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Unlocking Bangladesh-India Trade

Emerging Potential and the Way Forward

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Abstract

The primary objective of this study is to analyze the impact on Bangladesh of increased market access in India, both within a static production structure and also identifying dynamic gains. The study shows that Bangladesh and India would both gain by opening up their markets to each other. Indian investments in Bangladesh will be very important for the latter to ramp up its exports, including products that would broaden trade complementarity and enhance intra-industry trade, and improve its trade standards and trade-handling capacity. A bilateral Free Trade Agreement would lift Bangladesh's exports to India by 182 percent, and nearly 300 percent if transaction costs were also reduced through improved connectivity. These numbers, based on existing trade patterns, represent a lower bound of the potential increase in Bangladesh's exports arising from a Free Trade Agreement. A Free Trade Agreement would also raise India's exports to Bangladesh. India's provision of duty-free access for all Bangladeshi products (already done) could increase the latter's exports to India by 134 percent. In helping Bangladesh's economy to grow, India would stimulate economic activity in its own eastern and north-eastern states. Challenges exist, however, including non-tariff measures/barriers in both countries, excessive bureaucracy, weak trade facilitation, and customs inefficiencies. Trade in education and health care services offers valuable prospects, but also suffers from market access issues. To enable larger gains, Bangladesh-India cooperation should go beyond goods trade and include investment, finance, services trade, trade facilitation, and technology transfer, and be placed within the context of regional cooperation.

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Unlocking Bangladesh-India Trade: Emerging Potential and the Way Forward

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Key words: Bangladesh, India, FTA, Trade facilitation, Trade liberalization, CGE model

JEL codes: F10, F13, F15, F17

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1. Introduction

Despite bonds of culture and a shared history, as well as neighborly proximity, economic ties between Bangladesh and India are far below potential. There is a feeling that rapid growth in both countries and increasing levels of economic sophistication in India now present opportunities for enhanced economic cooperation. Bangladesh could export far more, for example, to India's vast market, and Indian firms could invest in Bangladesh, benefiting from abundant and relatively inexpensive labor, and re-export to India as well as other countries. And there are plentiful opportunities for trade in services.

Current reality is different. Trade in South Asia in general—and between India and Bangladesh, in particular—faces innumerable barriers, some of which are purely economic in nature. Because of these barriers, the loss to industry and consumers in general is considerable. For example, if markets were to open up effectively, Bangladesh could increase its exports of leather and ceramic products to India, and India could increase its sugar exports to Bangladesh, where currently it is being smuggled in. Pakistan could increase its trade in fresh and dry fruits. India could buy molasses and cement from Pakistan and export machinery back, or increase its export of yarn to Sri Lanka. Since this is not the case at present, South Asian traders have to contend with a multitude of trade barriers, while the absence of proper facilitating mechanisms multiplies trade costs. For example, a surgical equipment manufacturer in Pakistan sells equipment to Indian hospitals via a third country simply because India and Pakistan do not trade in these products directly. The landed cost of *jamdani sarees* or *hilsa* fish from Bangladesh in the West Bengal state of India is high because the trade standards adopted by the two countries are very different. There are many other examples. Pakistan imports tea from Kenya, when neighboring India and Sri Lanka offer much better options. India exports a significant amount of cotton yarn to Bangladesh, but not to Sri Lanka or Nepal, which are deficient in cotton yarn. As a result, informal trade in South Asia has grown considerably and in many cases exceeds the formal trade volume.

Better market access, improved physical connectivity and transit, and energy trade between India and Bangladesh are important instruments for unlocking bilateral trade potential. Greater engagement in these areas would also stimulate employment and other economic and social activities, which in turn would help to reduce poverty (particularly in the border areas), enhance foreign direct investment (FDI) flows, and generate new business opportunities for the private sector. Bilateral trade and investment offer immense opportunities for accelerating growth and reducing poverty. India could become a hub for stimulating the growth of intra-industry trade and boosting FDI inflow to Bangladesh. At the same time, Bangladesh can become an additional source of trade and investment for India's eastern and north-eastern states. Furthermore, in view of several regional and sub-regional cooperation initiatives involving India and Bangladesh, greater bilateral economic cooperation and integration between these two economies is a critical step for an integrated South Asia. This integration will eventually provide a basic foundation for a more effective SAARC (South Asian Association for Regional Cooperation) in moving towards more free-market and trade-oriented policies. Deeper India-Bangladesh cooperation would be a part of the process towards a stronger SAARC.

The prospects of cooperation between Bangladesh and India seem brighter than ever, particularly since the governments of both countries have recently shown political interest in this regard. The Prime Ministers of the two countries met in 2010 and 2011[1] and agreed to cooperate in (i) broadening access to each other's markets, (ii) improving physical connectivity, including sub-regional transit, and (iii) electricity trade. Would deeper cooperation in these fields lead to significant economic and social benefits? A full-length study on bilateral economic cooperation between India and Bangladesh would be needed to answer that question.

1 Refer to the joint communiqué issued on the occasion of the visit of the Prime Minister of Bangladesh to India on January 12 2010, and the joint statement issued on the occasion of the visit of the Prime Minister of India to Bangladesh on 7 September 2011.

This study's primary objective is to explore the benefits for trade and economic growth that could be derived from enhanced market access for Bangladesh in India, and improved physical connectivity between the two countries. It studies the impact of market access on trade in goods, an area of particular interest to Bangladesh. It also analyzes trade facilitation and transit issues between the two countries, and examines a set of emerging challenges for the region, setting out a road map for deepening bilateral economic relations.

Data and Methodology

The study is based on secondary data.[2] A computable general equilibrium (CGE) model was used to address market access issues and to assess the impact of, say, a free trade agreement (FTA) on potential exports. The indirect effects of even a single tariff reduction may be quite complex, and this complexity increases with the number of trade policies and markets involved. As FTAs cover multiple sectors and various trade reforms, they are often simulated using CGE modeling. The CGE model relies on standard microeconomic theory for rigor and consistency and on computer algorithms for model-solving.

An augmented gravity model was also used to assess the effect of trade facilitation and trade cost elements on bilateral trade. Estimated results from this partial equilibrium model would help to estimate the potential for trade, whereas those from the CGE model would provide directions to the way forward.

2. Quantifying the Benefits of Trade Liberalization and Facilitation between India and Bangladesh: Brief Literature Review

In trade theory, welfare effects of any regional trade agreement (RTA) are analyzed using two concepts: trade creation and trade diversion.[3] The fundamental arguments for regionalism rest on evidence that suggests RTAs are predominantly trade-creating.[4] The reasoning is that most RTAs are likely to entail relatively low welfare losses resulting from trade diversion, since the countries involved are often neighbors and hence already engaged in substantial trade;[5] countries can "lock in" reform through RTAs, which is often politically less feasible under multilateral arrangements,[6] and if multilateral trade talks fail or stall, trade liberalization is restricted to RTAs. It is further argued that countries can build on the progress of regionalism and ultimately move towards a freer trade regime on the whole. There are, however, some critical arguments against formation of any RTA. It is alleged that an RTA undermines the spirit of multilateralism, and that the world might be divided into protectionist blocs, and that protectionists might accept RTAs in order to oppose further multilateral liberalization. In that case RTAs might be stumbling blocks to multilateralism. Simultaneous, complicated RTA negotiations could also bring about a "spaghetti bowl" effect.[7]

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2 Data came mostly from national government sources of Bangladesh and India, and multilateral development organizations such as the World Bank, IMF, WTO, UNCTAD, UNESCAP, and UNCOMTRADE.

3 Integration is both a policy of protection and a move towards free trade. The effect of the protectionist element of integration is called *trade diversion*, and the effect of the trade liberalization element is called *trade creation*. The RTA's overall effect on the welfare for a member country is determined by comparing the trade-creation and trade-diversion effects. If trade creation dominates, the formation of a RTA will enhance welfare; if trade diversion is greater, the RTA will lead to a welfare loss for the country concerned. Note that if member countries are the low-cost producers of the traded good, there will be no trade-diversion effect and integration will unambiguously increase welfare.

4 See Rodríguez-Delgado (2007).

5 See Krugman (1991).

6 Whalley, (1996), for example, asserted that a desire for increased credibility of domestic reforms was a central preoccupation behind the Mexican negotiating position on the North American Free Trade Agreement (NAFTA).

7 See Bhagwati and Panagariya (1996).

Baysan *et al.* (2006) have argued that the economic case for any regional integration in South Asia has been relatively weak. They point to three important features of the South Asian economies that they believe make a regional FTA economically unattractive. Firstly, the economies are relatively small: despite its population (one-fifth of the world), the region's per-capita income is low, so its economic size remains small: less than 5 percent of the world's GDP, and just 0.4 percent if India is discounted. Since, as Baysan *et al.* contend, it is improbable that the most efficient suppliers to the member countries are located within the region, the probability that the FTA would be largely trade diverting is quite high. Secondly, they argue that the levels of protection among all South Asian countries, with the possible exception of Sri Lanka, are too high to make a regional arrangement practical. Third, they contend that when countries in an FTA are allowed to choose sectors to exclude from tariff preferences, domestic lobbies press to protect those sectors of their country that may not withstand foreign competition. The rules of origin, too, may be misused by bureaucrats to block imports if an inefficient domestic competitor is affected.

Baysan *et al.*'s first argument, however, may not apply to bilateral trade between India and Bangladesh, since India has been a major source of imports for Bangladesh, suggesting that India might be the most efficient import source for many products. Secondly, study has shown that tariffs in India are often redundant because competition between Indian producers is so intense that it forces down prices domestically, even to levels below world prices.[8] The third argument may stand, however, because the sensitive lists of SAFTA members are long.

Empirical quantitative studies on regional integration in South Asia differ significantly in terms of the methodologies employed. Broadly, three types of models have been used: (i) gravity models; (ii) partial equilibrium models; and (iii) CGE models.

Gravity models have been widely used to predict the impact of RTAs on bilateral trade flows,[9] and their findings have been mixed.[10] Srinivasan and Canonero predicted that the impact of SAFTA on trade flows would be small for India but much larger for the smaller countries. Coulibaly found net export creation, whereas Tumbarello and Hirantha found net trade creation from the South Asian Preferential Trading Arrangement (SAPTA). On the other hand, Hassan observed net trade diversion effects from SAPTA, and Rahman (2003) found that regional integration is unlikely to generate significant trade expansion in this region. Using an augmented gravity model, Rodríguez-Delgado found that trade liberalization under SAFTA might influence regional trade flows mainly by increasing India's exports and both Bangladesh's and Nepal's imports.

The advantage in partial equilibrium models[11] is that they are generally based on disaggregated data and are also flexible, which facilitates sector-specific study. However, they ignore general equilibrium interactions and thus cannot capture inter-sectoral effects on the economy.

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8 See Pursell (2004) and World Bank (2004).

9 The gravity models basically try to explain bilateral trade flows with a set of explanatory variables, which in turn try to predict the impact of the arrangement on bilateral trade flows. Typically, the exercise involves estimating a bilateral trade-flow equation with bilateral trade (imports, exports, or total trade at the aggregate or sector level) as the dependent variable and country characteristics, such as the gross domestic products, population, distance, commonality of language or cultural ties and the existence of preferential trade arrangements, as independent variables. Once estimated, the equation can then be used to predict the impact of a union between country pairs that did not have such a union during the sample period.

10 See Srinivasan and Canonero (1995), Hassan (2001), Coulibaly (2004), Hirantha (2004), Tumbarello (2006), Rahman (2003), and Rodríguez-Delgado (2007).

11 The major partial equilibrium studies on RTA in South Asia have been Govindan (1994), DeRosa and Govindan (1995), Pursell (2004), and the World Bank (2006).

To explore the potential of an India–Bangladesh bilateral FTA, the World Bank (2006) provided a comparative assessment between Bangladesh and India with respect to cement, light bulbs, sugar, and readymade garments (RMGs). The partial equilibrium simulation suggested that for cement, lights bulbs, and sugar the likely effects of an FTA between Bangladesh and India were an expansion of Indian exports to Bangladesh, but no exports from Bangladesh to India. This is mainly because Indian export prices for these products are substantially lower than ex-factory, before-tax prices of the same or similar products in Bangladesh. The simulations for RMGs predicted increased Bangladeshi exports to India and also increased RMG exports from India to Bangladesh. The study found that an FTA would bring large welfare gains for consumers in Bangladesh provided there is adequate expansion of infrastructure and administrative capacity at custom borders. It, however, cautioned that the benefits of such an FTA for Bangladesh could be wiped out if it had the effect of keeping out cheaper, third-country imports (mainly from East Asia), and such trade diversion costs could be large. The study suggested that the only way to minimize trade diversion costs would be through further unilateral liberalization.

Studies based on CGE models[12] predict the effects of the trading arrangement on all variables including production, consumption, and trade flows in all sectors of the economy as well as on welfare. These studies employed the Global Trade Analysis Project (GTAP) database and model, though they differ in technicalities and assumptions because of the evolution of the GTAP itself. Pigato *et al.* found that regional integration in South Asia would produce benefits for member nations, though unilateral trade liberalization would yield larger gains. Bandara and Yu argued that, in terms of real income, such integration would lead to gains for India and Sri Lanka, while Bangladesh would stand to lose. Raihan and Razzaque found that Bangladesh would incur a net welfare loss from SAFTA because, despite a positive trade creation effect, the negative trade diversion effect would be large enough to offset the positive gain. However, all other South Asian countries would gain from SAFTA, and as far as any individual country is concerned, India would gain the maximum.

From a trade perspective, and to forge greater regional integration in South Asia, there is a need to reduce trade costs. Despite falling tariffs, trade in South Asia has suffered because of higher trade costs. Banik and Gilbert (2008) found that for a 100 percent increase in trade costs, exports from India to neighboring Asia are expected to fall between 42 percent and 73 percent. De (2009) found that trade transport costs across South Asia are very high and vary across goods and countries. The cost of trade transport increases for landlocked countries like Nepal. Land borders in South Asia are overcrowded and need special attention to reduce time delays and transaction costs. Higher trade costs not only restrict trade but can also reduce the political will for greater regional cooperation.

Other studies show that trade facilitation reforms significantly contribute to greater regional integration in South Asia's intra-regional trade.[13] Hertel and Mirza (2009) observed that trade facilitation plays an important role in determining patterns of global trade flows, where the relative effect on bilateral trade of improving exporters' border logistics is larger than improving importers' trade facilitation. The study also revealed that proportionate increases in intra-regional trade are larger in all countries for textile and clothing, automobiles and parts, and other manufactured goods.

South Asia is notoriously weak in facilitating trade at borders.[14] The region suffers from excessive direct costs and time taken at border crossings, and inefficiencies in cross-border transactions. Trade in this region is also constrained by poor infrastructure, congestion, high costs, and lengthy delays. These problems are particularly severe at border crossings, many of which pose significant barriers to trade. De and Ghosh (2008) argued that transaction costs of India's exports to Bangladesh have increased despite

[12] Major studies that applied the CGE model to regional integration in South Asia are Pigato *et al.* (1997), Bandara and Yu (2003), and Raihan and Razzaque (2007).

[13] Refer, for example, Asian Development Bank (ADB)-UNCTAD (2008)

[14] See, for example, De (2008a, 2008b), and De (2011).

simplification of documentation at borders. The paper concluded that the rent-seeking informal economy is deep-rooted and makes trade transaction expensive at borders. Sharma (2007) observed that removing such inefficiencies in trade transactions would increase welfare in the region by about US $116 million per annum as compared to a gain in income of US$ 418 million from a preferential removal of regional trade tariffs. However, it is worth noting that some smaller countries in the region gained much more from removal of transaction inefficiencies than from trade liberalization. This underscores the importance of implementing reforms in border infrastructure and logistics in tandem with other policy reforms to enhance regional integration.

Nahar and Siriwardana (2009) examined, in a CGE framework, the contribution of trade liberalization policies to household welfare and poverty in Bangladesh. They found that complete removal of tariffs favors export-oriented, labor-intensive sectors, such as RMGs and the knitting industry in Bangladesh in both the short and long term. They argued that in rural areas trade liberalization has a positive impact on poverty in the short run, and in urban areas it has helped raise poor people to the non-poor category in the long run, despite a negative impact in the short run.

