BENEFIT-COST ANALYSIS OF TRADE LIBERALIZATION AND TRADE FACILITATION INTERVENTIONS IN BANGLADESH

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Benefits and Costs of Trade Liberalization and Trade Facilitation in Bangladesh

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Bangladesh Priorities

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List of Tables

List of Figures

Introduction

Bangladesh pursued an import-substituting industrialization strategy in the 1970s, the key objectives of which were to safeguard the country's infant industries, reduce the balance of payments deficit, use the scarce foreign exchanges efficiently, ward off international capital market and exchange rate shocks, lessen fiscal imbalance, and to achieve higher economic growth and self-sufficiency of the nation. However, in the face of the failure of such an inward-looking strategy's delivering the desire outcomes along with rising internal and external imbalances, trade policy reforms were introduced in the early 1980s. Since then trade liberalization has become an integral part of Bangladesh's trade policy. Bangladesh has been able to reduce its protection for the domestic sectors quite significantly by undertaking substantial reductions in quantitative restrictions, drastic opening up of trade in many restricted items, significant rationalization and diminution of import tariffs, a move to a freely floating exchange rate system, and considerable adjustments to monetary and fiscal policies. Another important element of trade policy reform was the introduction of generous promotional measures for exports. While import and exchange rate liberalization were intended to correct the domestic incentive structure in the form of reduced protection for import-substituting sectors, export promotion schemes were undertaken to provide exporters with an environment in which the previous bias against export-oriented investment could be reduced significantly. The reform measures and export incentives have witnessed an impressive export performance.

Meanwhile, worldwide multilateral trade negotiations, along with preferential trading arrangements (PTAs) and unilateral liberalization efforts, have succeeded in bringing down tariffs and establishing rules on non-tariff barriers (NTBs). This has happened not only in developed countries but also in the developing world. However, though the 'traditional' trade barriers gradually disappeared, the costs of inefficient administration and cumbersome trade procedures commonly termed, as 'national barriers' have become increasingly visible stumbling blocks in the countries. Given these concerns, issues on 'Trade Facilitation' are negotiated as part of the Doha Development Round of the World Trade Organisation (WTO).

The world economy witnessed that, as conventional trade barriers are lowered, transaction costs related to transport, transit, meeting NTM requirements and customs procedures for clearance of goods are of increasing importance, which exceed in many instances the cost of duties to be paid. The high cost of formal trade due to poor TF only promotes informal trade with its own adverse consequences of loss of revenue for the governments. For developing economies, inefficiencies in

areas such as customs and transport can be roadblocks to the integration into the global economy and may severely impair export competitiveness or inflow of foreign direct investment.

For instance, there is no direct cross-border road or rail transportation in South Asia, as a result goods are required to be transshipped through land borders across countries in South Asia and cause various impediments. The border delay in terms of time for India's exports to Bangladesh (Petrapole India, and Benapole, Bangladesh) was not reduced between 1998 and 2005. On the one hand, delays in terms of time at the border increased from 2.5 days in 1998 to 3.92 days in 2005. The costs of transaction at the border also increased from 10.38 percent in 2002 to 16.80 percent in 2005 (De, 2009). Therefore, according to De (2009), the cost of transportation and time delays at borders in South Asia greatly penalize trade in the same way high tariffs do.

Since a large portion of South Asia's merchandise trade is carried overland and through borders, existing obstacles lead to a rise in transaction costs and to rent-seeking informal economies in South Asia that wipes out the benefits of trade liberalization in the region. APEC estimated that trade facilitation programs would generate gains of about 0.26% of real GDP to APEC, almost double the expected gains from tariff liberalization, and that the savings in import prices would be between 1–2% of import prices for developing countries in the region. The SAARC multimodal transport study (2004) identified that lack of multilateral transport agreements, railway gauge differences, some missing links of shorter lengths in border areas, load restrictions on Jamuna bridge, manual handling of documentation, duplications of customs checks, restrictions on movement of open wagons and oil tankers, siltation in ports, inefficient port management, lack of direct flights between SAARC countries were the major hindrances to introduction of multi-modal transport system in the region. According to the study results, there was a tremendous potential for growth in intraregional trade once the political environment became supportive and transport network was integrated.

Trade facilitation in South Asia has been addressed through a number of initiatives at the national and subregional levels. Among others, South Asia Subregional Economic Cooperation (SASEC) program seeks to strengthen multimodal cross-border transport networks that boost intraregional trade and open up trade opportunities with East and Southeast Asia. This program aims to promote regional prosperity, improve economic opportunities, and boost intraregional trade and cooperation in South Asia, while also connecting to Southeast Asia through Myanmar, to the People's Republic of China and the global market. SASEC helps build modern and effective customs administrations that speed up the time and reduce the costs of moving goods, vehicles, and people across borders. Since 2001, SASEC countries have implemented 33 regional projects worth more than $6 billion in the energy, transport,

trade facilitation, and information and communications technology sectors. Bangladesh is one of the members and recipients of SASEC projects, that brings together Bangladesh, Bhutan, India, the Maldives, Nepal, and Sri Lanka in a project-based partnership that aims to promote regional prosperity, improve economic opportunities, and build a better quality of life for the people of the subregion. SASEC Program is supported by multilateral organizations such as the ADB, the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), WCO, as well as from the Government of Japan.

In Bangladesh, trade openness has increased considerably in recent years. To a large extent, this reflects impacts of significant reductions in import tariffs and in quantitative restrictions on imports, as well as considerable progress on exchange liberalization. However, there still exist significant barriers, which impact adversely on Bangladesh's export competitiveness. Therefore, to achieve higher productivity and export competitiveness, policy measures are obliged to relate to trade related infrastructure and domestic (behind the border) factors. Bangladesh held a World Trade Organization trade facilitation self-assessment workshop in July 2008, during which 48 trade facilitation measures were considered in detail. Infrastructure and lack of human resources were identified as important barriers to trade facilitation (WTO Delegate Presentation on Results of Completed Needs Assessments). Besides, studies undertaken by the World Bank, SEDF and BEI, Metropolitan Chamber of Commerce and Industry (MCCI) and the Confederation of Indian Industry (CII), the officials in Bangladesh's missions in India and Nepal, FBCCI and FICCI Taskforce found lack of adequate infrastructure and administrative capacity and nontariff barriers to be the major impediments to trade between Bangladesh and the region in general. They stressed the need for improvement of infrastructure and administrative capacity on both sides of the border to reduce bottlenecks and to stay ahead of the expanded trade, whether bilateral, regional or beyond (FBCCI).

