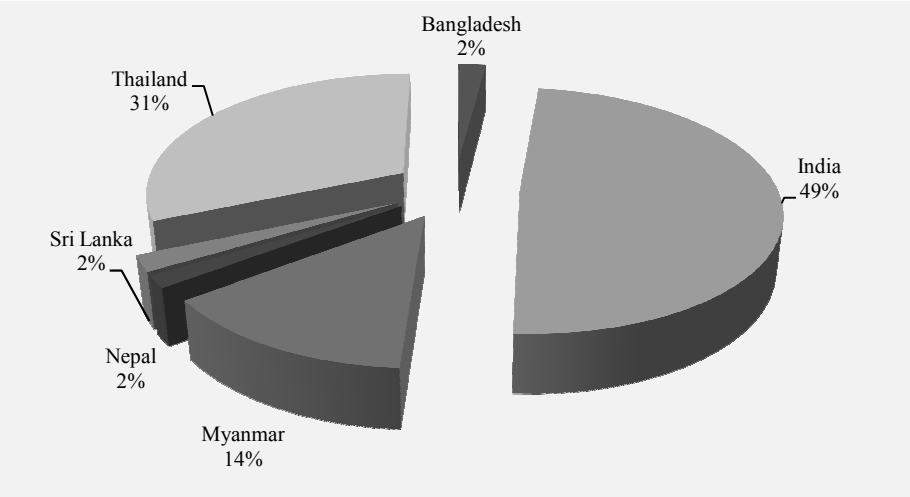
The volume of intra-BIMSTEC trade among its members is very low compared to some other trading blocs in the world. The establishment of a free trade area with low volume intra-regional trade generates limited scope of gaining from such arrangements (Bandara and Yu 2003, p. 1296). Table 2 shows the country-wise share of intra-BIMSTEC trade as a percentage of their total trade in 2011. It is evident from the table that Myanmar, Nepal and Sri Lanka have higher intra-BIMSTEC trade compared to other member countries. Myanmar's intra-BIMSTEC trade is around 36.14 percent of its total trade. The share for Nepal and Sri Lanka is around 59.13 percent and 18.42 percent respectively. In case of Bangladesh, the intra-BIMSTEC trade share is 11.55 percent while for India and Thailand the figures are slightly higher than 3 percent. A wider look at the bilateral trade share from the table reveals that although India and Thailand are the main destinations of trade for other member countries, the intra-BIMSTEC trade share of these two countries are very low. This is because India and Thailand are the two big economies in this sub-regional bloc with large extra-bloc trade. As a result total intra-BIMSTEC trade as a percentage of total trade was only 4.71 percent in 2011.[1] This figure reflects that still now BIMSTEC itself is not a significant trade destination for its members. However, the encouraging sign is that, over time the intra-BIMSTEC trade of its members is increasing more swiftly compared to their extra-block trade (Kabir and Selim 2010, p. 149).

Table 2: Country-wise Share of Intra-BIMSTEC trade in 2011

	Bangladesh	Bhutan	India	Myanmar	Nepal	Sri Lanka	Thailand	BIMSTEC
Bangladesh	-	0.04	9.10	0.27	0.08	0.08	1.99	11.55
Bhutan	..	-	..	..	..	..	..	..
India	0.56	0.06	-	0.22	0.40	0.72	1.08	3.04
Myanmar	0.67	0.00	7.60	-	0	0.03	27.84	36.14
Nepal	0.76	0.12	57.01	0	-	0.02	1.23	59.13
Sri Lanka	0.23	0.00	16.24	0.03	0.00	-	1.91	18.42
Thailand	0.27	0.00	1.79	1.34	0.01	0.13	-	3.54

Source: Calculated based on DOTS (2012)