3. Market Access for Trade in Goods and Selected Services

South Asia's ability to integrate successfully with the global economy is drawing increasing international interest. However, bilateral trade barriers present an impediment not only to access for trade in goods between countries but integration of the region as a whole. This section discusses market access issues in bilateral trade in goods, particularly for Bangladesh. It presents the pattern of Bangladesh's trade with other South Asian countries and applies a global general equilibrium model to explore the effects of an FTA between Bangladesh and India.

Table 1: Share of Bangladesh's Exports with Neighbouring Countries*

Country	Year					
	1995	**2000**	**2005**	**2007**	**2008**	**2009**
Bhutan	0.00	0.00	0.02	0.00	0.00	0.00
India	0.79	0.35	1.90	2.31	2.20	1.53
Nepal	0.03	0.00	0.01	0.01	0.01	0.01
Pakistan	1.03	0.91	0.87	0.41	0.40	0.48
Sri Lanka	0.41	0.10	0.13	0.13	0.14	0.12
South Asia total	**2.26**	**1.36**	**2.93**	**2.86**	**2.75**	**2.14**
Rest of the world	97.74	98.64	97.07	97.14	97.25	97.86

*As percentage of total export.
Source: Calculated based on UN COMTRADE.

3.1. Bangladesh's Trade with Neighboring Countries

Intra-regional trade between South Asian countries has been low for decades. Prior to 1951, its share of the region's total trade was in double digits. By 1967, however, as South Asia became progressively more closed to the world market and political rivalry between India and Pakistan intensified, intra-regional trade fell to just 2 percent of the total. It rose through the 1990s and by 2002 had increased to 4.4 percent (Baysan *et al*.). It peaked at 6.21 percent in 2004 and then fell back to 4.46 percent in 2010 (Figure 1a), though this decline in intensity is attributable more to South Asia's increased trade with the rest of the world than to intra-regional declines.[15] The region's outward trade may look healthy, but its internal activity, compared to other regions such as NAFTA, ASEAN, and EU, is very low (Figure 1b). South

[15] During 2004 and 2008, South Asia's trade with the world more than doubled (from US$245 billion in 2004 to US$600 billion in 2008) and increased faster than intra-regional trade (based on IMF DOTS).

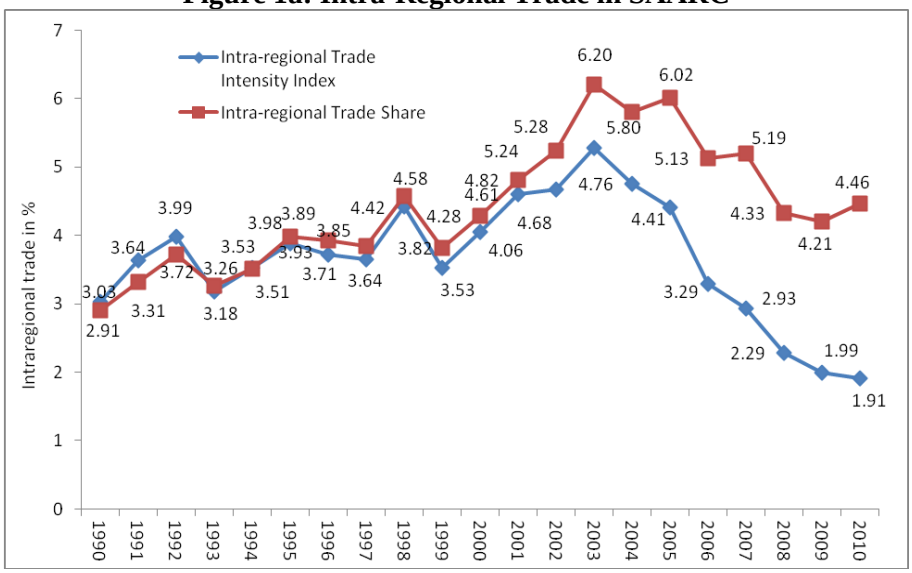
Asia has been an insignificant export destination for Bangladesh for many years. In 1995, its exports to South Asia were only 2.26 percent of its total. By 2009 this had declined to 2.14 percent (Table 1). Bangladesh's dependence on South Asia for imports also declined, from 15.5 percent in 1995 to 12.02 percent in 2009 (Table 2).

Table 2: Share of Bangladesh's Imports with Neighbouring Countries*

Country	Year					
	1995	**2000**	**2005**	**2007**	**2008**	**2009**
Bhutan	0.13	0.03	0.00	0.00	0.00	0.00
India	11.31	6.66	10.86	11.83	13.78	10.36
Nepal	0.01	0.01	0.00	0.00	0.00	0.02
Pakistan	3.95	1.40	1.24	1.41	1.52	1.55
Sri Lanka	0.11	0.13	0.09	0.10	0.09	0.10
South Asia total	**15.52**	**8.22**	**12.20**	**13.34**	**15.39**	**12.02**
Rest of the world	84.48	91.78	87.80	86.66	84.61	87.98

*As percentage of total import.
Source: Calculated based on UN COMTRADE.

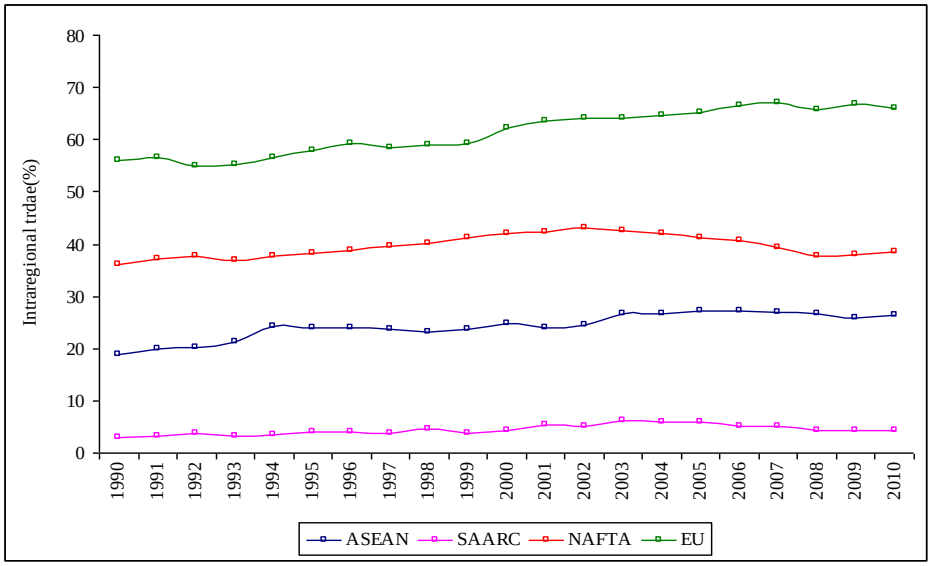
Figure 1a: Intra-Regional Trade in SAARC



Note: Intra-regional trade intensity index is the ratio of intra-regional trade share to that of world trade with the region, based on export data. An index of more than 1 indicates intra-regional trade flows larger than expected given the importance of the region in the world.[16] Intra-regional trade is the percentage of intra-regional trade to total trade of the region, based on export data. A higher share indicates a higher degree of dependency on regional trade.
Source: ARIC, ADB

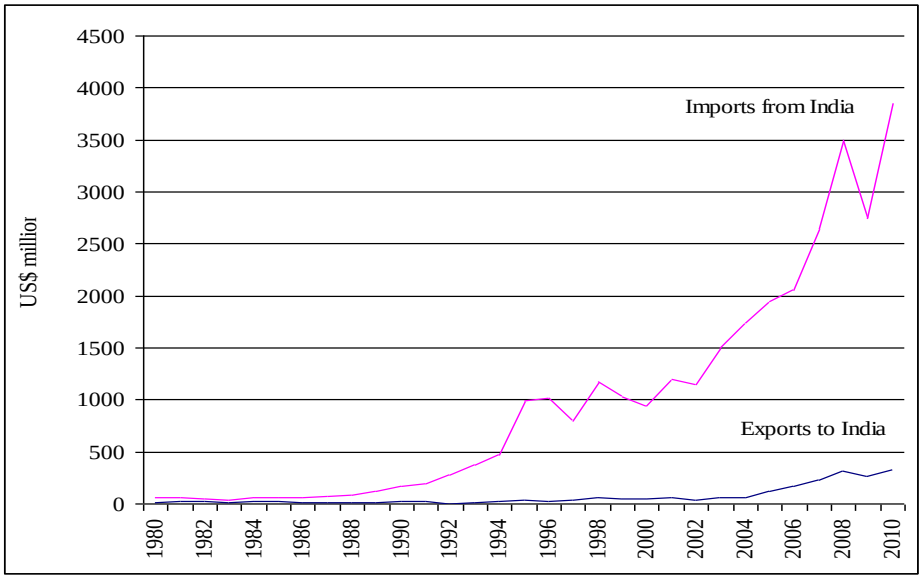
[16] Intra-regional trade intensity index was calculated based on following: $\frac{\sum_{sd} X_{sd} / \sum_{sw} X_{sw}}{\sum_{wd} X_{wd} / \sum_{wy} X_{wy}}$, where *s* is the set of countries in a region, *d* is the destination in the region, *w* and *y* represent countries in the world, and *X* is the bilateral flow of total exports.

Figure 1b: SAARC Trade vs. Other Regions



Source: Calculations based on Direction of Trade Statistics Online Database (DOTS), IMF.

Figure 2: Bangladesh Trade with India (1980–2010)

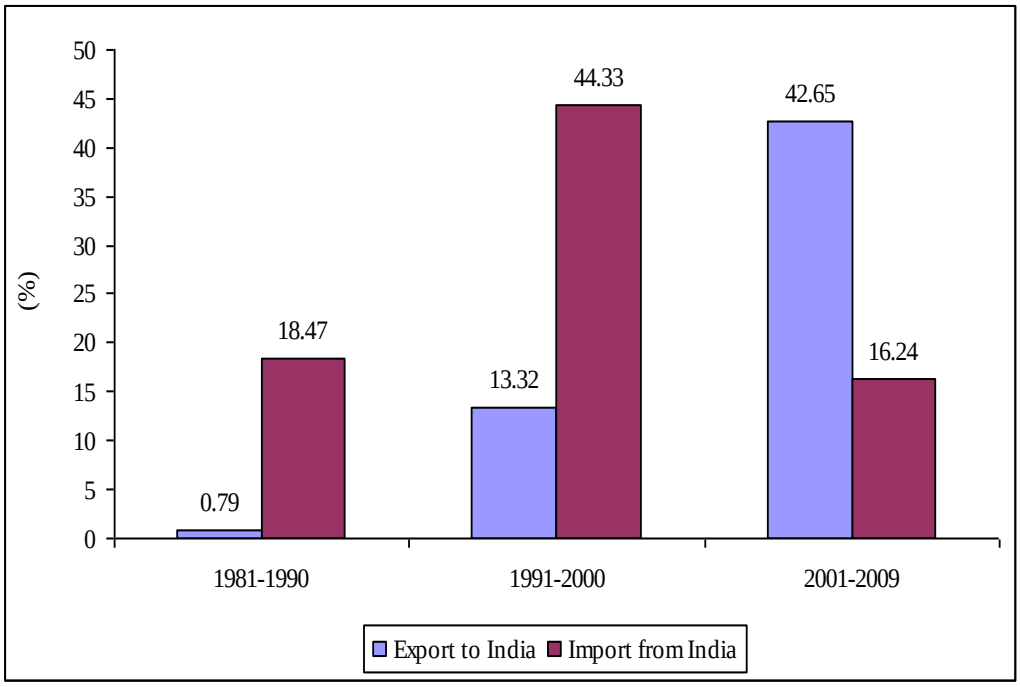


Source: IMF DOTS.

Bangladesh's trade with neighboring countries is unequally distributed, having little to do with Bhutan, Nepal, or Sri Lanka. India is Bangladesh's primary trading partner, followed by Pakistan. Bangladesh has a high deficit in its trade with India—having risen from US$ 44 million to US$ 2.5 billion from 1981-2009 (Figure 2).[17] The ten years from 2000-2009 have seen the fastest rise in Bangladesh's exports to India (42.65 percent per annum growth), while Bangladesh's import growth from India declined to 16.24 percent per annum (Figure 3). Nevertheless, Bangladesh exports are only 1 percent of India's total imports and the range of products is small, mostly fertilizers and jute products. RMGs are Bangladesh's major exports, but the share going to India is very small, at least so far.

[17] From a macroeconomic point of view, the issue is whether the current account deficit is sustainable, and this has not been a concern because Bangladesh has had consistent trade surpluses with trading partners like the US and EU, and has also enjoyed surpluses on its invisibles account.

Figure 3: Bangladesh: Bilateral Trade Growth Rates (%)



Source: Calculated based on IMF DOTS.

3.2. Trade Complementarity and Intra-Industry Trade

The trade complementarity index (TCI) indicates whether trade is likely to grow between countries. Research indicates that trade complementarity between India and Bangladesh is relatively limited, although it has grown.[18] The TCI at the disaggregated level (6-digit HS) for 2002 and 2007 offers mixed results for the two countries (Table 3). Bangladesh had a higher trade complementarity than India in both years,[19] though Bangladesh's decreased and India's increased. The scale of trade is driving the complementarity. Hence, although India's TCI score is lower, the number of commonly traded products is far higher, so India fulfills a larger proportion of Bangladesh's import demands; similarly, Bangladesh's higher TCI score for fewer traded products indicates a smaller trade creation potential with the existing basket of goods. The TCI scores do indicate, however, that bilateral trade between India and Bangladesh has the potential to grow, since trade in similar product lines has grown. This will deepen production networks between the two countries.

The scope for production networks and vertical trade between the two countries can be judged by the intensity of intra-industry trade (IIT) at the disaggregated (6-digit HS) level. IIT occurs when a country simultaneously imports and exports similar types of products within an industry or sector. There are two types of IITs—horizontal and vertical.[20] IIT has been described also as a measure of the degree to which

[18] In some of the literature, it is observed that the lack of complementarity and high degree of competition in export structures imply daunting prospects for expanding regional trade in South Asia. Refer, for example, Pitigala (2005).

[19] The TCI measures the degree to which the export pattern of one country matches the import pattern of another. A high degree of complementarity is assumed to indicate more favourable prospects for a successful trade arrangement. The index lies on the range 0–100, with 100 indicating perfect complementarity. The latest period for Bangladesh trade data in UN Comtrade and other comparable sources was 2007. Before calculating TCI, data coordinates at HS nomenclature H2 were matched for both the countries for both years. For further details on TCI, refer Mikic and Gilbert (2007, p. 72).

[20] Greenaway *et al*. (1995).

trade in a particular sector is based on scale economies and/or market structure.[21] By engaging in IIT, a country can reduce the number of similar goods it produces and benefit from scale economies. Higher IIT ratios suggest that these sources of gains are being exploited. The IIT index measures the degree of overlap between imports and exports in the same commodity category, with a value of 1 indicating pure intra-industry trade and a value of 0 indicating pure inter-industry trade.[22]

Table 3: Trade Complementarity Index (TCI) at 6-digit HS

Reporter (Exporter)	Partner (Importer)	TCI (%)		Number of Commonly Traded Products	
		(2002)	(2007)	(2002)	(2007)
Bangladesh	India	42.0	39.3	1,057	1,752
India	Bangladesh	27.1	32.2	4,256	4,270

Source: Calculated based on UN COMTRADE.

Table 4: Intra-Industry Trade (IIT) Index* in 2007: Common Set of Products at 6-digit HS

HS Code	Product	IIT India	IIT Bangladesh
230220	Rice bran oil	0.935	0.836
721550	Bars and rods other than free-cutting steel not further worked than cold formed/cold finished	0.923	0.421
850720	Other lead-acid accumulators	0.922	0.557
600622	Other knitted or crocheted fabrics of cotton, dyed	0.771	0.929
960719	Other slide fasteners	0.770	0.719
610510	Men's/boys' shirts of cotton	0.758	0.819
621790	Parts of garments/clothing accessories	0.729	0.463
848390	Parts of transmission shafts, cranks, bearing housings, gears or clutch	0.703	0.778
854419	Winding wires of other metals/substances	0.505	0.633
620319	Suits of other textile materials	0.486	0.704
521211	Other unbleached woven fabrics of cotton weighing not more than 200 g/m^2	0.417	0.770

*IIT index was calculated for bilateral trade between India and Bangladesh.
Source: Calculations based on UN COMTRADE.