Against this background, the objective of the paper is to explore the major policy issues related to the trade liberalization and trade facilitation interventions in Bangladesh so that suggested approaches would fit the interests and priorities of this country. This study thus aims to identify and analyze the costs and benefits of tariff liberalization interventions in Bangladesh along with the costs and benefits of trade facilitation interventions in Bangladesh.

This paper is broadly divided into two parts. The first part starts with a brief description of trade liberalization intervention in Bangladesh where import policies and import regimes in Bangladesh are discussed. After that, detailed methodology section contains explanation of assessing the impact of tariff liberalization using the CGE model along with social account matrix (SAM) for the structure of

Bangladesh economy as in 2012. Finally, benefit-cost analysis of trade liberalization intervention is delivered along with few caveats. The second part of the paper encompasses trade facilitation interventions in Bangladesh with some conceptual briefings. This section concisely describes current trade facilitation initiatives in Bangladesh followed by methodology of assessing the impact of trade facilitation using the SAM multiplier model and lastly benefit-cost analysis of trade facilitation intervention is calculated to analyze the findings.

Trade Liberalization Intervention in Bangladesh
Import Policies and Import Regimes in Bangladesh

Trade policy during 1972 and 1980 consisted significant import controls. Under the Import Policy Orders (IPOs), items were specified whether their importation were allowed, prohibited or required special authorization. With the exception of a few cases, licenses were required for all other imports. The import-licensing system was subject to criticism for not being sufficiently flexible to ensure its smooth functioning under changing circumstances. Moreover, it was characterized by complexity, deficiency in administration, cumbersome foreign exchange budgeting procedures, poor inter-agency coordination, rigid allocation of licenses and time-consuming procedures (Bhuyan & Rashid, 1993).

 Since early 1980s, import liberalization had started to take place. The import-licensing system was abolished and imports were permitted against letters of credit (L/C). The long *Positive List* in the IPOs of importable was replaced by two lists, namely the *Negative List* (for banned items) and the *Restricted List* (for items importable on fulfillment of certain prescribed conditions) and imports of any items outside the lists were allowed. Since 1990, the Negative and Restricted Lists of importable had been consolidated into one list, namely the 'Consolidated List' (Raihan, 2007). The range of products subject to quantitative restrictions (QRs) had been curtailed substantially during 1980s, 1990s and 2000s. Whereas during mid 1980s, about 40 percent of all import lines at the HS-4 digit level was subject to trade-related QRs, these restrictions had drastically been reduced to less than 2 percent towards the end of 2000s (Raihan & Razzaque, 2007).

Beginning from the late 1980s the tariff regime had become increasingly liberalized. In 1991-92 the un-weighted average rate of tariff was around 70 percent (Raihan & Razzaque, 2007) and by 2013-2014 it fell down to 13.2 percent (Sattar, 2014). Much of this reduced protection was achieved through the reduction in the maximum rate. In 1991-92 the maximum tariff rate was 350 percent, which came down to only 25 percent in 2004-2005 (Raihan & Razzaque, 2007), and it has been kept at this rate in recent years. The number of tariff bands was 24 in the 1980s, 18 in the early 1990s and only 4 in recent

years (Raihan & Razzaque, 2007). Bangladesh has no tariff quotas, seasonal tariffs and variable import levies (WTO, 2000). All these measures have greatly simplified the tariff regime and helped streamline customs administration procedures. A drastic reduction in un-weighted tariff rates during the 1990s also resulted in the fall in import-weighted tariff rates. The import-weighted average tariff rate declined from 42.1 percent in 1990-91 to around 13 percent towards the end of 2000s (Raihan & Razzaque, 2007).

One important aspect of the tariff structure in Bangladesh relates to the use of import taxes which have protective effects (also known as para-tariffs) over and above the protection provided by customs duties (World Bank, 2004). These taxes have been the infrastructure development surcharge (IDSC), supplementary duties (SD), Regulatory duties. One of the major reasons behind this is because of the fact that though the VAT was instituted in the early 1990s as a revenue replacing tax, the VAT was not successful in early years as the tax base for the VAT was too low. Therefore, it appears that, despite the lowering of customs duties, the presence of para-tariffs did not significantly lower the total protection rate during the 2000s (Table 1).

Table 1: Average Custom-duties and Para-tariffs in Bangladesh

Year	Customs Duties	Para-Tariffs	Total protection rate
1991-92	70.6	3.0	73.6
2001-02	21.0	8.4	29.4
2011-12	13.6	12.9	26.5

Source: Raihan (2015)

The liberal import policies led to large growth in imports into Bangladesh as shown in Figure 1. In 1972, total import was only US$ 863.5 million, which rose to US$ 4,076.6 million in 1990, and increased further to US$ 43,854 million in 2014.

Figure 1: Trend in the total imports into Bangladesh (million US$)
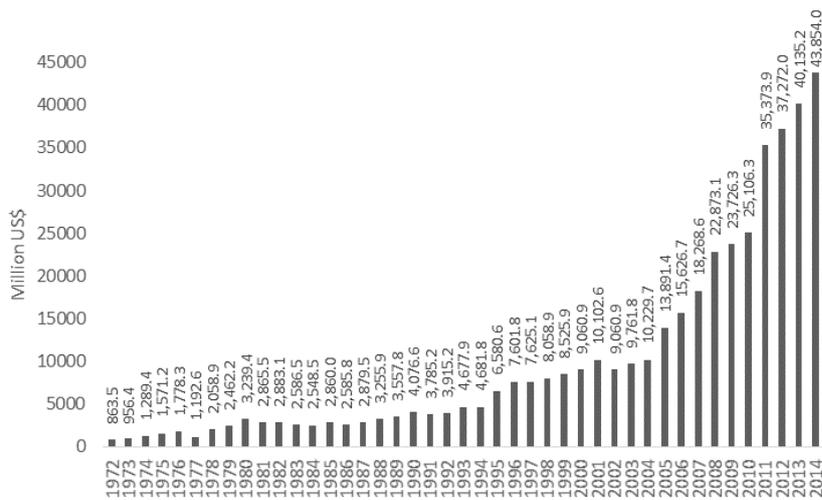
Source: World Development Indicator (2014)