Figure 1: Country-wise percentage share in intra-BIMSTEC Exports in 2011

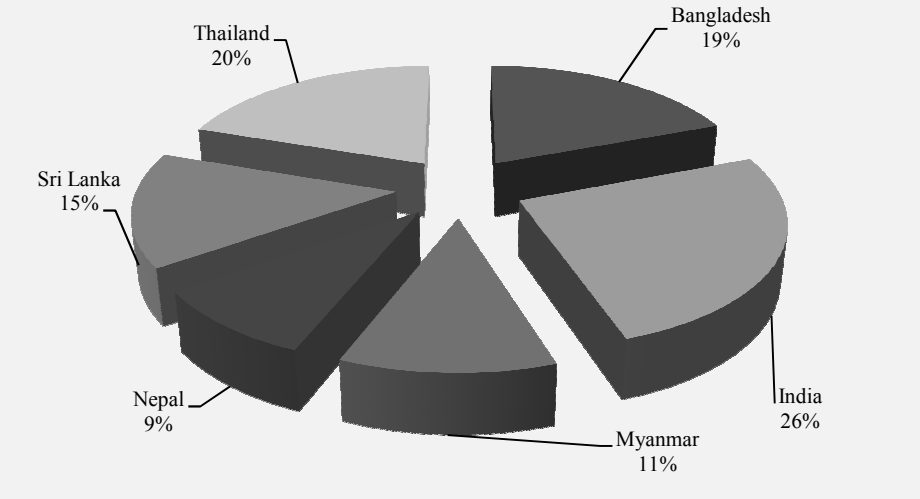


Source: Calculated based on DOTS (2012)

Within this limited intra-BIMSTEC trade, India and Thailand dominates both import and export market in this sub-region. As far as intra-bloc exports share is concerned, figure 1 identifies India as the single largest exporter in this sub-region comprising 49 percent of intra-BIMSTEC exports in 2011. Two other major exporters within

this sub-region are Thailand and Myanmar comprising 31 percent and 14 percent of intra-BIMSTEC exports respectively. This share for Bangladesh, Sri Lanka and Nepal are very low around 2 percent. As far as intra-bloc imports share is concerned, India also has the highest share comprising 26 percent of intra-BIMSTEC imports in 2011 (figure 2). Figure 2 also shows that Thailand's imports share from the bloc is around 20 percent followed by Bangladesh (19 percent), Sri Lanka (15 percent), Myanmar (11 percent) and Nepal (9 percent).

Figure 2: Country-wise percentage share in intra-BIMSTEC Imports in 2011



Source: Calculated based on DOTS (2012)

4. Methodology and Data

The increasing demand for quantitative assessments of FTAs has given rise to the extensive use of global modeling by policy analyst (Bandara and Yu 2003, p. 1304). To quantify the various effects of an FTA and for better understanding of its effects, as an analytical tool, multi-regional computable general equilibrium (CGE) models have been widely used. In the trade related literature one can find that a large number of CGE modelling applications deal with issues related to FTAs. Although there are criticisms against the use of CGE models in analyzing the effects of FTAs (see Panagariya, 2000; and Panagariya and Dattagupta, 2001), Baldwin and Venables (1995), DeRosa (1998) and Robinson and Thierfelder (1999) have clearly recognized the contributions made by CGE models in evaluating FTAs (cited in Bandara and Yu 2003, p. 1304). The current paper has used Global Trade Analysis Project (GTAP) model and data to analyze the effects of BIMSTEC FTA. GTAP is a multi-country CGE model which captures various aspects of world economic activity (see Hertel, 1997). At present, the GTAP model and database has become a useful tool for analyzing the effects of FTAs. Since the main objective of this paper is to assess the impacts of BIMSTEC FTA on its members, a multi-regional CGE model like GTAP is an appropriate analytical tool.

In GTAP model each region has a single representative household. The income of these households mainly depends on factor income and tax revenue. The allocation of expenditure of these households is classified as private expenditure, government expenditure and savings, according to a Cobb-Douglas aggregate utility function. In GTAP, private consumption and government consumption expenditures are described by Constant Difference of Elasticities (CDS) expenditure function and Cobb-Douglas function respectively. Constant Elasticity of Substitution (CES) function is applied to substitute same type of domestic and foreign produced goods. In case of production, GTAP model applies constant returns to scale production function. Leontief and CES function is applied to describe the technology. Two broad categories of inputs are used to maximize profits by producers; these are intermediate inputs and primary factors. For a given level of output the input allocation assumed to be done efficiently to minimize the total cost of production. The factor movement is restricted among the region but intermediate input can be used from domestically produced or imported input goods. The GTAP database covers all the bilateral trade, transport and protection data that link 113 country/regional economic databases (version 7). These transport and protection data drive a wedge between prices in regions, i.e., the same products may be more expensive in one region than in another because of the protection. International trade is modelled by tracing all bilateral flows. In GTAP, international capital flows are governed by a global bank. This bank collects savings and uses these for international investments. Since savings are polled by the global bank before being sued for investments there is no tracing of bilateral capital flows. The version 7 of GTAP database,