To identify the vertical IIT, the indices at a high disaggregated level (HS 6) are compared with those at a low disaggregated level (HS 2). IIT indices that are low at HS 6 and high at HS 2 are a necessary, although not sufficient, condition for the existence of vertical trade because they suggest that the countries trade different products in the same sector.[23] Examination of the common set of traded goods between

[21] Horizontal IIT refers to the simultaneous exports and imports of goods classified in the same sector and at the same stage of processing, usually based on product differentiation. Vertical IIT refers to the simultaneous exports and imports of goods classified in the same sector but at different stages of processing, usually based on the "fragmentation" of the production process into different stages, each performed at different locations and taking advantage of the local conditions. See, for example, Sodersten and Reed (1994).

[22] Before calculating IIT, data coordinates at HS nomenclature H2 were matched for both countries. The traditional way to measure the degree of intra-industry trade is the Grubel-Lloyd Index (G-L Index). For further details, refer to Mikic and Gilbert (2007, p. 76).

[23] The authors are grateful to the referee for asking to carry this particular comparison. However, the usual caveat is that there might be aggregation bias. When the IIT index is observed to be low at HS6 but high at HS2, one

India and Bangladesh (Table 4) and the estimated IIT indices for major products for both partners (Appendix 1), brings the following to light:

Table 5: Vertical Trade Potential between India and Bangladesh*

Reporter	Partner	HS2	Commodity (HS2)	IIT (HS2)	IIT** (HS6)	Potential (HS2 – HS6)
India	Bangladesh	03	Fish, crustacean, mollusc, and others	0.970	0.787	0.183
India	Bangladesh	09	Coffee, tea, MATN, and spices	0.801	0.560	0.241
Bangladesh	India	03	Fish, crustacean, mollusc, and others	0.200	0.003	0.197
Bangladesh	India	08	Edible fruits and nuts	0.180	0.001	0.179
Bangladesh	India	14	Vegetable plaiting materials	0.770	0.012	0.758
Bangladesh	India	19	PREP. of cereal, flour, starch, and milk	0.160	0.012	0.149
Bangladesh	India	25	Salt, sulphur, earth, stone, and plastering materials	0.830	0.140	0.691
Bangladesh	India	31	Fertilizers	0.950	0.194	0.756
Bangladesh	India	33	Essential oils, resinoids, perfumery, and cosmetics	0.800	0.476	0.324
Bangladesh	India	39	Plastics and articles thereof	0.440	0.326	0.114
Bangladesh	India	53	Other vegetable textile fibres	0.020	0.000	0.020
Bangladesh	India	54	Man-made filaments	0.330	0.019	0.311
Bangladesh	India	55	Man-made staple fibres	0.530	0.288	0.242
Bangladesh	India	56	Wadding, felt, and nonwoven yarns	0.690	0.041	0.650
Bangladesh	India	63	Other made-up textile articles	0.310	0.235	0.075
Bangladesh	India	84	Nuclear reactors, boilers, parts	0.980	0.277	0.703
Bangladesh	India	87	Vehicles of railway, tram, roll-stock	0.080	0.051	0.029

*IIT indices are calculated for bilateral trade between India and Bangladesh at H2 nomenclature.
**Average of multiple products at HS6.
Source: Calculations based on UN COMTRADE.

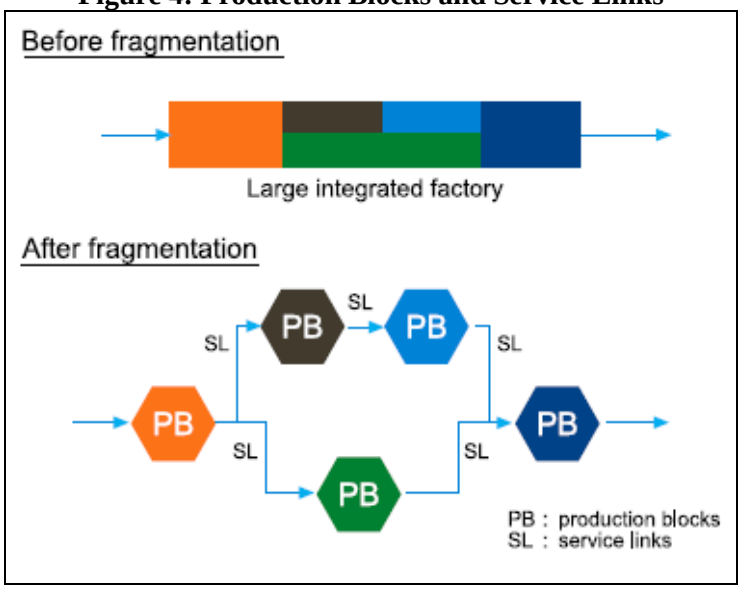
1. The IIT index levels are higher in manufactured products than in primary products, reflecting the greater role of economies of scale in the production of manufactures.
2. IIT index scores suggest there are production-sharing opportunities, in a static sense, in 11 products, with varying potential. The range of this potential varies from textile and clothing (highest concentration) to iron and steel (lowest concentration). Electrical machinery and equipment and mechanical appliances occupy the middle portion of the value chain, with mid-level concentrations. The estimated results in Table 5 support this.
3. Only two sectors for India and Bangladesh had IIT shares in the moderate range: textiles and clothing, and electrical machinery and mechanical appliances. All other sectors had low or negligible IIT shares.

How, then, to intensify vertical IIT between the two countries? Sectors with increasing shares of IIT and high economies of scale are most likely to have bilateral trade growth potential. To realize that potential,

should check on a case-by-case basis whether the different products are differentiated as final products or as parts and components versus final products.

both countries need to further liberalize trade: reduce tariffs (largely in the case of imports into Bangladesh), remove non-tariff barriers, reduce trade costs by improving trade facilitation at borders and then inland. It has been argued that by driving down real trade costs and trade and transport logistics barriers, India and Bangladesh may realize the potential of higher production-sharing arrangements.[24] The World Bank has stated that the drivers of such trade go beyond relative factor endowments to factors such as complementary use of information and communication technologies and natural geographies (clustering, agglomeration, and scale effects).[25] Kimura and Kobayashi argue that according to fragmentation theory, the key to attracting fragmented production blocks is to improve the advantages of location by, for example, developing special economic zones (SEZs) with at least an improved local-level investment climate, and to reduce the cost of service links that connect remotely located production blocks by improving trade and transport facilitation (see Figure 4 that illustrates the link between improved service links and strengthening of production networks).

Figure 4: Production Blocks and Service Links



Source: Kimura and Kobayashi (2009).

Table 6: Number of South Asian Students in Indian Universities

Country	Year				
	1991–92	**1995–96**	**2001–02**	**2005–06**	**2007–08**
Afghanistan	125	118	33	70	976
Bangladesh	565	1244	545	345	368
Bhutan	112	155	254	365	487
Maldives	18	23	14	42	264
Nepal	725	695	873	1252	1821
Pakistan	12	4	3	4	8
Sri Lanka	487	363	504	431	997
South Asia	**2044**	**2602**	**2226**	**2909**	**4965**

Source: Association of Indian Universities (AIU), New Delhi.

[24] See World Bank (2010, 2012).

[25] Manufacturing production sharing (or vertical specialization) is a key characteristic in East Asia's regional integration and export dynamism. See, for example, Yeats (2008), Kimura (2006), Ando (2007), and Kimura and Kobayashi (2009).

3.3. Trade in Services in Education and Health Sectors between Bangladesh and India

A large part of services trade between India and Bangladesh is informal. There has been a small, formal flow of trade in education and health-related services between the two countries but, generally, barriers inhibit this bilateral trade. Barriers to trade in services are not like tariffs; they are typically regulatory, rather than explicit taxes. The barriers between the two countries are complex and have been taxing such trade for years. For example, trade in higher education services—in which Bangladeshi students pursue higher education in India—has fallen at a time when the number of foreign students studying in India has increased strongly overall (Table 6).[26]

Capacity and quality constraints in Bangladeshi institutions encourage students to pursue higher education in India and elsewhere. Generally, consumption abroad (mode 2, students moving abroad to study), is assumed to be the most frequently-used mode by which education services are traded between India and Bangladesh. However, a host of problems prevent the two countries opening up their facilities, raising standards, recognizing each other's standards (mutual recognition), and removing barriers to education services trade. The Bangladesh government has unilaterally allowed foreign direct investment (FDI) through joint ventures in educational services. But Indian educational institutions (except those in information technology) are yet to open branches under mode 3 (commercial presence) in Bangladesh. With the setting up of the South Asian University (SAU) in India, the flow of Bangladeshi students in higher education might rise. The flow presently is unidirectional, to India, and at least some observers believe that there is substantial informal trade in the sector.[27] Both countries need to remove the barriers prohibiting formal movement of students, by issuing hassle-free and long-term multiple-entry visas. The Bangladesh government could facilitate Indian universities and institutions to set up branches in major cities in Bangladesh, with free interaction between faculties of Bangladeshi and Indian universities (say, under mode 4), thereby encouraging inter-personal contact between the two countries. The prime ministerial meeting in Bangladesh in September 2011 brought about some progress in this regard. The two leaders agreed to promote trade in services under the SAARC agreement and directed early completion of work to harmonize the education curricula and mutually recognize degrees in the two countries.[28]

Health services trade consists mainly of patients crossing borders. However, South Asian countries face a host of obstacles to opening up health services, recognizing each other's standards, and removing barriers to health-care trade. Bangladeshi patients visit India for treatment every year, largely because of a paucity of quality domestic health infrastructure.[29] At the same time, the informal trade in health services is huge and unaccounted for. Consumption abroad (mode 2) is known to be the most popular mode of trade in health services between the two countries, but the number of Bangladeshi patients travelling to India in this mode is unknown.[30]

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[26] Due to the absence of mode-wise trade in higher education between the two countries, in value terms, it is difficult to pinpoint the actual flow of higher education services in either direction.

[27] According to Rahman (2002), a considerable number of Bangladeshi students studying in India use Indian identities.

[28] See the joint statement issued after the visit of the Indian Prime Minister to Bangladesh on September 7, 2011.

[29] Refer, Raychaudhuri and De (2012). Rahman (2002) states that about 57 percent of Bangladeshi patients seeking treatment abroad in 1999 went to India, and most chose India because of the unavailability of medical facilities in Bangladesh and because the Indian medical services are better.

[30] Rahman (2002) estimated that about 50,000 Bangladeshi patients were treated in India in 1999, through which India earned about US$30 million.

Several barriers are responsible for the rise in the informal trade in health services between the two countries.[31] A 2010 survey of patients' perceptions about barriers to accessing Indian health services showed a high proportion of similar complaints, from visa issues to medical insurance limitations and high air fare costs (Table 7). To reduce the barriers: (i) the Bangladesh government could allow Indian medical institutions to set up hospitals under mode 3 (India's Apollo Group has set up a hospital in a joint venture at Dhaka, but it is too small to meet local demand[32]); (ii) professionals in health services could be allowed to move freely (under mode 4) between the two countries; and (iii) genuine patients from Bangladesh coming to India for treatment could be granted visas on arrival at Indian land ports or airports. Although both governments have agreed to facilitate the granting of long-term, multiple-entry visas to research scholars and students, and people visiting on medical grounds, the progress on the ground has been slower than what has been targeted.

Table 7: Perceptions of Bangladeshi Patients* about Indian Health Services

Particulars	Percentage of Patients (%)
Complicated visa	77.90
Fraud of informal foreign exchange traders	40.00
Lack of pan-South Asia medical insurance	80.00
High airfare	64.70

*Sample size: 190 patients.
Source: Banik *et al*. (2010).

3.4. Scenario Analysis with the Global Computable General Equilibrium (CGE) Model

The global CGE modeling framework of the GTAP uses aggregated data on regions and commodities for its objectives.[33] Version 7 is used here, covering 57 commodities, 113 countries/regions, and 5 factors of production—although for purposes of this study the 113 countries/regions are aggregated to 6.[34]

Three scenarios are considered: (i) a full FTA for goods between Bangladesh and India, (ii) India's unilateral duty-free, quota-free (DFQF) offer to Bangladesh, and (iii) a full FTA for goods and improved connectivity (FTA plus). To capture the improvement in connectivity, a 25 percent drop in the bilateral trade-cost margin between Bangladesh and India is simulated.

An FTA-plus–improved-connectivity option clearly would have the greatest impact on world imports to both countries (Figure 5). In both FTA-only and FTA-plus scenarios, Bangladesh's imports would rise more than India's because India is Bangladesh's primary source and Bangladesh is an insignificant source for India. With the DFQF option, imports into Bangladesh would increase by only 0.29 percent, since Bangladesh would not liberalize its trade regime. With regard to exports (Figure 6), it is notable that Bangladesh's increase would be higher with the FTA-only scenario than the DFQF option. This is because the FTA would increase access to cheaper raw materials through tariff liberalization, which would not occur in the DFQF scenario. However, exports from Bangladesh would rise most in the FTA-

[31] Rahman (2002) found that about 20 percent of the approximately 50,000 Bangladeshis that chose to go to India for treatment in 1999 went without the right visas: in most cases, patients chose tourist visas to avoid the more arduous medical visa process.

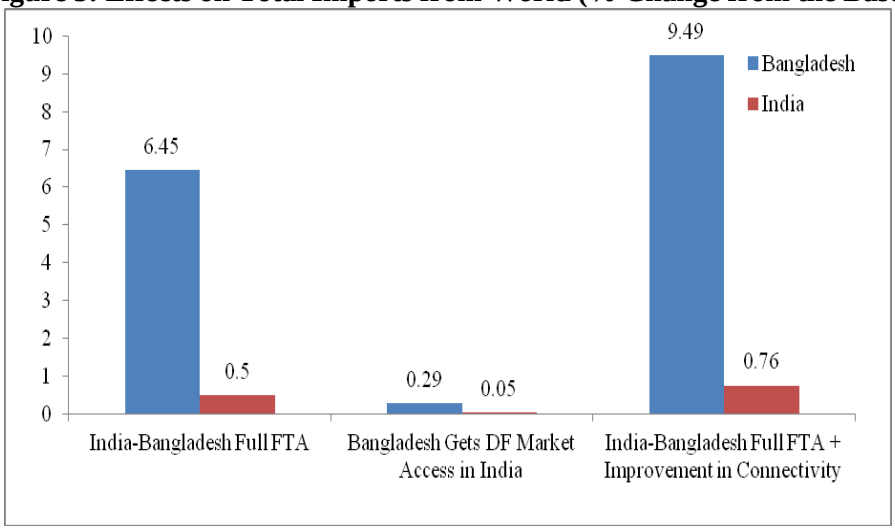
[32] Another new Apollo Group hospital is being established in Chittagong.

[33] See Appendix 2 for explanation of the GTAP model. This study uses the Version 7 database, with 2004 as base. This has been adjusted with some pre-simulations to reflect the base year as close to 2010 as possible.

[34] See Appendices 3 and 4.