Figure 2: Trend in the Import-GDP Ratio in Bangladesh
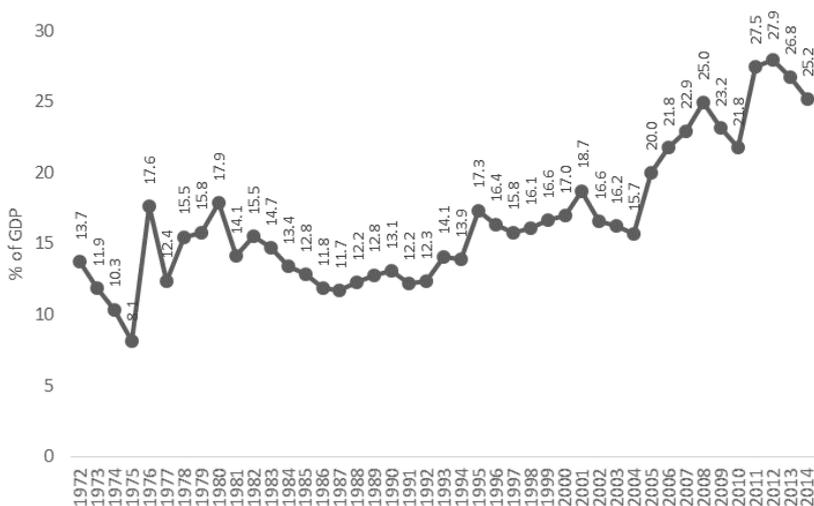
Source: World Development Indicator (2014)

The surge in imports also resulted in rising import penetration ratio, defined as the share of total imports in GDP. Figure 2 shows that the import penetration ratio was only about 12 percent during the early 1970s, and it increased to more than 25 percent in recent years.

Methodology of Assessing the Impact of Tariff Liberalization: The CGE Model

The economy-wide impact of trade liberalization is a much debated and controversial issue. Theoretically, trade liberalization results in productivity gains through increased competition, efficiency, innovation and acquisition of new technology. Trade policy works by inducing substitution effects in the production and consumption of goods and services through changes in prices. These effects, in turn, change the level and composition of exports and imports. In particular, the changing relative prices induced by trade liberalization cause a re-allocation of resources from less efficient to more efficient uses. Trade liberalization is also thought to expand the set of economic opportunities by enlarging the market size and increasing the effects of knowledge spill over. These are the key theoretical components of the effects of trade liberalization, which together induce growth of output and consequent poverty alleviation. The CGE approach is the dominant methodology for the *ex-ante* analysis of economic consequences of comprehensive trade agreements whether multilateral or bilateral in nature (Francois & Shiells, 1994). This is the dominant methodology because no other approach offers the same flexibility for looking at prospective changes in trade policy while respecting the fundamental economy-wide consistency requirements, such as balance of payments equilibrium and labor and capital market constraints, that are so important in determining the consequences of comprehensive trade reforms.

In this paper, the CGE model is built using the PEP standard static model (Decaluwe et al, 2009) and with further developments and modifications. In the CGE model, a representative firm in each industry maximizes profits subject to its production technology. The sectoral output follows a Leontief production function. Each industry's value added consists of composite labor and composite capital, following a CES specification. Different categories of labor are combined following a CES technology with imperfect substitutability between different types of labor. Composite capital is a CES combination of the different categories of capital. It is assumed that intermediate inputs are perfectly complementary. They are combined following a Leontief production function.

Household incomes come from labor income, capital income, and transfers received from other agents. Subtracting direct taxes yields household's disposable income. Household savings are a linear function of disposable income, which allows the marginal propensity to save to differ from the average propensity.

Corporate income consists of its share of capital income and of transfers received from other agents. Deducting business income taxes from total income yields the disposable income of each type of business. Likewise, business savings are the residual that remains after subtracting transfers to other agents from disposable income.

The government draws its income from household and business income taxes, taxes on products and on imports, and other taxes on production. Income taxes for both households and businesses are described as a linear function of total income. The current government budget surplus or deficit (positive or negative savings) is the difference between its revenue and its expenditures. The latter consists of transfers to agents and current expenditures on goods and services.

The rest of the world receives payments for the value of imports, part of the income of capital, and transfers from domestic agents. Foreign spending in the domestic economy consists of the value of exports and transfers to domestic agents. The difference between foreign receipts and spending is the amount of rest-of-the-world savings, which are equal in absolute value to the current account balance but are of opposite sign.

The demand for goods and services, whether domestically produced or imported, consists of household consumption demand, investment demand, demand by government, and demand as transport or trade margins. It is assumed that households have Stone–Geary utility functions (from which derives the Linear Expenditure System). Investment demand includes both gross fixed capital formation (GFCF) and changes in inventories.

Producers' supply behavior is represented by nested constant elasticity of transformation (CET) functions. On the upper level aggregate output is allocated to individual products; on the lower level the supply of each product is distributed between the domestic market and exports. The model departs from the pure form of the small-country hypothesis. A local producer can increase his share of the world market only by offering a price that is advantageous relative to the (exogenous) world price. The ease with which his share can be increased depends on the degree of substitutability of the proposed product for competing products; in other words, it depends on the price-elasticity of export demand. Commodities demanded on the domestic market are composite goods, combinations of locally produced goods and imports. The imperfect substitutability between the two is represented by a CES aggregator function. Naturally, for goods with no competition from imports, the demand for the composite commodity is the demand for the domestically produced good.

The system requires equilibrium between the supply and demand of each commodity on the domestic market. The sum of supplies of every commodity made by local producers must equal domestic demand for that locally produced commodity. Finally, supply to the export market of each good must be matched by demand.

Also, there is an equilibrium between total demand for capital and its available supply. However, the model assumes both fixed and flexible wage rates for labor under different closures.

Brief Description of Social Account Matrix (SAM) for 2012

The CGE model of uses the latest available Social Accounting Matrix (SAM) of Bangladesh for the year 2012 (Raihan, 2014). The 2012 SAM for Bangladesh has the following accounts: (1) total domestic supply of 10 commodities; (2) production accounts for 10 activities; (3) 4 factors of productions-two labor types and two capital categories; (4) current account transactions between 4 current institutional agents- households and unincorporated capital, corporate enterprises, government and the rest of the world; household account includes seven representative groups (5 rural and 2 urban); and (5) one consolidated capital account. A description of the Bangladesh SAM is described in Table 2.