which is used to analyze the impact of BIMSTEC FTA, represents the world economy in 2004. This version has 113 regions, 57 commodities and 5 factors of production (Hossain 2011, p. 170).
Since the main objective of this paper is to assess the impact of BIMSTEC FTA on its members in general and on Bangladesh in particular, all the member countries are separated as much as possible. Considering Bangladesh's trade relationships China, United States and European Union are also separated as different regions. Other regions are combined as rest of the world. In case of commodity aggregation, agriculture, manufacturing and service sectors are separated and 57 commodities are aggregated as 9 commodities. The strategy behind this aggregation is to separate main traded commodities of BIMSTEC member countries, considering both intra-BIMSTEC trade and trade with rest of the world (see appendix table A1). There are five factors of production in GTAP model which are kept unchanged. The factors of production include land, unskilled labor, skilled labor, capital and natural resources.

Box 1: Simulation Scenarios

Simulation 1: All the BIMSTEC member countries reduce their bilateral tariff rates to zero, while the tariff rates against countries outside the region remain unchanged. Standard neo-classical closure, full employment and flexible wage rate is used.

Simulation 2: Simulation 1 is extended by changing the neo-classical closure by fixing wage rate and making unskilled labor supply flexible.

In this paper two simulations have been performed to examine the effects of BIMSTEC FTA on its member countries. As opposed to quantify the effects of actual fast track and normal track tariff reduction/elimination and maintaining the existing tariff rates on commodities under negative list, the paper performs a policy scenario involving a 100 percent tariff cut on all products. The reasons for not separating the products under negative list is that the product items considered under BIMSTEC FTA are very narrowly defined at 6-digit HS level and it is very difficult to aggregate them in a sensible way according to GTAP commodity classification. However, this simulation will give an idea and direction of possible effects of BIMSTEC FTA. Another issue is, the standard GTAP model used in this paper is a neo-classical full employment model. Neo-classical closure used in this model is full employment and flexible wage rate. But most of the BIMSTEC member countries except Thailand are in general labor surplus countries with high unemployment in unskilled labor. To capture this unemployment situation another simulation is performed by changing the standard neo-classical closure by fixing the wage rate and make unskilled labor supply flexible. Two simulation scenarios are summarized in box 1.

5. Simulation Results

The results of two policy simulations are discussed and analyzed in this section. Simulation results are reported in appendix tables A2 to A6. To get an immediate picture of the outcome of any policy option, perhaps it is the best way to look at the welfare impact of such policy. In GTAP welfare effects are measured as equivalent variation (EV) which is equal to the difference between expenditure required to obtain the new level of utility at initial prices and the initial expenditure (Hossain 2011, p. 170). The changes in equivalent variations associated with each simulation and its decompositions are presented in appendix table A2. It is observed from the table that all the BIMSTEC member countries except Bangladesh experience substantial welfare gains from simulation 1. Bangladesh experiences a welfare loss of 213 million US dollar. The welfare gain is highest in case of Thailand which is 575 million US dollar followed by India (380 million US dollar), Sri Lanka (149 million US dollar) and Myanmar (70 million US dollar). All other regions lose because of diverted trade and unfavourable terms of trade effects. The sources of welfare change are also reported in table A2 and it is observed that in simulation 1 there are three determining factors of equivalent variation *i.e.,* allocative efficiency, terms of trade (TOT) effects and investment-saving (I-S) effects.[2] If we look at the allocative efficiency we can see that complete removal of all tariffs among BIMSTEC member countries only improves the allocative efficiency in Thailand while Bangladesh, India and Myanmar experience loss due to inefficient resource reallocation. Bangladesh is the highest loser among the members in terms of allocative efficiency. Commodity decomposition of allocative efficiency gives a wider picture to understand this effect. From table A3 it is revealed that Bangladesh experience large amount of allocative efficiency lose from textile and heavy manufacturing industries. However, allocative efficiency is positive in grains and crops, and garments sectors. A positive efficiency gain in garments sector is very encouraging for Bangladesh as this sector comprises around two third of its export earnings. India experiences positive resource reallocation in grains and crops but

reallocation is inefficient in processed food, garments and heavy manufacturing industries. In Thailand effect of resource reallocation is positive in almost all the sectors. Sri Lanka efficiently reallocated its scarce resources in grains and crops but failed to do the same in garments sector while resource reallocation in Myanmar is inefficient in most of the sectors. The second important component of equivalent variation is TOT effect which is also reported in table A2. Due to the relative increase of price of imports, Bangladesh experiences a negative TOT effect of 129 million US dollar in simulation 1. All other BIMSTEC member countries experience a favourable TOT effects with a relative increase in the price of exports as compared to that of imports. The I-S effects are positive for India, Sri Lanka and Myanmar and negative for Bangladesh and Thailand.