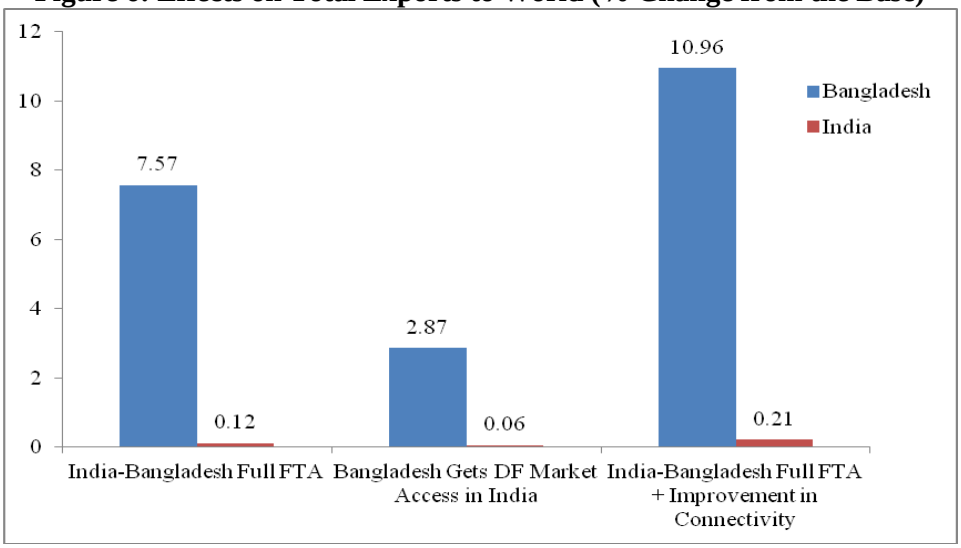
plus scenario—by 10.96 percent. India's small 0.21 percent rise is due to the fact that its export base is already large and exports to Bangladesh are a small part of global exports.

Figure 5: Effects on Total Imports from World (% Change from the Base)



Source: GTAP simulation results.

Figure 6: Effects on Total Exports to World (% Change from the Base)



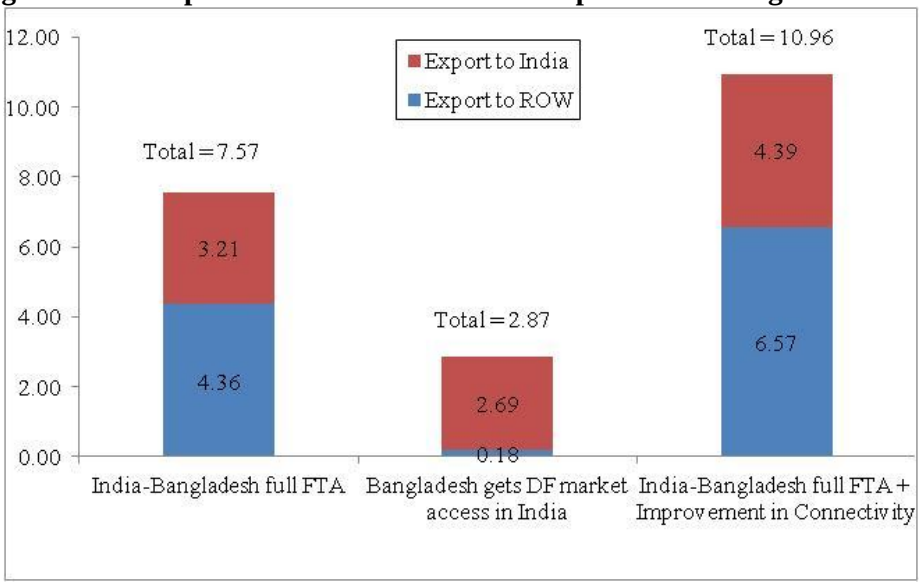
Source: GTAP simulation results.

In a decomposition of the increase in exports for Bangladesh (Figure 7), it appears that of the 7.57 percent increase under an FTA-only option, 3.21 percent would be due to the increase in exports to India; the remaining 4.36 percent increase would go to the rest of the world. In the DFQF scenario, most of the 2.87 percent increase (2.69 percent) would go to India. In the third scenario, a full FTA-plus-improved-connectivity, a little less than half of the 10.96 percent increase in total exports from Bangladesh, or 4.39 percent, would be due to the increase in exports to India.

Under all these scenarios, Bangladesh's exports to India increase significantly in percentage terms. The next step is to separate out the bilateral component of the overall increase in exports. Under the FTA-only scenario, total exports to India would increase by nearly 182 percent (Table 8). Three categories of products, namely—chemicals, rubber & plastic, textiles, and plant-based fibers (jute)—account for 66

percent of Bangladesh's total exports to India. Under a full bilateral FTA, exports to India of these three products would rise by 130 percent, 240 percent, and 165 percent. Export of other products, too, would rise significantly. In the DFQF scenario, exports to India increase by 134 percent, but the FTA-plus scenario offers a 297 percent rise in exports to India. So, reducing transaction costs in trade seems to have a significant stimulatory effect on exports.

Figure 7: Decomposition of Increase in Total Exports from Bangladesh



Source: GTAP simulation results.

India's exports to Bangladesh also increase significantly (Table 9). An FTA-only option would raise India's exports to Bangladesh by about 126 percent. The leading export item (i.e., textiles) would jump by 259 percent, and exports of processed rice, and chemicals, rubber & plastics would also rise strongly. A DFQF offers negligible benefits (since the offer is from India), but a full FTA-plus-improved connectivity would boost Indian exports to Bangladesh the most, by 172 percent.

3.4.1. Removal of India's Negative List and Its Impact on Bangladesh's Export to India

The above analysis has become relevant since there have been developments in market access offers from India. Ahead of the state visit of Indian Prime Minister Manmohan Singh to Bangladesh in September 2011, India removed all 46 textile lines affecting Bangladesh from its negative list in SAFTA's provisions for least-developed countries (LDCs), thereby zero-rating the duty on those items.[35] With further tariff concessions and removal of items from India's negative list just before the 2011 SAARC Summit, Bangladesh to India exports are now close to free-trade, except for about 25 items (mostly tobacco and liquor).

To analyze the impact of this action on the Bangladesh-India trade scenario, the change in weighted tariff has been calculated for each of the GTAP sectors,[36] and three scenarios simulated, in all of which India gives Bangladesh zero-duty market access: (i) with no sensitive list (i.e., the DFQF scenario above), (ii) keeping India's old sensitive list of 480 products for LDCs, and (iii) keeping India's sensitive list of 46 products for LDCs.[37] Change in exports has been calculated in each of these scenarios with reference to the base.

[35] Refer to the joint statement for the visit of the Prime Minister of India to Bangladesh on September 7, 2011.
[36] In the GTAP model there are 57 sectors. However, the sensitive lists are provided at the 6-digit HS code.
[37] The list of 46 negative-list items appears in Appendix 5.

Table 8: Change in Exports from Bangladesh to India

	Share in Base Year Export to India (percent)	India–Bangladesh Full FTA (% Change)	Bangladesh Gets DFQF Market Access in India (% Change)	India–Bangladesh Full FTA + Improved Connectivity (% Change)
Chemical, rubber, and plastic products	36.46	130.49	90.16	228.17
Textiles	17.27	240.01	188.84	392.37
Plant-based fibres	12.38	165.23	102.54	226.99
Fishing	8.59	32.89	21.66	56.52
Metal products	3.17	244.63	202.71	368.19
Leather products	2.72	195.07	158.95	365.44
Business services nec	2.65	31.48	1.08	61.19
Wearing apparel	2.45	278.51	199.61	359.31
Public admin/defence/health/education	2.11	30.78	0.9	50.71
Food products nec	2.05	202.69	152.56	402.46
Ferrous metals	1.62	261.34	201.76	370.40
Metals nec	1.10	335.8	245.22	513.15
Machinery and equipment nec	0.99	307.58	213.46	494.88
Petroleum and coal products	0.93	123.92	82.47	177.26
Crops nec	0.74	2002.23	1746.15	3461.86
Sea transport	0.72	33.43	1.33	48.26
Wood products	0.61	248.35	165.63	375.78
Communication	0.6	25.99	0	45.97
Vegetables, fruits, and nuts	0.54	1659.19	1280.7	2678.03
Mineral products nec	0.31	127.95	75	169.23
Minerals nec	0.27	56.93	25	116.25
Beverages and tobacco products	0.27	137.86	85.71	222.93
Financial services nec	0.22	29.65	4.35	51.64
Transport nec	0.19	28.78	0	42.96
Manufactures nec	0.16	295.5	205.88	510.92
Animal products nec	0.14	78.38	40	126.75
Vegetable oils and fats	0.10	1765.26	1580	3174.33
Sugar	0.10	185.08	136.36	276.26
Electronic equipment	0.10	309.98	220	495.62
Transport equipment nec	0.07	301.17	242.86	502.39
Recreation and other services	0.07	30.53	0	49.36
Paper products and publishing	0.06	179.57	133.33	312.72
Motor vehicles and parts	0.06	3505.94	2916.67	5233.18
Insurance	0.06	32.27	0	52.28
Forestry	0.04	381.17	250	567.42
Construction	0.04	27.62	25	46.58
Air transport	0.04	30.23	0	45.13
Processed rice	0.01	29.65	0	51.27
Trade	0.01	28.49	0	42.88
Total	**100.00**	**182.17**	**133.53**	**297.04**

Source: GTAP simulation results.

Table 9: Change in Exports from India to Bangladesh

	Share in Base Year Export to Bangladesh (percent)	India–Bangladesh Full FTA (% Change)	Bangladesh Gets DF Market Access in India (% Change)	India–Bangladesh Full FTA + Improved Connectivity (% Change)
Textiles	14.24	259.25	0.15	353.88
Processed rice	12.47	60.25	0.84	84.94
Chemical, rubber, and plastic products	11.64	106.99	0.66	141.23
Machinery and equipment nec	8.34	98.73	0.19	145.46
Vegetables, fruits, and nuts	6.77	48.38	0.85	59.01
Wheat	4.59	44.82	0.66	64.91
Vegetable oils and fats	4.58	41.17	0.34	64.26
Plant-based fibres	4.30	17.96	0.25	23.69
Ferrous metals	4.30	82.97	0.25	120.80
Metal products	3.60	202.44	0.55	285.40
Petroleum and coal products	3.36	163.84	0.16	216.27
Motor vehicles and parts	2.25	147.34	0.12	195.95
Cereal grains nec	2.24	–0.57	0.18	–0.88
Paper products and publishing	1.98	177.10	0.31	213.37
Transport equipment nec	1.89	388.39	0.43	518.27
Metals nec	1.83	89.93	0.81	111.32
Coal	1.54	–0.13	–0.13	–0.20
Crops nec	1.49	149.30	2.08	195.45
Electronic equipment	1.42	223.79	0.19	344.64
Mineral products nec	1.38	191.66	0.49	230.91
Dairy products	1.29	316.61	0.53	422.49
Minerals nec	1.05	19.28	0.13	24.73
Apparels	1.02	352.72	0.53	555.95
Food products nec	0.94	85.75	0.36	135.97
Manufactures nec	0.64	413.95	0.64	550.97
Sugar	0.13	278.35	0.52	370.18
Forestry	0.11	83.54	0.63	128.66
Fishing	0.09	54.62	0.77	65.80
Leather products	0.09	169.47	0.00	226.14
Wood products	0.08	299.14	0.86	383.68
Business services nec	0.08	–1.71	0.00	–2.70
Beverages and tobacco products	0.05	81.58	0.00	116.66
Cattle, sheep, goats, and horses	0.04	–1.85	0.00	–2.60
Transport nec	0.04	–1.89	0.00	–2.18
Insurance	0.04	–1.61	0.00	–2.37
Public admin/defence/health/education	0.04	–3.13	0.00	–4.21
Paddy rice	0.02	392.00	4.00	569.44
Communication	0.02	–3.57	0.00	–6.08
Trade	0.01	0.0	0.00	0.00
Sea transport	0.01	0.0	0.00	0.00
Air transport	0.01	0.0	0.00	0.00
Financial services nec	0.01	0.0	0.00	0.00
Recreation and other services	0.01	0.0	0.00	0.00
Total	**100.00**	**125.64**	**0.47**	**172.20**

Source: GTAP simulation results.

Table 10: Bangladesh's Increased Exports to India – Three Scenarios

	Scenarios		
	Bangladesh has duty-free market access in India with no sensitive list	*Bangladesh has duty-free market access in India keeping India's sensitive list of 480 products for LDCs*	*Bangladesh has duty-free market access in India keeping India's sensitive list of 46 products for LDCs*
Rise in Bangladesh exports to India, from base (%)	133.53	19.12	85.09

Source: GTAP simulation results. The increase in exports is calculated with reference to the baseline.

The static export potential could be considered as an increase in exports of 134 percent (the first scenario above), i.e., with no sensitive list (Table 10). Other simulation results show that India's maintaining of the sensitive list of 480 products would only see an export increase of about 19 percent, much less than the first scenario. It should be noted, however, that Bangladesh's major export items—readymade garments (RMGs, HS codes 61 and 62)—have a very limited export base in India, so the GTAP model would always show a small rise in these product exports, even under a "no sensitive list" scenario. Initially, India was wary of allowing Bangladesh's garments into its market. But after the September 2011 prime ministerial agreement, India has allowed Bangladesh's RMGs into its market under a duty-free, quota-free scenario. However, although the GTAP simulations show the removal of the 46 textile products from the negative list raises Bangladesh's exports to India by about 48 percentage points (difference between first and third simulations), the volume is very small in comparison to Bangladesh's global sales. Nonetheless, given India's massive market, it also suggests that Bangladesh has enormous potential to increase garment exports to India.

The projected trade outcomes imply that an FTA would stimulate Bangladesh's trade with India significantly; both countries would likely see a substantial increase in manufactured goods' exchanged under duty-free market access. Bangladesh, especially, would benefit from improved performance in its highly labor-intensive manufacturing sectors, thereby helping to reduce poverty.

For India, closer economic cooperation with Bangladesh would be an important stepping-stone to reducing the economic isolation of its eastern and north-eastern states. A bilateral FTA between the two countries could help address this isolation, and provide an impetus to resolve problems relating to non-tariff barriers.

A very important caveat for policy makers is that the above analysis based on the GTAP model simulation is static in nature and is therefore not capable of capturing the dynamic impacts of bilateral trading arrangements. Also, when trade is restricted (for whatever reason), the model cannot capture "new trade"; if the initial base of trade in any product is very low (or even zero), there would not be any substantial increase (or no increase, in the case of zero base) in trade for that particular commodity. However, as evidence suggests, mutual tariff concessions can generate trade in new items. For instance, in the bilateral FTA between India and Sri Lanka, the latter benefited by initiating exports of *vanaspati* oil to India, which had been almost nil before the FTA.

Thus, these simulation results represent only a part of the additional trade that will be generated—in particular, Bangladesh could gain by creating a production base in new products. Indian FDI into Bangladesh could play a key role in that process. Seen in this light, the above simulation results could be seen as a lower bound of the potential increase in Bangladesh's exports to India.

3.5. Market Access Issues

While tariff concessions have been offered under SAPTA and SAFTA, there would be greater benefit in addressing non-tariff and para-tariff barriers in both countries. In this paper, while the primary concern is Bangladeshi exports to India, a few examples of non-tariff and para-tariff barriers in both countries are discussed below.[38]

One, India requires permitted risk analysis of agricultural imports in biosecurity and sanitary & phytosanitary categories, and this has turned out to be a complex process lacking transparency. It covers about 600 items with the aim of protecting "human, animal or plant life or health". Nearly all livestock, agricultural, and food imports require sanitary or phytosanitary (SPS) certificates and import permits from India's Ministry of Agriculture.

Two, the Indian Food Adulteration (Prevention) Act 1954 requires the shelf life of processed foods to be not less than 60 percent of the original shelf life at the time of import. While this objective is fine, the process of determining shelf life is often arbitrary and non-transparent. India's Prevention of Food Adulteration Rules, 1955, are complicated. Just one rule, number 32, has 30 provisions with further sub-provisions. It also cross-references other rules prescribing content, size and design of labels, display-panel specifications, details of colors and flavors, trade names, and so on. No certificate from the country of origin is accepted. The results of laboratory tests cannot be challenged. Separate regulations exist for various food types.

Three, to export textile and textile products to India, exporters must obtain a pre-shipment inspection certificate from a textile testing laboratory accredited to the National Accreditation Agency of the country of origin. Non-availability of the certificate requires testing from the notified agencies in India for each and every consignment. In some cases, even certificates issued by EU-accredited labs have been rejected by Indian customs authorities and such consignments are subject to repeat tests in India. In addition, the Textile (consumer protection) Regulation of 1988 imposes strict marking requirements for yarns, fibers, and fabrics imported into India.

Four, exporters of jute products to India must have certificates from the exporting country providing it does not contain more than 3 percent, by weight, of non-homogenate hydrocarbon (jute batching oil). Jute bags/sacks require special labeling, and each bag/sack must carry machine-stitched marking of the country of origin.