Table 2: Description of Bangladesh SAM Accounts for 2012

Set	Description of Elements
Activity (10)	Agriculture and extraction: Grains and Crops, Livestock and Meat Products, Mining and Extraction. Manufacturing: Processed Food, Textiles and Clothing, Light Manufacturing, Heavy Manufacturing. Services: Utilities and Construction, Transport and Communication, Other Services.
Commodity (10)	Agriculture and extraction: Grains and Crops, Livestock and Meat Products, Mining and Extraction. Manufacturing: Processed Food, Textiles and Clothing, Light Manufacturing, Heavy Manufacturing. Services: Utilities and Construction, Transport and Communication, Other Services.
Factors of Production (4)	Unskilled labor, Skilled labor, Capital and Land
Households (7)	Rural: landless, Agricultural marginal, Agricultural small, Agricultural large, Non-farm Urban: Households with low educated heads, and households with high educated heads
Other Institutions (4)	Government; Corporation; Rest of the World and Capital

Source: Raihan (2015)

Structure of the Bangladesh Economy as in 2012 SAM

Table 3 presents the structure of the Bangladesh economy in 2012. In terms of value-addition, among the agricultural sectors, the leading sector is the grains and crops with 11.33 percent share. Among the manufacturing sectors, the leading sector is textile and clothing (7.55 percent). Among the services sectors, the leading sector is transport and communication (27.65 percent). The textile and clothing sector is highly export oriented. The export basket is highly concentrated as 88.12 percent exports come from textile and clothing. The heavy manufacturing sector is highly import dependent. In the case of tariff rate, agricultural sectors have lower tariff rates than the manufacturing sectors.

Table 3: Structure of the Bangladesh economy in 2012 as reflected in the SAM 2012

Sectors	1	2	3	4	5	6
	Vi/TV	Ei/Oi	Ei/TE	Mi/Oi	Mi/TM	TAR
Grains and Crops	11.33	0.42	0.56	9.09	8.05	4.52
Livestock and Meat Products	1.25	0.07	0.01	2.25	0.25	8.22
Mining and Extraction	6.60	0.16	0.08	2.20	0.75	7.61
Processed Food	1.34	1.53	1.59	15.96	10.87	13.38
Textiles and Clothing	7.55	51.68	88.12	17.57	19.70	25.33
Light Manufacturing	1.74	2.41	1.44	20.83	8.22	19.59
Heavy Manufacturing	0.99	1.17	1.26	60.96	43.16	11.77
Utilities and Construction	16.86	-	-	-	-	-
Transport and Communication	27.65	2.87	6.30	2.42	3.49	-
Other Services	24.69	0.28	0.63	3.65	5.52	-
Total	100.00	—	100.00	—	100.00	—

Note: Vi=sectoral value added, TV=total value added, Ei=sectoral export, Oi=sectoral output, TE=total export, Mi=sectoral import, TM=total import, TAR=tariff rate, All figures are expressed in percentages.
Source: Raihan (2014)

Tariff Liberalization Simulation in the CGE Model and Closures

This experiment undertakes a unilateral elimination of all commodity tariffs by 50 percent. This scenario is run under a common set of closures where total stocks of land, tax rates, technical changes, total real inventories are held fixed; and the consumer price index (CPI) is the model's numéraire. However, in addition to the aforementioned common set of closures, this scenarios is run under six different sets of closures, where:

- Closure 1: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.

- Closure 2: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, fixed government expenditure, flexible government savings, and full mobility of capital across sectors.

- Closure 3: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.

- Closure 4: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, fixed government expenditure, flexible government savings, and full mobility of capital across sectors.

- Closure 5: Fixed wage rates, flexible supply of all categories of labor, flexible current account balance, fixed total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.

- Closure 6: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and sector specific capital.

The reason behind applying different sets of closures for a particular scenario is to see whether model simulation results vary with the model assumptions.

Table 4: Effects on key macroeconomic variables (% change from base)

	Closure 1	Closure 2	Closure 3	Closure 4	Closure 5	Closure 6
GDP	0.00	0.00	0.44	1.42	0.41	0.33
Gross production (volume)	0.64	0.38	1.13	1.90	1.17	0.94
Exports (volume)	8.67	7.45	9.40	9.61	9.94	8.68
Imports (volume)	0.93	0.76	1.12	1.19	0.62	0.78
Domestic sales (volume)	-0.12	-0.29	0.35	1.17	0.34	0.20
GDP deflator	-1.50	-1.53	-1.07	-0.13	-1.10	-1.17
Exchange rate (real)	0.46	0.56	0.45	0.42	0.35	0.44
Intermediate input costs	-0.12	-0.17	-0.21	-0.23	-0.21	-0.02
Primary factor costs	0.47	0.57	0.45	0.42	0.35	0.45

Note: Common set of closures: total stocks of land, tax rates, technical changes, total real inventories are held fixed; and the consumer price index (CPI) is the model's numéraire.

Closure 1: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.

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Source: Simulation in the Bangladesh CGE model

The macroeconomic effects of the trade liberalization shock are presented in Table 4. Tariff cut by 50 percent would leave real GDP unaffected under closure assumptions 1 and 2, whereas in all other cases real GDP would rise in the range between 0.33 percent and 1.42 percent. The largest rise in real GDP would be observed under the 4th closure. There would be positive effects on gross production, exports and imports under all closures. Domestic sales would fall under first two closures, whereas it would rise under the remaining closures. The GDP deflator would fall under all closures. The real exchange rate would depreciate which, together with the fall in intermediate input costs would leads to a rise in exports.

Table 5 presents the impact on the volume of output by broad sector. Both agricultural and industrial sectors would expand, whereas, services sector would contract in most cases. The largest positive impact is observed in the industrial sector.

Table 5: Effects on the volume of output (by broad sector) (% change from base)

	Closure 1	Closure 2	Closure 3	Closure 4	Closure 5	Closure 6
Agriculture	0.64	0.26	1.11	1.29	1.14	0.76
Industry	2.92	2.04	3.59	3.99	3.85	3.10
Services	-0.79	-0.63	-0.41	0.78	-0.52	-0.37
All Sectors	0.64	0.38	1.13	1.90	1.17	0.94

Note: Common set of closures: total stocks of land, tax rates, technical changes, total real inventories are held fixed; and the consumer price index (CPI) is the model's numéraire.