Simulation 2 performs by incorporating unemployment closure. As most of the BIMSTEC member countries are labour surplus countries with high unemployment rate in unskilled labour, the conventional model has been modified to reflect this ground reality. The results of simulation 2 show that most of the BIMSTEC member country's equivalent variation has increased compared to the results from simulation 1. In contrast to welfare loss of 213 million US dollar in simulation 1, Bangladesh experiences a welfare gain of 200 million US dollar in simulation 2. This welfare gains mainly generated from endowment effects. Endowment effect is a measure of how much the countries gain due to increase in employment of factors of production. In Bangladesh, the total unemployment pool is so large that even a small increase in labour employment (table A6) may have resulted a large aggregate welfare gains as in case of simulation 2. The situation of allocative efficiency has also improved in simulation 2 due to the employment generation.

Appendix table A4 shows the percentage changes in industry output. Trade liberalization under BIMSTEC FTA does not give substantial raise of output levels for member countries. However, in Bangladesh, the output levels of textile and garments raise in both the simulations. As a result Bangladesh's exports of textile and garments products are not only increased within BIMSTEC sub-region but also in the US and EU, the main export destinations of Bangladesh's textile and garments products (table A5). Table A5 also shows that Bangladesh's bilateral exports not only increase within BIMSTEC countries but also with the rest of the world. However, intra-BIMSTEC export generation is not very significant for Bangladesh compared to the increase in its extra-bloc export.

Table A6 reports macroeconomic impact of BIMSTEC FTA on member countries. It is observed from the table that all the member countries except Bangladesh experience an increase in real GDP in both the simulations. The underlying reasons for GDP loss in Bangladesh is inefficient resource reallocation as well as a decrease in the output levels in some of its productive sectors. The balance of trade situation is favorable only in case of Myanmar among the member countries. All other members experience a deterioration of balance of trade due to the relative increase of value of exports. All the BIMSTEC member countries experience an increase in wage rate while the level of employment in unskilled labor is increased in simulation 2 in which the unemployment closure is used.

6. Conclusion

This paper has examined the possible impacts of BIMSTEC FTA on its member countries using GTAP model and database. Two simulations have been performed considering both neo-classical full employment situation and unemployment situation. From the simulation results it is observed that BIMSTEC FTA will be welfare enhancing for all its members. Although, in first simulation, with full employment assumption, the results imply an adverse welfare effect for Bangladesh, this might not be true with the presence of high unemployment rate. This is confirmed from the results of second simulation, with unemployment assumption, where Bangladesh experiences a substantial welfare gain due to employment generation. The estimated results also suggest that Bangladesh's terms of trade will be deteriorated whiles all other members experience a favorable terms of trade effect. In general the level of output might not increase significantly within the bloc. The change of output level will be worse in case of Bangladesh and it will experience a real GDP fall. But, the real GDP growth will be positive for other BIMSTEC member countries. In terms of intra-BIMSTEC export generation, the role of BIMSTEC FTA will not much significant for Bangladesh. It is also observed from the results that due to the relative increase of imports most of the member countries trade balances will be deteriorated. Above all, the most encouraging fact is that this trading arrangement might generate employment for its members. Since poverty is a common phenomenon in majority of the BIMSTEC countries, by creating employment opportunities for unskilled labor, BIMSTEC FTA can reduce poverty within the bloc.

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Notes

Note 1: Calculated based on DOTS (2012).

Note 2: Allocative efficiency refers to the efficient sector-wise allocation of scarce resources to produce the optimal combination of output. TOT effect refers the changes in relative prices of exports and imports and I-S effect refers the changes in price of capital goods and savings.