Bangladesh also imposes several NTBs and supplementary duties on Indian exports. Some of them are as follows[39]:

One, Bangladesh has imposed over 60 percent supplementary duty on import of plastics from India.

Two, Bangladesh still maintains 225 items in its sensitive list in terms of trade with India, covering machinery, pharmaceuticals, textiles, etc.

Other issues brought up by the Commerce Secretary level discussion held on 28-29 March 2012 include the cases of port restrictions in both countries. Not all Indian ports can accept cargoes from Bangladesh. There are also port restrictions imposed by Bangladesh on Indian exports. For example, port restrictions

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38 Sourced from Raihan (2011).

39 Summary record of India-Bangladesh Commerce Secretary level discussions held at New Delhi on 28-29 March, 2012. Available at http://commerce.nic.in/WhatsNew/IndiaBangladeshTalk.pdf

exist in Bangladesh on export of vulcanized rubber thread via Akhaura LCS. Similarly, exports of yarn, milk powder, fish, sugar, and potatoes from India (particularly from the northeastern states and West Bengal) face port restrictions in Bangladesh.

Finally, the same Commerce Secretary level discussions also note that heavy restrictions limit professional exchanges and cooperation. Moreover, Indian companies and professionals face difficulties in sending remittances back to India. Indian exporters can remit dollars converted from taka only as royalty, consultancy and "other charges", and there is a ceiling on the repatriable amount (for example, under 'royalty', only 6 percent of the sale proceeds in Bangladesh can be repatriated). This creates problems for knowledge-intensive sectors like software, IT and telecom, architecture, and so on.

Thus, non-tariff measures/barriers such as standards, certification, regulations, labeling, documentation and public procurement, licensing, countervailing measures, tariff quotas, and anti-dumping measures are all matters of contention between India and Bangladesh. Non-tariff barriers are the most difficult, and undermine the trade potential of both countries. Sanitary & Phytosanitary and Technical Barriers to Trade and related measures have been found to account for 86.3 percent of all barriers across South Asia.[40] Besides, other hurdles such as stringent visa regimes, inadequate physical connectivity, restrictions in opening bank branches, lack of testing facilities at the border, non-honoring of irrevocable letters of credit, etc., have been faced by exporters and importers in both countries.

There is recent empirical evidence that standards harmonization tends to increase the export variety of a partner country,[41] and this may well apply to Bangladesh's exports to India (Rahman *et al*., 2011). An arrangement for recognition in India of certificates issued by Bangladeshi testing laboratories for export products will help exports.[42] There have been misunderstandings regarding acceptance of test certificates issued by BSTI labs for products accredited by NABL (lndia). Testing laboratories could be part of customs stations, at least to cater to testing requirements of more commonly traded products. Mutual recognition of testing laboratories and test reports from accredited laboratories by customs authorities will be very useful. In this respect, the upcoming South Asian Regional Standards Organization (SARSO) in Dhaka is a very welcome step.

Greater use of information technology in customs, to expedite processes such as electronic transfer of test reports and certificates of origin would help bilateral trade as well as the global trade of the two countries. This could be addressed if Bangladesh and India implement a single window system for customs. In parallel, harmonization of HS codes at 8-digit level will reduce disputes on classification and also provide the basis for establishing a system of seamless exchange of data between the customs authorities of Bangladesh and India.

Such non-tariff measures/barriers can easily reduce the potential gains from tariff liberalization. Therefore, the next generation of trade talks between the two countries should give the highest priority for reduction of non-tariff measures/barriers.

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40 See, for example, ADB-UNCTAD (2008) and Rahman *et al*. (2011).

41 See, for example, Shepherd (2007).

42 Bangladesh and India agreed that the respective standards' bodies, BIS and BSTI, will finalise the Agreement on bilateral cooperation to enable mutual recognition for each other's standards for specified products. Refer to the Summary record of India-Bangladesh Commerce Secretary level discussions held at New Delhi on 28 -29 March, 2012.

3.6. Beyond Trade in Goods

Bangladesh may gain significantly more, in the long run, from diversifying exports to India, and thereby also exploit increasing possibilities for intra-industry trade. As the CGE analysis has shown, there could be fewer opportunities for Bangladesh (although not small by any means) at the "intensive margin" (exporting more of the same to Indian markets) compared to exports at the "extensive margin" (diversifying the export basket to India's large and growing market).[43] This is where FDI becomes very important.

A bilateral FTA between Bangladesh and India should go beyond "trade in goods" to deepen cooperation and improve Bangladesh's export capability. Without significant structural changes in its production pattern, Bangladesh will be unlikely to derive the desired benefits from a bilateral FTA. Top priority, therefore, should be given to augmenting Bangladesh's export supply capability. This can be encouraged through a broader, bilateral cooperation mechanism in the areas of investment, finance, services trade, trade facilitation, and technology transfer. In the context of investment flows, horizontal and vertical integration of Indian and Bangladeshi industries could help to improve scale economies, especially for Bangladesh, and help Indian firms gain from the use of inexpensive labor. Closer economic cooperation between the two countries would also promote Bangladesh's prospects for attracting larger investment from India. Such investments, whether 100 percent Indian or joint ventures, would help to improve the country's export supply capability and boost exports to both the region and the outside world.

Bilateral economic cooperation should emphasize trade in services, to enhance connectivity, trade in health and higher education, tourism, and facilitate trade and transit, and so on. Empirical studies have found that trade in services can generate substantial gains over and above those from trade in goods.[44] Both countries would gain from continued trade liberalization, in both goods and services, and streamlining of trade transactions through trade facilitation.

Some sectors in both countries, however, are bound to lose out due to increased import competition. In Bangladesh these could include coal, dairy products, metal products, transport equipment, petroleum and coal products, paper products, publishing, electronics equipment, and mineral products. In India, the sectors could include leather products, apparel, meat products, and vegetable oils & fats. For this reason, a possible bilateral FTA will benefit from addressing (or at least trying to address) the costs of adjustment.

4. Connectivity, Trade Facilitation, and Transit

Many empirical studies have examined the effect of transport costs on trade flows. Limão and Venables (2001) found a link between the quality of infrastructure and transport costs and concluded that infrastructure investments are important for export-led economic growth. Other studies argued that differences in logistics performance are driven only in part by poor quality of physical infrastructure services such as road, rail, waterways, port services, and interfaces.[45] The inadequacies are often caused by (non-tariff) policy and institutional constraints, such as red tape, inadequate enforcement of contracts, poor definition and enforcement of rules of engagement, asymmetry in standards, delays in customs, ports and border crossings, pilferage in transit, corruption, and highly restrictive protocols on movement of cargo.

One of the key challenges facing South Asia is high cost of trading. For example, transaction costs at the India-Bangladesh border are estimated to be very high due mainly to infrastructure bottlenecks both at the

[43] Based on Hummels-Klenow (products) extensive and intensive margins. Refer to De (2012).
[44] See, for example, Ahmed and Ghani (2009), Ahmed *et al.* (2010).
[45] Subramanian and Arnold (2001).

borders as well as within the countries.[46] The World Bank has argued that an FTA would bring large welfare gains for consumers in Bangladesh, provided infrastructure and administrative capacity at customs borders is adequately expanded.[47] The conditions of land ports in Bangladesh are not satisfactory. It has also been found that ports in Bangladesh are plagued by labor problems, poor management, and lack of equipment; costs rise further with inadequate customs services, including delays in clearances and rent-seeking.

Poor trade logistics in Bangladesh affects the cost of export and import very significantly and is reflected in the Logistic Performance Index (LPI). The World Bank (2012) finds that the domestic logistics chain – including collection of products from producers, road haulage to the warehouse, containerization, haulage to the port, and customs at port- is still very underdeveloped. Bangladesh ranks 87 in the LPI, while its South Asian comparators like India and Pakistan rank 39 and 68 respectively.

The quality and performance of logistics services differ markedly between India and Bangladesh and also across their trade partners. These variations in time and cost stem from differences in the quality and cost of infrastructure services as well as differences in policies, procedures, and institutions. The quality of such services, policies, and procedures has a significant effect on trade competitiveness and market access. While there is strong anecdotal evidence that the lack of adequate trade infrastructure might have altered the bilateral trade potential due to trade costs, this study tries to assess the effect of trade facilitation/trade cost elements (e.g., transit and time) and logistics services on bilateral trade. It does so with the help of an augmented gravity model (AvW type), and then determines important trade remedies. The regressions are based on a cross-section pooled dataset for the years 2007 and 2008. A three-stage regression process is used here to understand the impact of trade facilitation, comprising several of the logistics and trade facilitation indicators and shows that this captures essentially all the explanatory power of the indicators used separately.[48] Definition of variables and corresponding data sources appear in Appendix 6, and the list of Bangladesh's trade partners in Appendix 7. The initial augmented gravity results are worth noting (Table 11):

- Specification 1 contains the initial set of models fitted before any of the trade facilitation or logistics indicators or additional variables are included. It contains regressions of bilateral trade on GDP in the exporting and importing countries. The results are qualitatively consistent with those of earlier studies, particularly de Groot *et al.* (2004). What is most interesting is that the tariff and the dummy variables for regional transit in specification 1 are statistically significant at a 1 percent level. Furthermore, trade liberalization and regional transit would lead to increased exports of Bangladesh, other things remaining equal.

[46] De and Ghosh (2008); De and Bhattacharyay (2007a, 2007b).

[47] Countries that have removed common barriers to trade have raised per-capita income by increasing trade. The removal of common borders between Germany and the Czech Republic and between the United States and Mexico are seen as key factors in the incomes per capita rising in the smaller countries-—-by 26 percent in the Czech Republic and 27 percent in Mexico (Redding and Venables, 2004).

[48] The following diagnostics are carried out: (i) linearity assumption between response variable and predictors is checked; (ii) statutory hypothesis tests are carried out on the parameter estimates; (iii) Ramsey test is done to check model specification; (iv) normality of residuals is tracked through Kernel density plot; (v) all estimates are checked for heteroscedasticity through Cameron and Trivedi's decomposition of IM-test; (vi) multicollinearity problems are checked by looking at the variance inflation factor (VIF); (vii) models do not suffer from endogeneity as highly correlated exogenous variables are not used in the gravity equations; and (viii) it being cross-section data, the presence of serial correlation does not appear.

Table 11: Initial Augmented Gravity Model Estimations

Variable		Specification							
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
ln_gdp_ex		0.998***	0.995***	1.002***	0.994***	0.982***	0.941***	0.997***	0.961***
		(0.0762)	(0.0836)	(0.081)	(0.0864)	(0.0718)	(0.0743)	(0.0741)	(0.0792)
ln_gdp_im		0.0163	0.0488	–0.0998	–0.0887	–0.0886	–0.163	–0.00638	–0.0564
		(0.0976)	(0.112)	(0.127)	(0.121)	(0.11)	(0.128)	(0.109)	(0.106)
ln_tariff		–0.844***	–0.852***	–0.695**	–0.608**	–0.758**	–0.766**	–0.828***	–0.811***
		(0.272)	(0.282)	(0.274)	(0.264)	(0.296)	(0.312)	(0.278)	(0.269)
contig		0.553	–1.167	–1.097	–1.390*	0.525	0.521	0.565	0.381
		(0.599)	(0.719)	(0.822)	(0.823)	(0.674)	(0.73)	(0.623)	(0.577)
comlang_off		–0.426	0.552*	–0.0133	0.42	–0.492	–0.749	–0.618	–0.481
		(0.627)	(0.285)	(0.44)	(0.368)	(0.702)	(0.783)	(0.728)	(0.606)
rta		–0.947	–0.773	–1.098*	–1.192*	–1.196*	–1.289*	–1.092	–1.057
		(0.672)	(0.64)	(0.591)	(0.694)	(0.696)	(0.738)	(0.686)	(0.681)
sr_transit		0.114	0.684	0.647	1.045	–0.0797	–0.121	0.0472	–0.0209
		(0.568)	(0.73)	(0.806)	(0.803)	(0.627)	(0.664)	(0.562)	(0.534)
r_transit		2.561***	2.223***	2.517***	2.381***	2.898***	3.272***	2.792***	2.834***
		(0.716)	(0.654)	(0.658)	(0.74)	(0.779)	(0.891)	(0.802)	(0.749)
ln_distance		–0.0516	–0.0126	–0.0141	–0.107	–0.0456	–0.0242	–0.00379	–0.00922
		(0.251)	(0.271)	(0.247)	(0.251)	(0.262)	(0.268)	(0.253)	(0.256)
ln_cost			0.352						
			(0.561)						
ln_time				–1.18					
				(0.72)					
ln_number					–2.625***				
					(0.91)				
ln_customs						1.446*			
						(0.835)			
ln_infrastructure							2.018*		
							(1.044)		
ln_shipments								0.829	
								(1.405)	
ln_timeliness									1.846
									(1.232)
Observations		210	210	210	210	210	210	210	210
R^2		0.808	0.807	0.814	0.825	0.819	0.823	0.815	0.818
Adj. R^2		0.806	0.806	0.812	0.824	0.818	0.823	0.815	0.817
Mean VIF#		2.630	2.970	3.140	3.020	2.900	3.200	2.740	2.850
IM-test[$]	chi^2	23.050	41.830	32.680	33.110	38.890	46.950	32.820	29.850
	p	0.902	0.349	0.753	0.735	0.520	0.209	0.783	0.879
Ramsey RESET test[$$]	*F*	3.210	3.250	3.450	2.980	1.970	1.830	1.960	2.190
	p	0.027	0.026	0.021	0.036	0.125	0.149	0.126	0.096

Note: Dependent variable is total bilateral exports (in logs) in 2008 or latest year available. ***, **, and * indicate values significant at 1%, 5%, and 10% levels. Robust standard errors appear in parentheses. Constant terms are not shown.

Variance inflation factors (VIF) of all explanatory variables test for multicollinearity (tolerance level <10).

[$]Cameron and Trivedi's decomposition of IM-test is to test for heteroscedasticity.

[$$]Ramsey RESET test is to detect model specification error or test omitted variable bias.

Table 12: Augmented Gravity Model Estimations

		Specification		
Variable		**9**	**10**	**11**
ln_gdp_ex		0.932***	0.889***	0.866***
		(0.0807)	(0.0804)	(0.0726)
ln_gdp_im		–0.243*	–0.126	
		(0.126)	(0.132)	
ln_tariff		–0.611**	–0.577**	–0.532*
		(0.300)	(0.281)	(0.277)
rta		–1.547**	–1.527**	–1.382**
		(0.771)	(0.747)	(0.641)
contig		–0.998*	–0.751	–0.472
		(0.563)	(0.61)	(0.581)
r_transit		3.409***	3.466***	3.309***
		(0.889)	(0.881)	(0.810)
ln_distance		–0.251	–0.266	–0.282
		(0.251)	(0.246)	(0.242)
ln_number		–3.023***	–3.397***	–3.343***
		(0.965)	(0.959)	(0.945)
ln_customs		–1.572	–1.796	–1.815
		(1.254)	(1.196)	(1.217)
ln_infrastructure		2.950*	3.655***	3.295***
		(1.531)	(1.288)	(1.247)
ln_cc_ex			–0.431*	–0.489**
			(0.225)	(0.210)
ln_cc_im			0.129	0.134
			(1.040)	(1.073)
Observations		210	210	210
R^2		0.844	0.853	0.852
Adj. R^2		0.843	0.853	0.851
Mean VIF#		4.63	4.56	4.28
IM-test[$]	chi^2	57.74	75.29	61.46
	p	0.3388	0.1581	0.2264
Ramsey RESET test[$$]	*F*	0.73	0.69	0.91
	p	0.5365	0.5586	0.4407

Note: Dependent variable is total bilateral exports (in logs) in 2008 or latest year available. ***, **, and * indicate values significant at 1%, 5%, and 10% levels. Robust standard errors are given in parentheses. Constant terms are not shown.

#VIF of all explanatory variables are to test for multicollinearity (tolerance level <10).

[$]Cameron and Trivedi's decomposition of IM-test is to test for heteroscedasticity.

[$$]Ramsey RESET test is to detect model specification error or test omitted variable bias.