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Closure 6: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and sector specific capital.

Source: Simulation in the Bangladesh CGE model

Table 6: Effects on the volume of exports (by broad sector) (% change from base)

	Closure 1	Closure 2	Closure 3	Closure 4	Closure 5	Closure 6
Agriculture	5.85	5.50	6.57	6.75	7.07	6.00
Industry	8.95	7.68	9.68	9.84	10.24	8.89
Services	5.24	4.56	5.92	6.84	6.31	6.11
All Sectors	8.67	7.45	9.40	9.61	9.94	8.68

Note: Common set of closures: total stocks of land, tax rates, technical changes, total real inventories are held fixed; and the consumer price index (CPI) is the model's numéraire.

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Source: Simulation in the Bangladesh CGE model

Table 6 shows the impact on the volume of exports by broad sectors. The largest positive impact is observed in the case of industrial exports, which would rise in the range between 7.68 and 10.24 percent. Also both agricultural and services export would rise under all closures.

Impact on volume of imports by broad sectors are presented in Table 7. As the tariff rates on industrial imports are much higher than those on agricultural imports, there would be some sizeable rises in imports in the industrial sectors followed by the tariff cut. In the agricultural sectors however, import would fall due to the fact the positive effect on the price of import due to the depreciation of exchange rate would be larger than the negative effect on the price of import due to tariff cut. This is primarily due to the reason that, the initial tariffs on agricultural sectors and also the import-dependence in these sectors are much lower than those of industrial sectors. In the case of services sectors too, as there is no tariffs, the import prices of services sectors would rise as a result of the depreciation of the exchange rate and imports in these sectors would fall.

Table 7: Effects on the volume of imports (by broad sector) (% change from base)

	Closure 1	Closure 2	Closure 3	Closure 4	Closure 5	Closure 6
Agriculture	-3.22	-2.93	-3.37	-2.87	-3.99	-3.33
Industry	2.59	1.92	2.80	2.50	2.32	2.50
Services	-9.95	-6.08	-9.73	-6.58	-10.22	-10.74
All Sectors	0.93	0.76	1.12	1.19	0.62	0.78

Note: Common set of closures: total stocks of land, tax rates, technical changes, total real inventories are held fixed; and the consumer price index (CPI) is the model's numéraire.
Closure 1: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.
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Closure 6: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and sector specific capital.
Source: Simulation in the Bangladesh CGE model

Table 8: Effects on the volume of output (by sector) (% change from base)

Sectors	Closure 1	Closure 2	Closure 3	Closure 4	Closure 5	Closure 6
Grains and Crops	1.02	1.04	1.54	2.09	1.66	1.05
Livestock and Meat Products	-0.29	-0.09	0.14	0.76	0.12	0.15
Mining and Extraction	-0.05	-1.70	0.30	-0.65	0.14	0.19
Processed Food	0.07	-0.07	0.71	1.69	0.71	0.55
Textiles and Clothing	5.19	4.23	5.92	6.33	6.35	5.10
Light Manufacturing	-1.24	-1.66	-0.67	0.07	-0.63	-0.49
Heavy Manufacturing	0.16	-2.39	0.63	-0.72	0.68	0.60
Utilities and Construction	0.04	-4.40	0.29	-3.28	-0.21	0.17
Transport and Communication	1.38	1.50	1.97	3.26	2.11	1.73
Other Services	-3.54	0.22	-3.25	1.50	-3.32	-2.82
Total	0.64	0.38	1.13	1.90	1.17	0.94

Note: Common set of closures: total stocks of land, tax rates, technical changes, total real inventories are held fixed; and the consumer price index (CPI) is the model's numéraire.
Closure 1: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.
Closure 2: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, fixed government expenditure, flexible government savings, and full mobility of capital across sectors.
Closure 3: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.
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Closure 5: Fixed wage rates, flexible supply of all categories of labor, flexible current account balance, fixed total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.
Closure 6: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and sector specific capital.
Source: Simulation in the Bangladesh CGE model

Impacts on the disaggregated sectoral level outputs are shown in Table 8. Across all closures, the highly export-oriented 'Textiles and Clothing' sector would have the largest expansions followed by the 'Transport and Communication' sector. With the assumption of fixed labor supply, under both closures 1 and 2, the sectors with high tariff protection, such as 'Livestock and Meat Products' and 'Light Manufacturing' would experience contraction in outputs. Under most of the other closures, the 'Light Manufacturing' would continue to experience contraction. The effect on the services sectors would vary depending on the closure assumptions.

Impacts on the disaggregated sectoral level exports are shown in Table 9. All export sectors would experience rise in exports. In agriculture, 'Grains and Crops' and 'Livestock and Meat Products' exports would rise by more than 5 percent. Among the industrial exports, the largest positive effects are

observed for the 'Textiles and Clothing' sector. Among the services sectors, the largest positive impact is observed for the 'Transport and Communication' sector.

Table 9: Effects on the volume of exports (by sector) (% change from base)

Sectors	Closure 1	Closure 2	Closure 3	Closure 4	Closure 5	Closure 6
Grains and Crops	6.05	5.79	6.83	7.12	7.37	6.13
Livestock and Meat Products	5.22	5.03	5.98	6.30	6.39	6.58
Mining and Extraction	4.58	3.57	4.83	4.28	5.16	5.05
Processed Food	5.07	4.27	5.73	6.26	6.04	5.84
Textiles and Clothing	9.14	7.86	9.88	10.05	10.45	9.04
Light Manufacturing	4.64	3.92	5.19	5.59	5.51	5.71
Heavy Manufacturing	5.13	3.40	5.48	4.74	5.80	5.58
Transport and Communication	5.46	4.61	6.20	6.93	6.60	6.28
Other Services	3.07	4.14	3.14	5.92	3.42	4.48
Total	8.67	7.45	9.40	9.61	9.94	8.68

Note: Common set of closures: total stocks of land, tax rates, technical changes, total real inventories are held fixed; and the consumer price index (CPI) is the model's numéraire.
Closure 1: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.
Closure 2: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, fixed government expenditure, flexible government savings, and full mobility of capital across sectors.
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Closure 5: Fixed wage rates, flexible supply of all categories of labor, flexible current account balance, fixed total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.
Closure 6: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and sector specific capital.
Source: Simulation in the Bangladesh CGE model

Impacts on the disaggregated sectoral level imports are shown in Table 10. Agricultural and services sectors would experience fall in imports. Among the industrial sectors, imports would rise in most of the sectors, with the largest rise being observed for the 'Textiles and Clothing' sector due to the large dependency of the export of 'Textiles and Clothing' sector on imported textile materials.