APPENDIX

Table A1: Regional and Commodity Aggregation in GTAP Model

Regional Aggregation	
New region	**Comprising old regions**
Bangladesh	Bangladesh.
India	India.
Sri Lanka	Sri Lanka.
Myanmar	Myanmar.
Thailand	Thailand.
China	China.
USA	United States of America.
EU	Austria; Belgium; Cyprus; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Latvia; Lithuania; Luxembourg; Malta; Netherlands; Poland; Portugal; Slovakia; Slovenia; Spain; Sweden; United Kingdom; Ethiopia.
ROW	All other countries of the World
Commodity Aggregation	
New Sector	**Comprising old commodities**
Grains and Crops	Paddy rice; Wheat; Cereal grains nec; Vegetables, fruit, nuts; Oil seeds; Sugar cane, sugar beet; Plant-based fibers; Crops nec; Processed rice.
Livestock and Meat Products	Cattle, sheep, goats, horses; Animal products nec; Raw milk; Wool, silk-worm cocoons; Meat: cattle, sheep, goats, horse; Meat products nec.
Mining and Extraction	Forestry; Fishing; Coal; Oil; Gas; Minerals nec.
Processed Food	Vegetable oils and fats; Dairy products; Sugar; Food products nec; Beverages and tobacco products.
Textiles	Textiles.
Garments	Wearing apparel.
Light Manufacturing	Leather products; Wood products; Paper products, publishing; Metal products; Motor vehicles and parts; Transport equipment nec; Manufactures nec.
Heavy Manufacturing	Petroleum, coal products; Chemical, rubber, plastic prods; Mineral products nec; Ferrous metals; Metals nec; Electronic equipment; Machinery and equipment nec.
Services	Electricity; Gas manufacture, distribution; Water; Construction; Trade; Transport nec; Sea transport; Air transport; Communication; Financial services nec; Insurance; Business services nec; Recreation and other services; PubAdmin/Defence/Health/Educat; Dwellings.

Source: GTAP Database

Table A2: Decomposition of Equivalent Variation (million US$)

	Country/Region	Allocative Efficiency	Endowment Effect	TOT Effect	IS Effect	Total
Simulation 1	Bangladesh	-80	0	-129	-4	-213
	India	-9	0	324	65	380
	Sri Lanka	5	0	117	27	149
	Myanmar	-12	0	79	3	70
	Thailand	100	0	560	-85	575
	China	-4	0	-110	10	-104
	USA	-14	0	-64	-49	-127
	EU	-253	0	-137	-9	-399
	ROW	-101	0	-650	43	-708
Simulation 2	Bangladesh	18	334	-145	-7	200
	India	59	413	318	64	854
	Sri Lanka	32	144	109	23	307
	Myanmar	-16	-6	80	3	61
	Thailand	98	0	560	-85	573
	China	-24	-74	-107	11	-194
	USA	-13	0	-70	-52	-135
	EU	-262	0	-140	-7	-409
	ROW	-104	0	-613	50	-668

Source: GTAP simulation results

Table A3: Decomposition of Allocative Efficiency (million US$)

	Sector	Bangladesh	India	Sri Lanka	Myanmar	Thailand
Simulation 1	Unskilled Labor	0	0	0	0	0
	Grains and Crops	21	11	10	1	4
	Livestock and Meat Products	0	1	0	0	0
	Mining and Extraction	-8	4	1	-5	54
	Processed Food	-2	-5	0	0	12
	Textiles	-59	3	-1	-2	6
	Garments	9	-11	-7	-1	-2
	Light Manufacturing	5	9	-2	-1	21
	Heavy Manufacturing	-47	-20	4	-4	-6
	Services	0	-2	0	0	10
	Total	-81	-10	5	-12	100
Simulation 2	Unskilled Labor	84	14	5	-2	0
	Grains and Crops	23	7	10	1	4
	Livestock and Meat Products	0	1	0	0	0
	Mining and Extraction	-4	9	1	-5	52
	Processed Food	2	-2	1	0	13
	Textiles	-66	4	-1	-2	6
	Garments	10	-10	-7	-1	-2
	Light Manufacturing	7	13	-1	-1	21
	Heavy Manufacturing	-37	16	6	-5	-7
	Services	0	7	17	0	10
	Total	19	59	32	-16	97

Source: GTAP simulation results

Table A4: Industry Output of Commodity (percentage change)