- Specifications 2-8 include, one at a time, the set of trade facilitation and global logistics indicators described in Appendix 6. Tariff, regional transit dummy, and exporting country GDP are statistically significant in all the specifications. The dummy variable representing RTA, including bilateral FTA, is significant in specifications 4-6 but appears with a negative sign. Among the trade facilitation or logistics indicators, it is seen that the (i) number of trade documents in the bilateral pair (ln_number), (ii) efficiency of the clearance process (speed, simplicity, and predictability of formalities) by border control agencies, including customs

(ln_customs), and (iii) quality of trade and transport-related infrastructure, for example, ports, railroads, roads, and information technology (ln_infrastructure) are statistically significant. Therefore, it can be concluded that most of the trade facilitation and logistics indicators have a significant effect on bilateral trade between Bangladesh and its partner countries, including India, in the expected direction.

- All the specifications in Table 11 explain over 80 percent of the variability in bilateral trade, thereby showing considerably good fit. The robust estimation is also supported by Cameron and Trivedi's decomposition of IM-test in all the cases, which suggests no presence of heteroscedasticity in residuals (always reject null hypothesis). Next, low VIF scores suggest our models do not suffer from multicollinearity (mean VIF always less than 10). However, some of the specifications (1-4) in Table 11 suffer slightly from omitted variable bias.

The above analysis indicates that bilateral trade between India and Bangladesh is very much contingent upon tariff, regional transit, and trade facilitation. We then select the set of those trade facilitation and logistics indicators shown to be significantly related to bilateral trade in Table 11 in the remaining gravity analysis. Specifications 9-11, in Table 12, include these critical trade facilitation and logistics indicators along with the standard variables described earlier. Most of the variables in these specifications have significant coefficients, with the expected sign, except for the importing country's GDP per capita.

On the basis of the finding by de Groot *et al*. (2004) and as argued by Rodrik *et al*. (2004) that institutional quality is important in explaining bilateral trade flows, a control of corruption (cc) variable is added to the model to represent institutional quality for both the exporting and importing country (Table 12, specifications 10-11). The exporting country's corruption coefficient has a negative sign and is also statistically significant. Moreover, when institutional quality is included, the coefficient of the GDP becomes insignificant and still has the wrong sign. Specification 11, of Table 12, gives the results: omitting GDP of the importing country reduces the adjusted *R*-squared value only slightly, but improves the coefficients of many of the statistically significant variables. As usual, none of the specifications (9–11) suffer from multicollinearity, heteroscedasticity, or model specification error. It follows, then, that the importing country's tariff, regional transit, and institutional quality of the exporting country, coupled with trade facilitation and logistics indicators, are important for enhancing Bangladesh's export. For the sake of simplicity, we need to derive a trade facilitation index (TFI), which can better represent the functional relation between bilateral export and aforesaid explanatory variables. Three-stage augmented gravity estimation is then selected for the remaining analysis.

The TFI for exports of Bangladesh is estimated in three stages. The first stage involves fitting a simple gravity model that includes most of the standard variables listed in Table 12. The second stage attempts to explain the residuals of the first-stage regression by using trade facilitation and logistics indicators, which represent the components of trade cost such as trade infrastructure, customs and trade documentations, and distance (a surrogate for shipping cost). The second-stage regression derives the optimal coefficients (weights) for these variables to best explain the residuals from the first stage. If the components of these variables are important determinants of bilateral trade, this second-stage regression would be expected to have statistically significant explanatory power. The third stage uses the coefficients derived in the second stage to create a single TFI in an augmented gravity model. If this single index performs reasonably well in explaining bilateral trade flows, it can then be argued that the index systematically captures the various components of the total trade cost.

Table 13 shows the results of these three stages. The second-stage adjusted R^2 is 0.229, which is significant since it is a cross-section period where first stage's residual was taken as dependent variable. The third-stage augmented gravity model using the single TFI together with the first-stage variables explains 83 percent of the variability in bilateral trade. This result is almost identical to the corresponding

one in Table 12. Therefore, the single TFI successfully replaces several separate trade facilitation and logistics indicators.

Table 13: Three-Stage Augmented Gravity Estimations

Variable		First Stage	Second Stage	Third Stage
ln_gdp_ex		0.990***		0.893***
		(0.0724)		(0.0725)
ln_gdp_im		0.0894		0.0494
		(0.11)		(0.128)
ln_tariff		–0.829***		–0.737***
		(0.244)		(0.245)
rta		–0.936		–1.198*
		(0.614)		(0.609)
contig		0.182		–0.222
		(0.432)		(0.548)
r_transit		2.478***		3.094***
		(0.669)		(0.742)
ln_cc_ex		–0.161		–0.357
		(0.189)		(0.227)
ln_cc_im		–0.023		–0.043
		(0.102)		(0.154)
ln_distance			–0.217	
			(0.167)	
ln_number			–2.666***	
			(0.937)	
ln_customs			–1.424*	
			(1.294)	
ln_infrastructure			0.849*	
			(1.185)	
ln_tfi				3.645***
				(–1.263)
Observations		210	210	210
R^2		0.809	0.231	0.831
Adj. R^2		0.809	0.229	0.830
Mean VIF#		2.58	4.84	3.19
IM-test[$]	chi^2	28.1	18.45	51.95
	p	0.6159	0.4928	0.0653
Ramsey RESET test[$$]	*F*	3.49	1.39	1.95
	p	0.0191	0.2515	0.1277

Notes: Dependent variable for first and third stages is total bilateral exports (in logs) in 2008 or latest year available. Dependent variable for the second stage is first-stage residuals. ***, **, and * indicate values significant at 1%, 5%, and 10% levels. Robust standard errors are in parentheses. Constant terms are not shown.

#Variance inflation factors (VIF) of all explanatory variables test for multicollinearity (tolerance level <10).

[$]Cameron and Trivedi's decomposition of IM-test is to test for heteroscedasticity.

[$$]Ramsey RESET test is to detect model specification error or test omitted variable bias.

4.1. Implications

The implications of the gravity analysis in the context of India–Bangladesh bilateral trade are shown in Appendix 8, and suggest that bilateral trade is highly responsive to improvements in transaction efficiencies. The gravity estimates suggest that a 10 percent reduction in the trade-related documentation could result in a 7.31 percent increase in bilateral trade. Similarly, a 10 percent improvement in the efficiency of clearance processes by border control agencies, including customs, might lead to a 3.91 percent increase in bilateral trade. In the case of trade infrastructure, a 10 percent improvement in the quality of trade and transport-related infrastructure could lead to a 2.33 percent increase in bilateral trade. Besides, Table 13 (third stage) shows that further trade liberalization (10 percent cut in tariff) would lead to rise in bilateral trade (7.37 percent). The table also shows that regional transit in South Asia is extremely important, and would help increase Bangladesh's exports to South Asia substantially.[49] Improved trade facilitation (as defined by the TFI) will have the strongest effect on Bangladesh's bilateral trade; a 1 percent improvement in trade facilitation would result in an almost 4 percent increase in Bangladesh's exports. These results also show that the gravity model with the TFI could also be used to evaluate the effectiveness of initiatives to improve logistics.

It would be very important to place the objectives of reducing transaction costs of trading between India and Bangladesh within the larger context of regional transit in South Asia. And to gain the full benefits of regional transit, integration of transportation networks should be a priority objective of South Asian cooperation.[50]

Two other elements that would help bilateral trade between India and Bangladesh are foreign direct investment and trade in energy—elements that might require further study. Foreign investment would help increase Bangladesh exports in the medium to long run. Inflow of foreign capital would stimulate exports and imports, transfer of technology, and generate employment. The energy sector, too, offers enormous investment and trade opportunities for both countries, particularly in a sub-regional context that includes Bhutan and Nepal.

5. Conclusions and Policy Implications

Contiguous countries like Bangladesh and India can benefit greatly from opportunities for trade and economic cooperation. The scope for trade expansion between the two countries depends partly on their trade complementarity, which is relatively limited but growing, partly on account of their economic imbalance. The other driver of bilateral trade is intra-industry trade between India and Bangladesh. This has the potential to grow significantly, since trade in similar product lines has been growing, and that could deepen production networks between the two countries.

What are the prospects for production networks and vertical trade between the two countries? This study shows that the intra-industry trade (IIT) index levels are higher in manufactured than in primary products, reflecting the greater role of economies of scale in the production of those products. Moreover, the IIT index scores suggest that there are production-sharing possibilities in a static sense in 11 products. These range from textiles and clothing (the highest concentration) to iron and steel (lowest concentration), with electrical machinery & equipment and mechanical appliances occupying the middle (medium concentration) of the value chain.

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[49] Estimated coefficient of regional transit dummy is found to be statistically significant.

[50] Owing to the importance of transportation integration, connectivity has been the central focus of SAARC. "South Asia has flourished most when connected to itself and the rest of the world" (from Indian Prime Minister Manmohan Singh's speech at the 14th SAARC Summit in 2007, available at http://pib.nic.in/newsite/erelease.aspx?relid=26591.)

How can vertical IIT between the two countries be intensified? This analysis indicates that a number of product categories and sectors exhibit an increasing share of IIT, and these are the sectors with the potential for increasing bilateral trade through IIT, at least to begin with, based on the static analysis. In order to realize this potential, both countries would have to further liberalize trade, for instance by reducing tariffs (in the case of Bangladesh) and reducing non-tariff barriers (both countries), and reducing trade costs by improving trade facilitation both at borders and within the borders.

Judging complementarity is only a start in analyzing the potential for a bilateral trade relationship. The analysis on IIT summarized in the previous section is based on actual trade patterns. The next question would be to understand the impact of liberalizing market access by one or both countries to each other's exports.

Market access offers have considerable potential to enhance trade. This study considered three scenarios with regard to market access for trade in goods (first, full FTA in goods; second, a one way offer by India to Bangladesh for duty and quota free access in goods (which has already happened); and third, a full FTA for goods along with improved connectivity between Bangladesh and India). A global CGE model shows that in all three scenarios, Bangladesh's exports to India increase very significantly. It was observed that under the first scenario, exports to India would increase by over 182 percent, in the second by 134 percent, and in the third by 297 percent. India also gains significantly in the FTA and FTA plus scenarios. In the first scenario, India's exports to Bangladesh would increase by about 126 percent, in the second scenario, hardly at all, and in the third scenario, by 172 percent. Reducing transaction costs in trade lead to significantly higher exports, as seen through a comparison of the first and third scenario results. The GTAP simulations also suggest that India's removal of 46 products from its negative list (which has already been done) could increase Bangladesh's exports to India by about 48 percentage points from the base level.

The projected trade outcomes imply that an FTA would provide a significant stimulus for Bangladesh to increase its presence in the Indian market. It is also likely that both countries would see a substantial increase in manufactured exports to each other as duty-free market access opened up with the FTA. However, for Bangladesh to benefit fully from such market access and expand its exports to India, it would need an adequate expansion of its inland and international infrastructure and administrative capacity for handling bilateral trade.

The above analysis is still limited by existing patterns of trade, and so does not consider the dynamic potential for trade to grow and expand into new areas that the models are not able to capture. It could be said that the CGE projections represent a lower bound for trade expansion as a result of a possible FTA agreement. For Bangladesh, whose export basked is still very concentrated, foreign investment from India as well as other countries would be critical to improve technology and skills and enhance production capabilities in goods as well as trade-related infrastructure.

Thus, a bilateral FTA between Bangladesh and India should go beyond any treaty based on "trade in goods", and should include cooperation in the areas of investment, finance, services trade, trade facilitation, and technology transfer. Despite the fact that there are some risks of welfare loss for Bangladesh through trade diversion in a bilateral FTA (such risks are low since India is already a dominant competitive supplier), the gains from extended economic cooperation in investment and services trade could be much larger. And both countries would gain from continued trade liberalization and streamlining of border transactions through trade facilitation and improved physical connectivity.

The study briefly considered services trade between the two countries, a large part of which is informal. There has been a formal flow of services trade to a small extent, for example in education and health-related services. Barriers to trade in services (e.g., mutual recognition) are not like tariffs; typically these

are regulatory barriers, rather than explicit taxes; they are complex in nature and impose high costs, at least on the formal component of bilateral trade in services. Mutual recognition of degrees, easier access to visas, and Bangladesh's encouragement of Indian FDI in health and education services would help improve trade in such services.

Going beyond an analysis of market access, the study considered the issue of trading costs in some depth. Cumbersome and complex cross-border trading procedures raise the already-high transaction costs of the trading systems of India and Bangladesh. A comprehensive measure of trade costs is derived from a gravity model of international trade. The analysis reveals that improved trade facilitation coupled with regional transit would help increase trade between the two countries. At the same time, there is strong evidence that improving the efficiency of customs and administrative procedures and simplifying trade-related documentation would also facilitate their trade. For example, as this study shows, a 10 percent reduction in trade-related documentation could result in a 7.31 percent increase in bilateral trade; a 10 percent improvement in the efficiency of clearance processes by border control agencies, including customs, might lead to a 3.91 percent increase in bilateral trade; a 10 percent improvement in the quality of trade and transport-related infrastructure could lead to a 2.33 percent increase in bilateral trade.

Not only will there be large payoffs to addressing the major bilateral barriers to reducing trading costs, there will be additional major gains in keeping the regional picture in mind. For India and Bangladesh, the system should aim to greatly reduce current physical and soft barriers to transportation and transit by means of physical infrastructure (such as multimodal corridors and terminals) and soft infrastructure (reformed policies and procedures, regulations, and incentives for efficient transportation and transit). Simplification of processes and procedures in trade transactions would certainly increase the bilateral trade between the two countries even in very short run. Reduction of NTBs should get utmost priority in this context. To derive larger gains, India and Bangladesh, along with other South Asian partners, should develop a regional (or sub-regional) transportation and transit system that offers efficient transportation options and low transaction costs that are competitive with those found elsewhere.

India can help deepen bilateral economic relations with Bangladesh through infrastructure investment. One option would be to invest in inland and border infrastructure to reduce the bottlenecks resulting from the expansion of the domestic private sector. This would mean a strategy of infrastructure development following private investment. Another option would entail both governments using infrastructure development as an engine for bilateral and regional growth. This would require a strategy where infrastructure development leads and crowds in private investment—for example, if both governments were to jointly build adjacent special economic zones (SEZs) at the India-Bangladesh border. India's latest US$ 1 billion credit to Bangladesh for the development of country's infrastructure is an example of the latter approach.

Increased trade between Bangladesh and India will require measures going beyond tariffs. This would mean India following up the significant changes on the tariff front (India now offers a free trade regime to Bangladesh for all except 25 products) with reduction in non-tariff measures/barriers. In addition, FDI by Indian and other foreign firms would help enhance product complementarities and production networks. Finally, Bangladesh would also gain from reducing its tariffs and para-tariffs as well as non-tariff measures/barriers in its trade with India, since this will help expand its overall production capability and help it to exploit dynamic gains from trade.

India-Bangladesh cooperation offers a "win-win" prospect for both countries and the South Asia region as a whole. For India, closer economic cooperation would help to reduce the economic isolation of its north-eastern states. A bilateral FTA between the two countries could create scope for resolving some of these critical issues while reducing non-tariff barriers.

Finally, the next generation of economic cooperation talks between the two countries should address non-tariff measures/barriers, services trade, technology transfer, logistics and infrastructure, finance and investments.