Table 10: Effects on the volume of imports (by sector) (% change from base)

Sectors	Closure 1	Closure 2	Closure 3	Closure 4	Closure 5	Closure 6
Grains and Crops	-3.38	-2.94	-3.57	-2.94	-4.15	-3.43
Livestock and Meat Products	-1.31	-0.62	-1.65	-0.92	-2.33	-2.56
Mining and Extraction	-2.11	-3.57	-1.89	-2.78	-2.79	-2.49
Processed Food	1.49	2.72	1.57	2.61	0.99	1.04
Textiles and Clothing	7.87	8.72	7.98	8.88	7.63	7.87
Light Manufacturing	3.95	4.46	4.12	4.93	3.59	3.51
Heavy Manufacturing	0.19	-1.88	0.50	-0.90	0.00	0.23
Transport and Communication	-6.84	-5.18	-6.93	-5.70	-7.31	-7.51
Other Services	-11.91	-6.65	-11.50	-7.13	-12.05	-12.77
Total	0.93	0.76	1.12	1.19	0.62	0.78

Note: Common set of closures: total stocks of land, tax rates, technical changes, total real inventories are held fixed; and the consumer price index (CPI) is the model's numéraire.

Closure 1: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.

Closure 2: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, fixed government expenditure, flexible government savings, and full mobility of capital across sectors.

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Closure 5: Fixed wage rates, flexible supply of all categories of labor, flexible current account balance, fixed total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.

Closure 6: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and sector specific capital.

Source: Simulation in the Bangladesh CGE model

The impact on the price of capital by broad sectors are shown in Table 11. Under all closures, except closure 2, the price of capital would rise between 0.6 and 0.88 percent. Agricultural capital would experience the highest rise in all cases except under closure 6 with the assumption of sector specific capital.

Table 11: Effects on the price of capital (by broad sector) (% change from base)

	Closure 1	Closure 2	Closure 3	Closure 4	Closure 5	Closure 6
Agriculture	1.07	0.24	1.31	1.33	1.17	1.87
Industry	0.40	-0.34	0.72	0.63	0.51	3.53
Services	0.40	-0.34	0.72	0.63	0.51	-0.10
All Sectors	0.60	-0.17	0.90	0.84	0.71	0.88

Note: Common set of closures: total stocks of land, tax rates, technical changes, total real inventories are held fixed; and the consumer price index (CPI) is the model's numéraire.

Closure 1: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.
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Closure 5: Fixed wage rates, flexible supply of all categories of labor, flexible current account balance, fixed total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.
Closure 6: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and sector specific capital.
Source: Simulation in the Bangladesh CGE model

The wage effects on two categories of labor are presented in Table 12. Under closures 3, 4, 5 and 6, since nominal wages are held fixed, there would be no impact on them. However, real wages (nominal wages deflated by the GDP deflator) in all cases would rise, with larger effects on unskilled labor than that on skilled labor under closures 1 and 2. In all other closures, real wages of both skilled and unskilled labor would rise by similar magnitude.

Table 12: Effects on wages (% change from base)

	Closure 1	Closure 2	Closure 3	Closure 4	Closure 5	Closure 6
Nominal wages						
Skilled	-1.19	0.99	0.00	0.00	0.00	0.00
Unskilled	1.51	1.53	0.00	0.00	0.00	0.00
Real wages						
Skilled	0.31	2.56	1.08	0.13	1.1	1.7
Unskilled	3.05	3.11	1.08	0.13	1.1	1.7

Note: Common set of closures: total stocks of land, tax rates, technical changes, total real inventories are held fixed; and the consumer price index (CPI) is the model's numéraire.
Closure 1: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.
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Closure 5: Fixed wage rates, flexible supply of all categories of labor, flexible current account balance, fixed total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.

Closure 6: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and sector specific capital.
Source: Simulation in the Bangladesh CGE model

Employment effects at the sectoral level are presented in Table 13. Under closures 1 and 2, with the assumption of fixed supply of labor, there is no change in the total supply of labor at the aggregate level. However, there are reallocations of labor among the sectors. In general, labor would move away from the import-competing sectors to the export-oriented sectors. The 'Textiles and Clothing' and 'Transport and Communication' would experience large rise in employments. Under other closures, with flexible labor supply, employment is generated in most of the sectors. Under the closure 4, where the employment effect is the largest, only 'Heavy Manufacturing' and 'Utilities and Construction' would experience decline in employment, while other sectors would encounter some sizeable rise in employment.

Table 13: Effects on employment (% change from base)

Sectors	Closure 1	Closure 2	Closure 3	Closure 4	Closure 5	Closure 6
Grains and Crops	0.79	-0.23	3.06	3.67	3.04	3.79
Livestock and Meat Products	-0.30	-1.05	1.79	2.51	1.66	0.45
Mining and Extraction	-0.27	-3.46	1.84	0.86	1.46	1.80
Processed Food	-0.12	-1.57	1.36	2.27	1.17	1.38
Textiles and Clothing	4.95	3.13	6.40	6.75	6.69	8.80
Light Manufacturing	-1.53	-2.87	-0.15	0.52	-0.26	-0.94
Heavy Manufacturing	-0.11	-4.19	1.43	-0.03	1.25	2.25
Utilities and Construction	0.01	-6.41	1.23	-2.50	0.46	1.17
Transport and Communication	1.31	0.88	2.24	3.50	2.31	2.29
Other Services	-3.11	-0.54	-2.89	1.83	-3.06	-4.28
Total	0.00	0.00	0.88	2.84	0.83	0.69

Note: Common set of closures: total stocks of land, tax rates, technical changes, total real inventories are held fixed; and the consumer price index (CPI) is the model's numéraire.
Closure 1: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.
Closure 2: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, fixed government expenditure, flexible government savings, and full mobility of capital across sectors.
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Closure 6: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and sector specific capital.
Source: Simulation in the Bangladesh CGE model

Impacts on real incomes of representative household groups are presented in Table 14. All household categories would experience rise in real income. In the rural area, the largest rise in real income would be for the 'Rural large farm' households primarily due to the large rise the price of agricultural capital. In the urban area, however 'Urban low educated' households would encounter larger rise in real income than that of 'Urban high educated' households due to the larger rise in labor income for the former category of households.