	Sector	Bangladesh	India	Sri Lanka	Myanmar	Thailand
Simulation 1	Grains and Crops	-1.28	0.08	-0.5	1.81	-0.2
	Livestock and Meat Products	-0.79	-0.06	-0.12	-4.94	-0.33
	Mining and Extraction	1.42	-0.18	-0.11	-0.67	-0.39
	Processed Food	-1.05	-0.03	1.42	-5.76	0.58
	Textiles	3.86	0.37	-6.93	-8.01	1.3
	Garments	9.78	-1.14	-7.31	-3	-1.27
	Light Manufacturing	-3.87	-0.07	2.78	-7.14	-0.39
	Heavy Manufacturing	-4.6	0.09	8.5	-4.42	-0.41
	Services	-0.22	-0.02	0	0.13	0.18
Simulation 2	Grains and Crops	-0.82	0.14	-0.09	1.73	-0.2
	Livestock and Meat Products	-0.08	0	0.57	-5.07	-0.33
	Mining and Extraction	1.85	-0.15	0.28	-0.69	-0.38
	Processed Food	-0.57	0.03	1.87	-5.87	0.59
	Textiles	5.12	0.49	-6.14	-8.48	1.32
	Garments	10.85	-0.95	-6.73	-3.18	-1.28
	Light Manufacturing	-2.97	0.02	3.85	-7.63	-0.38
	Heavy Manufacturing	-3.86	0.15	9.43	-4.87	-0.41
	Services	0.63	0.07	1.08	-0.01	0.17

Source: GTAP simulation results

Table A5: Changes of Bilateral Exports from Bangladesh (million US$)

	Sector	India	Sri Lanka	Myanmar	Thailand	China	USA	EU	ROW
Simulation 1	Grains and Crops	28.3	0	0	2.5	3.6	0.5	9.7	31
	Livestock and Meat Products	0.3	0	0.1	0.1	0	0.1	0	0.2
	Mining and Extraction	1.8	0	0	280.7	0.1	-0.1	-0.4	-1.5
	Processed Food	5.5	0	0	14.9	0.2	13	17.4	6.1
	Textiles	43.5	1.3	0	47.2	0.6	63	348.8	86.4
	Garments	5.4	0.1	0	1.6	0.3	297.9	362.5	67.5
	Light Manufacturing	11	0.1	0.1	0.3	1.5	2.7	16.7	14.2
	Heavy Manufacturing	58.6	9	0.5	7.9	1.2	3.4	5	14.4
	Services	0	0.1	0	0	-0.1	-5.7	-3.7	-4.9
Simulation 2	Grains and Crops	17.9	0	0	1	0.2	0.1	0.6	2.4
	Livestock and Meat Products	0.3	0	0.1	0.1	0	0.1	0	0.1
	Mining and Extraction	-0.9	0	0	248	-0.2	-0.2	-0.5	-4.4
	Processed Food	4.6	0	0	13.8	0	3.9	4.7	1.5
	Textiles	33.8	0.7	0	43.5	0.2	33.8	218.9	31.3
	Garments	5.1	0.1	0	1.5	0.2	193.2	242.3	45
	Light Manufacturing	10.2	0.1	0.1	0.2	0.5	0.6	3.8	3.4
	Heavy Manufacturing	47.1	8.1	0.3	6.3	0.1	0.4	1	3.2
	Services	0	0.1	0	0.1	-0.1	-3.8	-2.4	-3.2

Source: GTAP simulation results

Table A6: Macroeconomic Impacts of BIMSTEC FTA

	Changes in	Bangladesh	India	Sri Lanka	Myanmar	Thailand
Simulation 1	Real GDP (%)	-0.76	0.43	2.1	4.65	0.9
	Balance of Trade (million US$)	-194.09	-388.85	-206.25	27.77	-1357.77
	Value of Imports (%)	10.16	1.77	5.54	3.04	1.22
	Value of Exports (%)	10.65	1.79	4.5	4.27	-0.08
	Skilled wage rate (%)	0.75	0.53	3.44	2.11	1.27
	Unskilled wage rate (%)	0.77	0.55	3.2	4.56	1.13
	Unskilled employment (%)	--	--	--	--	--
Simulation 2	Real GDP (%)	-0.02	0.51	2.75	4.58	0.9
	Balance of Trade (million US$)	-243.93	-428.57	-249.51	27.69	-1350.67
	Value of Imports (%)	11.13	1.86	6.34	2.98	1.22
	Value of Exports (%)	11.38	1.86	4.97	4.2	-0.08
	Skilled wage rate (%)	1.15	0.58	3.83	2.03	1.27
	Unskilled wage rate (%)	--	--	--	--	--
	Unskilled employment (%)	2.03	0.21	2.67	-0.37	0

Source: GTAP simulation results