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Appendix 1

Sectoral IIT Index for Major Products (IIT≥0.40) of India's Bilateral Trade with Bangladesh, 2007

HS	Commodity	IIT India
410411	FULL GRAINS-UNSPLIT/GRAIN-SPLITS OF BOVINEIN WET STATE INCLDNG WET-BLUE	0.997
540810	WOVEN FABRICS,OBTAINED FROM HIGH TENACITY YARN OF VISCOSE RAYON	0.991
721590	OTHR BARS & RODS OF IRON/NON-ALLOY STL	0.978
702000	OTHER ARTICLES OF GLSS	0.943
230220	RICE BRAN OIL	0.935
721550	BARS & RODS OTHRTHN FREE-CUTNG STL NT FRTHR WRKD THN COLD FRMD/COLD FINSHD	0.923
850720	OTHER LEAD-ACID ACCUMULATORS	0.922
611120	BABIES'GARMENTS ETC OF COTTON	0.908
210690	OTHER FOOD PREPARATIONS	0.902
600290	OTHR KNITDOR CROCHETED FBRCS OF WIDTH	0.901
960720	PARTS OF SLIDE FASTENERS	0.891
843290	PRTS OF AGRCLTRL & HORTCULTRL MACHINERY	0.876
610342	TROUSERS,SHORTS ETC OF COTTON	0.862
721491	BARS & RODS OF RECTANGULAR (OTHER THAN SQUARE) CROSS-SECTION OF IRON/NON ALOY STL	0.857
730690	OTHER TUBES,PIPES ETC.OF IRON OR STEEL	0.851
600320	FBRCS OF COTTON	0.844
30379	OTHER FRZN FISH EXCL LIVRS & ROES	0.828
600390	FBRCS OF OTHR FIBRES	0.828
841330	FUEL,LUBRICATING/COOLING MEDIUM PUMPS FOR INTERNAL COMBUSTION PISTON ENGINES	0.818
700100	CULLET AND OTHER WASTE AND SCRAP OF GLASS;GLASS IN THE MASS	0.815
30559	OTHER DRIED FISH W/N SALTED NT SMOKED	0.782
600622	OTHR KNITED OR CROCHETD FBRCS OF COTTON , DYED	0.771
960719	OTHER SLIDE FASTENERS	0.770
610510	MEN'S/BOYS' SHIRTS OF COTTON	0.758
30199	OTHER LIVE FISH	0.752

620463	TROUSERS,BIB AND BRACE OVERALLS, BREECHES AND SHORTS OF SYNTHETIC FIBRES	0.747
843143	PRTS OF BORNG/SNKNG MCHNRY OF SUB HDG.NO.843041/843049	0.730
621790	PARTS OF GARMENTS/OF CLOTHNG ACCESSORIES	0.729
610349	TROUSERS,SHORTS ETC OF OTHR TXTL MATRLS	0.719
200819	OTHR NUTS & SEEDS INCL MIXTRS PRPD/PRSVD	0.717
843229	OTHR(HARROWS,SCRFRS,CLTVTRS,WEEDRS & HOES)	0.713
170490	OTHER SUGR CNFCTNRY NT CONTAINING COCOA	0.707
480269	PAPER & PAPERBOARD OTHER THAN ROLL/SHEET OFWHCH >10% BY WT OF TOTL FBR CNTNT.	0.703
848390	PARTS OF THE ITEMS OF HDG 8483	0.703
847720	EXTRUDERS	0.693
850690	PARS OF PRIMARY CELLS & PRIMARY BATTERIES	0.690
520929	OTHR BLEACHD COTTON FABRICS MORE THAN 200 GM PER SQM	0.674
720429	WASTE & SCRAP OF OTHER ALLOY STEEL	0.673
848310	TRNSMSN SHFT(INCL CAM & CRNK SHFT) & CRNK	0.671
790310	ZINC DUST	0.668
850780	OTHER ACCUMULATORS	0.658
844530	TXTL DOUBLNG/TWISTNG MCHNS	0.614
790390	ZINC POWDERS AND FLAKES	0.596
520912	UNBLCHD 3/4 THRED TWILL INCL CROSS TWILL COTTON FABRICS WEIGING MORE THAN 200 GM PER SQM	0.594
521051	MIXED COTTON FABRICS WEIGHING NOT MORE THAN 200 GSM PRINTED, PLAIN WEAVE	0.570
490599	OTHERS MAPS ETC	0.568
847420	CRUSHING/GRINDING MACHINES	0.565
940360	OTHER WOODEN FURNITURE	0.564
560890	KNOTTED NETTING OF TWINE CORDAGE/ROPE ETC OF OTHER TEXTILE MATERIALS	0.563
90920	SEEDS OF CORIANDER	0.557
520811	COTN FABRCS CONTNG>=85% BY WT OF COTN, UNBLEACHED PLAIN WEAVE WEIGING <=100 G/M2	0.555
251710	PEBBLES GRVL BRKN/CRSHD STONE COMMONLY USDFR CONCRTE AGRGTS FR RO MTLNG/RLY/OTHR BALAST SHINGLE & FLINT W/N	0.553

410799	OTHER/HIDES/SKINS INCLUDING SIDES	0.541
843280	OTHER AGRICULTURAL & HORTICULTURAL MCHNRY	0.535
392690	OTHER ARTICLES OF PLASTICS	0.530
520841	COTN FABRICS CONTNG >=85% BY WT OF COTN PLAIN WEAVE, WEIGHING NOT MORE THAN 100 GMPER SQM OF YARN OF DIFFERENT	0.515
410719	OTHER WHOLE HIDS/SKINS	0.512
854419	WINDING WIRES OF OTHR METLS,/SUBSTANCES	0.505
640610	UPPERS & PRTS THEREOF OTHR THN STIFFENERS	0.502
940330	WOODEN FRNTR OF A KND USED IN OFFICES	0.491
620319	SUITS OF OTHER TEXTILE MATERIALS	0.486
590110	TEXTILE FABRICS COATED WTH GUM/AMYLACEOUS SUBSTANCES USED FOR OUTER BOOK COVERS	0.481
790111	ZINC,NOT ALLOYD,CONTNG BY WT>=99.99% ZINC	0.454
843420	DAIRY MACHINERY	0.440
520829	OTHER COTTON FABRICS,BLEACHED CONTNG 85% OR MORE BY WT OF COTTON WEING NOT MORE THAN 200 GM PER SQM	0.438
620312	SUITS OF SYNTHETIC FIBRES	0.435
620930	BABIES GRMNTS & CLOTHNG ACCESS OF SYN FIBR	0.426
521211	OTHR UNBLCHED WOVEN FABRICS OF COTTON WEIGHING NOT MORE THAN 200 G/M2	0.417
520851	COTN FABRICS CONTNG >=85% BY WT OF COTN PRINTED PLAIN WEAVE WEIGNG <=100 G PER SQM	0.402
520299	OTHER COTTON WASTE	0.400

Sectoral IIT Index for Major Products (IIT≥0.40) of Bangladesh's Bilateral Trade with India, 2007

HS	Commodity	IIT Bangladesh
391690	MONOFIL,RODS,STICKS ETC. OF OTHR PLSTCS	1.000
521041	PLAIN WEAVE,OF YARNS OF DIFFERENT COLOURS MIXED COTTON FABRICS WEIGHING<=200 GSM	1.000
611030	JERSEYS ETC OF MAN-MADE FIBRES	1.000
640320	FTWEAR WTH OUTR SOLES OF LTHR & UPPRS WHICH CONSIST OF LTHR STRPS ACRS THE INSTEP & AROUND THE BIG TOE	1.000
740319	OTHER REFINED COPPER,UNWROUGHT	1.000
842820	PNEUMATIC ELEVATORS & CONVEYORS	1.000
850162	AC GENERATORS (ALTERNATORS) OF AN OUTPUT EXCEEDING 75KVA BUT NOT EXCEEDING 375KVA	1.000
851650	MICROWAVE OVENS	1.000
854389	OTHER ELECTRICAL MACHINES AND APPARATUS HAVING INDIVIDUAL FUNCTIONS	1.000
850432	OTHR TRNSFRMRS HVNG A PWR HNDLNG CAPACITY EXCDNG 1 KVA BUT NT EXCDNG 16KVA	0.999
521214	OTHR WOVN FBRCS OF COTTON OF YRNS OF DIFF COLOURS WEIGHING NOT MORE THAN 200 G/M2	0.993
630699	OTHR CAMPING GOODS OF OTHER TEXTL MATRLS	0.991
610590	SHIRTS OF OTHR TEXTILE MATERIAL	0.990
845140	WASHING,BLEACHING OR DYEING MACHINES	0.977
846693	PRTS & ACCSSRS FR HDG NOS.8456 TO 8461	0.956
521149	OTHR MXD COTN FABRICS OF YARNS OF DIFFERNTCOLOURS WEGHNG MORE THAN 200 GSM	0.954
850433	OTHR TRNSFRMRS HVNG A PWR HNDLNG CAPACTY EXCDNG 16 KVA BT NT EXCDNG 500 KVA	0.953
847439	OTHR MXNG/KNEADNG MACHINES	0.950
630229	PRINTED BED LINEN OF OTHR TXTL MATRLS	0.947
230240	BRAN SHARPS&OTHR RESIDUES OF OTHR CEREALS	0.944
490110	PRINTD BOOKS ETC IN SINGL SHEET W/N FOLDED	0.942
220290	OTHER SWEETND FLAVRD WATERS	0.939
392620	ARTCLS OF APRL & CLTHNG ACSORS(INCL GLVS)	0.938

490210	NEWSPARS JOURNLS ETC APPEARNG AT LEAST FOUR TIMES A WEEK	0.935
600622	OTHR KNITED OR CROCHETD FBRCS OF COTTON , DYED	0.929
853120	INDICATOR PANELS INCRPRTNG LQD CRYSTAL DEVICES(LCD)/LIGHT EMITTING DIODES(LED)	0.927
580631	OTHER NARROW WOVEN FABRICS OF COTTON	0.923
620341	TROUSERS,BIB & BRACE OVERALLS BREECHES & SHORTS OF WOOL/FINE ANML HAIR,MEN'S/BOYS'	0.922
620520	MEN'S OR BOYS' SHIRTS OF COTTON	0.920
40299	OTHR MILK OR CREAM CONTNG SWETNG MATTER	0.902
830710	FLXBL TUBNG OF IRON/STL WTH/WTHUT FTTNGS	0.896
400912	TUBES,PIPES & HOSES OF VULCMSD RUBR NOT REINFORCED/OTHERWSE COMBINED WITH OTHER MATERIALS WITH FITTINGS	0.884
520849	OTHER COTN FABRICS OF YARN OF DIFFERENT COLOUR WITH COTN CONTENT MORE THN 85% WEIGHNG NOT MORE THN 200 GM PER SQM	0.883
820790	OTHR INTERCHANGEABLE TOOLS	0.878
611011	JERSEYS, PULLOVERS, CARDIGANS ETC OF WOOL	0.871
844010	BOOK-BINDNG MCHNRY,INCL BOOK-SEWNG MCHNS	0.863
491191	PICTURES DESIGNS & PHOTOGRAPHS	0.857
900490	OTHER SPECTACLES,GOGGLES ETC	0.847
845019	OTHR MCHNS OF A DRY LINN CPCTY<=10 KG	0.846
300670	GEL PREP TO BE USED IN HUMAN OR VETERINARYMEDICINE AS A LUBRICANT FOR PARTS OF BODYFOR SURGI OPER/PHYS EXAM BETWN BODY&INSTRU	0.843
230220	RICE BRAN OIL	0.836
730110	SHEET PILING	0.833
620819	SLIPS & PETTICOATS OF OTHR TXTL MATRLS	0.831
610510	MEN'S/BOYS' SHIRTS OF COTTON	0.819
650400	HATS & OTHR HEADGEAR PLTD/MADE BY ASSMBLNGSTRIPS OF ANY MATRLS W/N LIND/TRMMD	0.803
852510	TRANSMISSION APPARATUS	0.801
620530	MEN'S OR BOYS' SHIRTS OF MAN-MADE FIBRES	0.798
842129	OTHR FLTRNG/PURFYNG MCHNRY & APPRTS FR LQD	0.793

848340	GEARS & GEARNG,EXCL TOOTHD WHEELS,TRNSMSN ELMNTS PRSNTD SEPRTLY;BALL SCRWS;GEAR BOXS& SPEED CHNGRS,INCL TORQUE CNVRTRS	0.793
841610	FURNACE BURNERS FOR LIQUID FUEL	0.784
848390	PARTS OF THE ITEMS OF HDG 8483	0.778
520100	COTTON, NOT CARDED OR COMBED	0.773
521211	OTHR UNBLCHED WOVEN FABRICS OF COTTON WEIGHING NOT MORE THAN 200 G/M2	0.770
890790	OTHER FLOTING STRUCTURES	0.769
330510	SHAMPOOS	0.759
271011	LIGHT OILS AND PREPARATIONS	0.754
841199	PARTS OF OTHER GAS TURBINES	0.744
610910	T-SHIRTS ETC OF COTTON	0.729
940310	MTL FRNTR OF A KND USD IN OFFICES	0.726
570239	CRPTS & TXTL FLOOR CVRNGS,WOVEN,OF OTHR TXTL MATRLS,OF PILE CNSTRCTN,NOT MADE UP	0.725
842890	OTHER MACHINERY OF HDG 8428	0.720
960719	OTHER SLIDE FASTENERS	0.719
620590	SHIRTS OF OTHER TEXTILE MATERIALS	0.705
620319	SUITS OF OTHER TEXTILE MATERIALS	0.704
621490	SHWLS,SCRVS ETC OF OTHER TXTL MATERIALS	0.686
843139	PRTS OF OTHR MCHNRY OF HDG.NO.8428	0.680
480300	TOILT/FACIAL TISU TOWL/NAPKIN AND SMLR PAPER USD IN HOUSHOLD/SANITARY PURPOSES IN ROLS/SHETS	0.668
391390	OTHER NATRL & MODFD NATRL POLYMERS	0.666
521059	OTHER MXD COTN FABRICS,PRINTED WEGHING NOT MORE THAN 200 GM PER SQM	0.653
731029	OTHR TNKS,CASKS & SMLR CNTNRS OF CPCTY	0.641
520832	COTN FABRICS CONTNG>=85% BY WT OF COTN DYED,PLAIN WEAVE WEIGHNG >=100 G/M2	0.640
391510	WSTE PARINGS & SCRAP OF PLYMRS OF ETHYLENE	0.636
610610	BLOUSE ETC OF COTTON	0.634
854419	WINDING WIRES OF OTHR METLS,/SUBSTANCES	0.633

902780	OTHR INSTRUMENTS & APPARATUS OF HDG 9027	0.628
845530	ROLLS FOR ROLLING MILLS	0.620
280300	CARBON (CARBON BLACKS & OTHR FORMS NES)	0.611
730820	TOWERS & LATTICE MASTS	0.611
550969	OTHR YRN OF ACRYLC/MODACRYLC STAPLE FIBRES	0.608
650590	OTHER HEADGEAR, HATS, KNITTED/CROCHETED MADE UP FROM LACES ETC W/N LIND/TRMMD	0.607
390610	POLYMETHYL METHACRYLATE	0.598
732690	OTHER ARTICLES OF HEADING 7326	0.595
570190	CRPTS & FLR CVRNGS KNOTTD OF OTR TXTL MTRL	0.594
600624	OTHR KNITED OR CROCHETD FBRCS OF COTTON , PRINTD	0.588
831000	SIGN PLTS, NAME PLTS,ADDRS PLTS & SMLR PLTSNUMBERS,LTTRS & SYMBOLS,OF BS MTL EXCLD OF HDG NO. 9405	0.586
902720	CHROMATOGRAPHS & ELECTROPHORESIS INSTRMNT	0.586
701329	DRINKING GLASSES NESOI	0.582
293339	OTHR CMPNDS CNTNG AN UNFUSED PYRDN RING(W/N HYDRGNTD) IN THE STRUCTURE	0.574
271019	OTHER PETROLEUM OILS AND OILS OBTAIND FROMBITUMINOUS MINERALS ETC	0.573
620990	BABIES GARMENTS AND CLOTHING ACCESSORIES OF OTHER TEXTILE MATERIALS	0.571
330710	SHAVING PRE OR AFTER SHAVE PRPNS	0.565
850720	OTHER LEAD-ACID ACCUMULATORS	0.557
330499	OTHR BEAUTY/MAKE UP PRPNS NES	0.554
580219	OTHR TERRY TOWELNG & SMLR TERRY FBRCS,COTN	0.539
940490	OTHR MATRESS SUPORT & ARTCLS OF BEDNG ETC	0.530
780110	REFINED LEAD	0.521
720430	WASTE AND SCRAP OF TINNED IRON OR STEEL	0.516
851711	LINE TELPHON SET WTH CORDLESS HAND SETS.	0.509
847410	SRTNG,SCRENING,SEPARATING&WASHING MCHNS	0.508
691200	CERMC TABLEWARE,KITCHENWARE,OTHR HOUSEHOLDARTCLS ETC OTHR THAN OF PORCELIAN OR CHINA	0.498