Table 14: Effects on households' real income (% change from base)

Household categories	Closure 1	Closure 2	Closure 3	Closure 4	Closure 5	Closure 6
Rural landless	0.38	0.66	0.79	1.78	0.70	0.64
Rural marginal farm	0.26	0.34	0.60	1.42	0.52	0.54
Rural small farm	0.54	0.59	0.88	1.67	0.80	0.78
Rural large farm	1.21	1.09	1.48	2.26	1.42	1.41
Rural nonfarm	0.46	0.29	0.78	1.30	0.67	0.73
Urban low educated	0.80	1.01	1.13	2.22	1.09	1.11
Urban high educated	0.16	0.42	0.27	1.49	0.16	0.12

Note: Common set of closures: total stocks of land, tax rates, technical changes, total real inventories are held fixed; and the consumer price index (CPI) is the model's numéraire.
Closure 1: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and full mobility of capital across sectors.
Closure 2: Flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, fixed government expenditure, flexible government savings, and full mobility of capital across sectors.
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Closure 4: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, fixed government expenditure, flexible government savings, and full mobility of capital across sectors.
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Closure 6: Fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, flexible government expenditure, fixed government savings, and sector specific capital.
Source: Simulation in the Bangladesh CGE model

Benefit-cost Analysis of Trade Liberalization Intervention

Trade liberalization ultimately benefits consumers because liberalized trade can help to lower prices and broaden the range of quality goods and services available. Companies benefit from liberalized trade through diversified risks and resources to where returns are highest. When accompanied by appropriate domestic policies, trade openness also facilitates competition, investment and increases in productivity. Conversely, trade liberalization may cost some (infant) industries and they will be forced out of the market by large transnational corporations (TNC) due to their inability to compete.

According to WTO special study (Bacchetta and Jansen, 2003), tariff reductions are an element of trade liberalization for many developing countries, which is of particular concern due to its negative impact on tax revenue. This concern is justified given the fact that tariff revenues are still an important source of tax revenue. In the mid 1990s tariff revenue exceeded 30 per cent of the government's total tax revenue in more than 25 developing countries whereas in high-income countries tariff revenues typically represent less than 2 per cent of total tax revenue.

Empirical evidence on the impact of major trade liberalization programmes cannot confirm that revenue implications are necessarily significant (Bacchetta and Jansen, 2003). Bangladesh, Chile and Mexico reduced applied tariff rates by more than 10 percentage points for trade liberalization since the mid-1980s. This has resulted in reducing the ratio of duties to total tax revenue significantly in Bangladesh, but only slightly in Chile and Mexico. Interestingly, in each country import growth accelerated sharply.

According to Bacchetta and Jansen, (2003) trade liberalization leads to two basic types of gains for the economy. Consumers gain from the lower prices (and increased quality and variety) and efficiency gains, as increased international specialization allows factors of production to shift into activities in which the country is relatively more productive. Trade liberalization brings even more gains when companies can exploit economies of scale and when trade boosts the country's growth rate through inflow of new technologies.

Nevertheless, benefits from reform are not costless since costs of adjustment for firms and workers, as reform forces some industries to downsize or close to allow others to expand (Anderson, 2014). Trade liberalization is thus likely to induce the relocation of workers. If obstacles to this relocation process exist, it may result in temporary unemployment in addition to the level of unemployment already prevailing in the economy. These temporary increases in unemployment or decreases in employment represent adjustment costs for an economy, as the economy loses the value added normally generated by those idle workers (Bacchetta and Jansen, 2003).

A significant portion of potential costs is related to the influence of trade reforms on the labor market. Free trade is expected to change relative prices, and hence redistribute resources to more efficient use. That would affect output composition, and in turn, demand for labor. Changes in demand for labor transmitted through labor market would shift employment and income distribution between sectors. Akhmedov et al. (2005) also adds that in addition to this indirect influence, changes in relative prices could affect employment and incomes directly: changes in relative prices of inputs would affect

22

labor demand, while adjustment of relative prices of consumer goods is expected to affect labor supply. Being transmitted trough the labor market this direct effect will also change sectoral distribution of employment and incomes.

The total outcome of the resource reallocation and the magnitude of adjustment costs depend both on the characteristics of external shocks and on degree of rigidity and flexibility of internal markets. The degree of flexibility of labor market reflected, among others, by regional and sectoral mobility, determines the speed of transition of workers from unemployment to employment or from old jobs to new jobs, thus shaping the size of adjustment costs (Akhmedov et al. 2005).

There is no evidence that trade liberalization permanently worsens income distribution. However, there is evidence that trade liberalization has been associated with adjustment costs in the form of employment losses. In Mexico, trade integration through NAFTA, while reducing poverty, has also increased income inequality between regions: regions with lower per capita GDP grew faster, while regions with high public employment grew more slowly (Perry et al. 2003).

In our current exercise, due to the absence of any estimates of benefits and costs tariff liberalization in Bangladesh, in our CGE framework we assume that the benefit would be the aggregate amount of the rise in output of sectors which would be experiencing expansion after tariff liberalization, and in a similar fashion, the cost would be the aggregate amount of the fall in output of the sectors which would be experiencing contraction after tariff liberalization.

The formula for the benefit-cost ratio is as follows:

$$BCR = \frac{\sum_{t=o}^{n} Bt/(1+i)^t}{\sum_{t=o}^{n} Ct/(1+i)^t}$$

Where, BCR = benefit-cost ratio; B = benefit; C= cost; t = time period; i = discount rate

Since, we are considering a 50 percent tariff cut, we assume that the impact of such a tariff liberalization would be realized over a period between short to medium term. In this context, we assume a period of 5 years. This suggests that the aggregate benefit and cost, as derived from the CGE model, would be realized over a 5-year period. From these aggregate benefit and cost, we get the annualized benefit and cost by dividing the aggregate figures by 5.