520911	PLAIN WEAVE,UNBLEACHED COTTON FABRICS WEIGHING MORE THN 200 GM PER SQM	0.491
840690	PARTS OF TURBINES	0.488
640699	OTHR FOOTWEAR PARTS OF OTHR MATERIALS	0.487
482190	OTHER LABELS	0.486
621790	PARTS OF GARMENTS/OF CLOTHNG ACCESSORIES	0.463
391739	OTHR TUBES PIPES AND HOSES	0.460
847180	OTHR UNITS OF AUTOMATC DATA PROCSNG MACHNS	0.450
392490	OTHR HOUSEHOLD & TOILT ARTCLS OF PLSTCS	0.446
732310	IRN/STL WOOL;POT SCOURERS & SCOURING OR POLISHING PADS,GLOVES & THE LIKE	0.444
850220	GENRTNG SETS WTH SPARK IGNITION INTERNAL COMBUSTION PISTON ENGINES	0.443
650699	OTHER HEADGEAR OF OTHER MATERIALS	0.441
120991	VEGETABLE SEEDS USED FOR SOWING	0.433
844520	TEXTILE SPINNING MACHINES	0.422
721550	BARS & RODS OTHRTHN FREE-CUTNG STL NT FRTHR WRKD THN COLD FRMD/COLD FINSHD	0.421
851660	OTHR OVNS; COOKERS,COOKING PLATES BOILING RINGS, GRILLERS & ROASTERS	0.419
852812	COLOR TELEVISION	0.416
441299	OTHR PLYWOOD,VINERED PANELS&LMNTD WOOD PANEL AND LAMINATED WOOD	0.414
843999	PRTS OF MCHNRY FR MKNG/FNSHNG PAPR/PAPRBRD	0.411
550630	STAPLE FIBRES OF ACRYLC/MODACRYLC,CRD/CMBD	0.406

Appendix 2

The Global Trade Analysis Project Model

The global computable general equilibrium (CGE) modeling framework of the Global Trade Analysis Project (GTAP) is the best model available for *ex ante* analysis of the economic and trade consequences of comprehensive multilateral or bilateral trade agreements. The GTAP model is a comparative static, global computable general equilibrium model, and is based on neoclassical theories.[51] The GTAP model is a linear model using a common global database for CGE analysis. The model assumes perfect competition in all markets, constant returns to scale in all production and trade activities, and profit- and utility-maximizing behavior of firms and households. The model is solved using the software GEMPACK (Harrison and Pearson, 1996).

Household income and expenditure

In the GTAP model each region has a single representative household, termed the regional household. The income of the regional household is generated through factor payments and tax revenues (including export and import taxes) net of subsidies. The regional household allocates expenditure over private household expenditure, government expenditure and savings according to a Cobb Douglas per-capita utility function. Thus each component of final demand maintains a constant share of total regional income.52 The private household buys commodity bundles to maximize utility, subject to its expenditure constraint. The constrained optimizing behavior of the private household is represented in the GTAP model by a constant difference of elasticity (CDE)-implicit expenditure function. The private household spends its income on consumption of both domestic and imported commodities and pays taxes. The consumption bundles are constant elasticity of substitution (CES) aggregates of domestic and imported goods, where the imported goods are also CES aggregates of imports from different regions. Taxes paid by the private household cover commodity taxes for domestically produced and imported goods and the income tax net of subsidies.

Government consumption

The government spends its income also on domestic and imported commodities and pays taxes. These taxes consist of commodity taxes for domestically produced and imported commodities. Like the private household, government consumption is a CES composition of domestically produced goods and imports.

Savings and Investment

In the GTAP model the demand for investment in a particular region is savings driven. In the multi-country setting the model is closed by assuming that regional savings are homogeneous and contribute to a global pool of savings (global savings). This is then allocated among regions for investment in response to the changes in the expected rates of return in different regions. If all other markets in the multi regional model are in equilibrium, if all firms earn zero profits, and if all households constrain their budgets, the savings and investment will bring about a situation in which global investment equal global savings, and Walras' Law will be satisfied.

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51 Full documentation of the GTAP model and the database can be found in Hertel (1997) and also in Dimaranan and McDougall (2002).

52 Savings enter the static utility function as a proxy for future consumption.

Producers' income

In the GTAP model, producers receive payments for selling consumer goods and intermediate inputs in both the domestic market and the rest of the world. Under the zero-profit assumption of the model, these revenues must be precisely exhausted by spending on domestic intermediate inputs, imported intermediate inputs, factor income and taxes to regional household (taxes on both domestic and imported intermediate inputs and production taxes net of subsidies).

Production technology

In the GTAP model a nested production technology is considered with the assumption that every industry produces a single output, and constant returns to scale prevail in all markets. Industries have a Leontief production technology to produce their output. Industries maximize profits by choosing two broad categories of inputs: a composite of factors (value added) and a composite of intermediate inputs. The factor composite is a CES function of labor, capital, land and natural resources. The intermediate composite is a Leontief function of material inputs, which are in turn a CES composition of domestically produced goods, and imports from all regions.

International trade

The GTAP model employs the Armington assumption which allows the ability to distinguish origin of imports and intra-industry trade of similar products. In the Armington approach, import shares of various regions depend on relative prices and the substitution elasticity between domestic and imported commodities.

Appendix 3

Commodity classification in the GTAP model

No.	Sector Description	No.	Sector Description
1	Paddy rice	30	Wood products
2	Wheat	31	Paper products, publishing
3	Cereal grains nec	32	Petroleum, coal products
4	Vegetables, fruit, nuts	33	Chemical, rubber, plastic prods
5	Oil seeds	34	Mineral products nec
6	Sugar cane, sugar beet	35	Ferrous metals
7	Plant-based fibers	36	Metals nec
8	Crops nec	37	Metal products
9	Cattle, sheep, goats, horses	38	Motor vehicles and parts
10	Animal products nec	39	Transport equipment nec
11	Raw milk	40	Electronic equipment
12	Wool, silk-worm cocoons	41	Machinery and equipment nec
13	Forestry	42	Manufactures nec
14	Fishing	43	Electricity
15	Coal	44	Gas manufacture, distribution
16	Oil	45	Water
17	Gas	46	Construction
18	Minerals nec	47	Trade
19	Meat: cattle, sheep, goats, horse	48	Transport nec
20	Meat products nec	49	Sea transport
21	Vegetable oils and fats	50	Air transport
22	Dairy products	51	Communication
23	Processed rice	52	Financial services nec
24	Sugar	53	Insurance
25	Food products nec	54	Business services nec
26	Beverages and tobacco products	55	Recreation and other services
27	Textiles	56	Public admin/Defense/Health/Education
28	Wearing apparel	57	Dwellings
29	Leather products		

Appendix 4

Regional Aggregation in the GTAP model

No.	New Region	Comprising Old Regions
1	Bangladesh	Bangladesh.
2	India	India.
3	Rest of South Asia	Pakistan; Sri Lanka; rest of South Asia.
4	North America	Canada; United States of America; Mexico; rest of North America.
5	EU_25	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.
6	Rest of the World	Australia; New Zealand; rest of Oceania; China; Hong Kong SAR, China; Japan; Korea; Taiwan, China; rest of East Asia; Cambodia; Indonesia; Lao People's Democratic Republic; Myanmar; Malaysia; Philippines; Singapore; Thailand; Viet Nam; rest of Southeast Asia; Argentina; Bolivia; Brazil; Chile; Colombia; Ecuador; Paraguay; Peru; Uruguay; Venezuela; rest of South America; Costa Rica; Guatemala; Nicaragua; Panama; Rest of Central America; Caribbean; Switzerland; Norway; rest of EFTA; Albania; Bulgaria; Belarus; Croatia; Romania; Russian Federation; Ukraine; rest of Eastern Europe; rest of Europe; Kazakhstan; Kyrgyzstan; rest of Former Soviet Union; Armenia; Azerbaijan; Georgia; Iran Islamic Republic of; Turkey; rest of Western Asia; Egypt; Morocco; Tunisia; rest of North Africa; Nigeria; Senegal; rest of Western Africa; Central Africa; South Central Africa; Ethiopia; Madagascar; Malawi; Mauritius; Mozambique; Tanzania; Uganda; Zambia; Zimbabwe; rest of Eastern Africa; Botswana; South Africa; rest of Southern Africa customs .

Appendix 5

India's Sensitive List on Bangladesh Export*

Sl. No.	Chapter, heading, sub-heading or tariff item of the First Schedule	Description of goods
1	500720	Other Woven Fabrics of Silk, containing 85 % or more by weight of silk or of silk waste other than non Silk.
2	610342	Men's or Boy's Trousers
3	610343	Men's /Boy's Trousers, Overalls and Shorts - Knitted - Synthetic Fibers
4	610462	Women's or Girls Trousers, Overalls and Shorts-Knitted- of Cotton
5	610463	All goods
6	610510	All goods
7	610520	All goods
8	610610	All Goods-knitted
9	610711	All goods
10	610721	All goods
11	610791	All goods
12	610821	All goods
13	610822	Women's/Girls Briefs and Panties: Knitted or crocheted: of Man-made Fibres.
14	610831	Women's or Girls Nightdresses and Pyjamas knitted or Crocheted- of Cotton
15	610910	All goods
16	610990	All goods
17	611020	All goods
18	611030	All goods
19	611090	All goods
20	611120	Babies Garments and Clothing Accessories: Knitted or crocheted of cotton.
21	611130	All goods
22	611241	Of synthetic fibers
23	611300	Garments , made-up of knitted or crocheted fabrics of heading No. 59.03,59.06
24	611420	All goods
25	611699	All goods
26	620332	All goods
27	620333	All goods
28	620342	Men's/Boy's Trousers, Overalls and Shorts -Woven-Cotton
29	620413	All goods
30	620452	All goods
31	620462	Women's/Girl's Trousers, Overalls and Shorts-Woven-Cotton
32	620520	Mens/Boys Shirts-Woven-Cotton
33	620530	Mens/Boys Shirts-Woven-Man-Made-Fibres
34	620590	All goods

35	620630	Womens/Girls Blouses, Shirts and Shirt-Blouses-Woven-Cotton
36	620721	All goods
37	620821	All goods
38	620920	All goods except hats
39	620930	All goods except hats
40	621040	All goods
42	621050	Sweaters, Sweat Shirts and Waist-Coats-Knitted-Cotton
42	621111	All goods
43	621132	All goods
44	621133	All goods
45	621210	All goods
46	621710	Made-Up Clothing Accessories; Woven

*Already removed by India in September 2011.

Appendix 6

Sources and definitions of data

Variable	Definition	Source
gdp_ex	GDP of exporter, US$ at current price	WDI Online 2009, World Bank
gdp_im	GDP of importer, US$ at current price	WDI Online 2009, World Bank
tariff	Simple average tariff (%)	WITS, World Bank
distance	Distance between bilateral pair of countries (weighted)	CEPII
contig	Contiguity, dummy variable (=1 if countries in bilateral pair are geographically contiguous, 0 otherwise)	CEPII
comlang_off	Common language (official), dummy variable (=1 if countries in bilateral pair have same official language, 0 otherwise)	CEPII
rta	Regional trade agreement (including bilateral free trade agreement), dummy variable (=1 if countries in bilateral pair have free trade agreement, 0 otherwise)	CEPII
sr_transit	Sub-regional transit, dummy variable (=1 if countries in bilateral pair have sub-regional transit, 0 otherwise)	Authors
r_transit	Regional transit, dummy variable (=1 if countries in bilateral pair have regional transit, 0 otherwise)	Authors
cost	Cost to export (US$ per container) in bilateral pair of countries	Doing Business Database, World
time	Time to export (days) in bilateral pair of countries	Doing Business Database, World
number	Documents to export (number) in bilateral pair of countries	Doing Business Database, World
customs	Efficiency of clearance process (speed, simplicity, and predictability of formalities) by border control agencies, including Customs	Logistic Performance
infrastructure	Quality of trade and transport related infrastructure (ports, railroads, roads, and information technology	Logistic Performance
shipments	Ease of arranging competitively priced shipments	Logistic Performance
timeliness	Timeless of shipments in reaching destination within the scheduled or expected delivery time	Logistic Performance
cc_ex	Control of corruption in exporting country	World Governance
cc_im	Control of corruption in importing country	World Governance

Appendix 7

Trade partners (importers) of Bangladesh (exporter)

Partner (importers)	Partner (importers)
AFGHANISTAN, I.R.	KOREA, REPUBLIC
ALBANIA	KUWAIT
ALGERIA	MADAGASCAR
ARGENTINA	MALAYSIA
AUSTRALIA	MALTA
AUSTRIA	MEXICO
BAHRAIN, KINGDOM	MOLDOVA
BELARUS	MOROCCO
BELGIUM	MOZAMBIQUE
BENIN	MYANMAR
BHUTAN	NEPAL
BRAZIL	NETHERLANDS
BRUNEI DARUSSALAM	NEW ZEALAND
BULGARIA	NIGERIA
CAMBODIA	NORWAY
CAMEROON	OMAN
CANADA	PAKISTAN
CHILE	PANAMA
CHINA,P.R.: MAINLAND	PERU
CHINA,P.R.:HONG KONG	PHILIPPINES
COLOMBIA	POLAND
CÔTE D'IVOIRE	PORTUGAL
CROATIA	QATAR
CYPRUS	ROMANIA
CZECH REPUBLIC	RUSSIAN FEDERATION
DENMARK	SAUDI ARABIA
DJIBOUTI	SINGAPORE
EGYPT	SLOVAK REPUBLIC
EL SALVADOR	SLOVENIA
ESTONIA	SOUTH AFRICA
ETHIOPIA	SPAIN
FINLAND	SRI LANKA
FRANCE	SUDAN
GEORGIA	SWAZILAND
GERMANY	SWEDEN
GHANA	SWITZERLAND
GREECE	SYRIAN ARAB REPUBLIC
GUINEA	TAJIKISTAN
GUINEA-BISSAU	TANZANIA
HUNGARY	THAILAND
ICELAND	TUNISIA
INDIA	TURKEY
INDONESIA	UGANDA
IRAN, I.R.	UKRAINE
IRELAND	UNITED ARAB EMIRATES
ITALY	UNITED KINGDOM
JAPAN	UNITED STATES
JORDAN	UZBEKISTAN
KAZAKHSTAN	VIETNAM
KENYA	YEMEN, REPUBLIC

Appendix 8

Derivation of gravity estimates

- $X(i,j)$ = Value of bilateral trade from country *i* (Bangladesh) to country *j* (India);
- $T(i,j)$ = Trade facilitation index from country *i* to country *j*;
- $D(i,j)$ = Distance from country *i* to country *j*;
- $N(i,j)$ = Number of trade documents (trade-related) from country *i* to country *j*;
- $C(i,j)$ = Efficiency of clearance process by border control agencies, including Customs from country *i* to country *j*;
- $I(i,j)$ = Quality of trade and transport related infrastructure

In the rest of the section, the (i,j) term in the variables is suppressed without loss of generality. From stage 2 of the gravity model (see Table 13), the TFI index can be represented as:

$T = -0.217(\ln D) - 2.666(\ln N) - 1.424(\ln C) + 0.849(\ln I)$

From stage 3, it can be seen that:

$\ln X = K' + 3.645T$

$= K' - 0.0593(\ln D) - 0.7314(\ln N) - 0.3907(\ln C) + 0.2329 (\ln I)$

where *K*' is a constant representing all the terms of independent variables in stage 1. Thus, it is possible to write:

$X = KD^{-0.0593} N^{-0.7314} C^{-0.3907} I^{0.2329}$

where $K = \exp(K')$. Now, it is easy to derive the following:

$$\frac{\partial X}{X} = -0.0593\frac{\partial D}{D},$$
$$\frac{\partial X}{X} = -0.7314\frac{\partial N}{N},$$
$$\frac{\partial X}{X} = -0.3907\frac{\partial C}{C},$$
$$\frac{\partial X}{X} = 0.2329\frac{\partial I}{I},$$
$$\frac{\partial X}{X} = 3.645\frac{\partial T}{T},$$