Table 15 presents the net present values of benefit and cost under six different closures and associated BCRs. Since both aggregate benefit and cost are annualized by dividing the same number (in this case

5), the BCR doesn't change across different discount rates. However, BCR changes across different closures. It is seen from Table 15 that, under all closures, the BCR is more than 1, which suggests an overall net benefit of tariff liberalization in Bangladesh. The largest BCR is observed in the case of closure 4 (BCR = 4.74) and the smallest one is observed in the case of closure 2 (BCR = 1.34).

Table 15: Net present value in 2016 of benefits and costs (in 2012 million taka) of tariff liberalization

	3% discount rate			5% discount rate			10% discount rate		
	Benefit	Cost	BCR	Benefit	Cost	BCR	Benefit	Cost	BCR
Closure 1	116067.95	57202.40	2.03	111856.72	55126.96	2.03	102602.85	50566.32	2.03
Closure 2	103366.32	77308.12	1.34	99615.93	74503.20	1.34	91374.74	68339.57	1.34
Closure 3	152460.25	50245.18	3.03	146928.62	48422.16	3.03	134773.26	44416.21	3.03
Closure 4	203426.88	42951.61	4.74	196046.05	41393.22	4.74	179827.22	37968.78	4.74
Closure 5	159213.33	53406.43	2.98	153436.68	51468.71	2.98	140742.91	47210.72	2.98
Closure 6	128349.27	43239.66	2.97	123692.45	41670.82	2.97	113459.41	38223.41	2.97

Source: Authors' calculation

Few caveats

However, the aforementioned gains are not automatic. As Raihan (2016) observed, the prospect of these gains would be lost if necessary steps are not taken for improving the quality of business environment in Bangladesh. In terms of the Logistic Performance Index (LPI) of World Bank, Bangladesh stood at 107th position out of 160 countries in 2014. While the overall LPI score was 2.56, the index for infrastructure was only 2.11 with the rank of 138. Further export diversification and integrating with the global value chain will require significant improvement in the quality of logistics in Bangladesh. ADB (2015) observed that in terms of infrastructure quality, Bangladesh is less competitive relative to its potential contenders including Cambodia, the People's Republic of China, India, and Sri Lanka. Bangladesh needs to increase the quality of roads, ports, railways, electricity supply, and water supply and sanitation. Capacity constraints in government agencies also need to be addressed. According to the World Bank's Doing Business 2015, Bangladesh ranked 188th of 189 countries on the ease of electricity delivery. Cost of power outages has been estimated to be about 0.5 percent of GDP.

Also, as Raihan (2015) observed, while the importance of tariff liberalization for export promotion and diversification can't be undermined, tariff liberalization alone can't by itself be sufficient to trigger 'auto' large supply responses in terms of expanding export volumes and diversifying the export basket. A number of supply-side constraints can prevent local producers from expanding exports, and the lack of an enabling environment can strangle entrepreneurship and innovation. Bangladesh faces several supply-side constraints. High lead-time is an important challenge in many LDCs. Inefficiencies at ports and related internal road transportation further aggravate the problem. Amongst others, lack of investment fund and working capital, high interest rate, poor physical infrastructure, shortage of skilled workers, technological bottlenecks, lack of entrepreneurship and management skills, poor law and order situation, lack of information, invisible costs of doing business, etc. are major impediments to export prospects and export diversification. Therefore, the policy options and support measures for exports are much more difficult and involved than mere reduction of tariffs.

Trade Facilitation Interventions in Bangladesh

Although conventional trade barriers lowered in world trade, transaction costs related to transport, transit, meeting NTM requirements and customs procedures for clearance of goods became more important. The high cost of formal trade due to poor trade facilitation promotes informal trade, brings loss of revenue for the governments and in many instances transaction costs exceed the cost of duties to be paid. For developing economies, inefficiencies in areas such as customs and transport can be roadblocks to the integration into the global economy and may severely impair export competitiveness or inflow of foreign direct investment.

According to CUTS (2004, 2013) studies, inefficiencies include poor port, rail, and road transport infrastructure, poor customs management, administrative and licensing restrictions and non-transparent trade rules as some of the common problems faced by developing regions. Past studies have suggested that friction is more prevalent for intra-regional trade than in trade with countries outside the region. Anderson and van Wincoop (2004) define trade costs that include all costs incurred in getting a good to a final user other than the cost of producing the good itself: transportation costs (both freight costs and time costs), policy barriers (tariffs and non-tariff barriers), information costs, contract enforcement costs, costs associated with the use of different currencies, legal and regulatory costs, and local distribution costs (wholesale and retail), Ultimately, these costs make goods more expensive for the consumer and compromise the competitiveness of the domestic economy. As a result, trade costs contribute to a very high percentage of product costs in South Asia.

Though tariff barriers have gradually declined in South Asia, high tariffs still exist in certain sensitive products. Rather, there is a strong presence of non-tariff barriers (NTBs) overall, which, in a broad sense, includes trade facilitation- and transit-related barriers as well. In particular, high transportation costs act as a serious constraint to enhancing merchandise trade flow in the region.

To understand the state of trade facilitation in any country Global Competitiveness report uses over 100 indicators to measure competitiveness and develop a Global Competitiveness Index (GCI), which is a comprehensive tool to assess the foundation of national competitiveness. Infrastructure, one of the sub-indices of Table 16, gives a clear indication of trade liberalization in these countries. Under Quality of Overall Infrastructure, Bangladesh is ranked worst among South Asian countries, i.e. 134th rank out of 148. Among India, Bangladesh, Nepal and Pakistan, India ranks highest at 85 out of 148. The average value for South Asia is calculated as 3.5 on a scale of 7, indicating that a lot of improvement in infrastructure is required in South Asia.

Table 16: Selected Indicators of Trade Facilitation in Bangladesh and South Asia

Indicators		Bangladesh	India	Nepal	Pakistan	Sri Lanka	South Asia (Calculated)
Quality of overall infrastructure	Value	2.8	3.9	2.9	3.3	4.8	3.5
	Rank	134	85	132	119	54	
Quality of roads	Value	2.8	3.6	2.7	4	4.7	3.6
	Rank	118	84	126	72	49	
Quality of railroad infrastructure	Value	2.4	4.8	1.1	2.5	3.6	2.9
	Rank	78	19	121	75	40	
Quality of port infrastructure	Value	3.5	4.2	2.7	4.5	4.2	3.8
	Rank	104	71	134	55	73	
Quality of air transport infrastructure	Value	3.2	4.8	3	4.1	4.8	4
	Rank	125	61	131	88	60	
Prevalence of trade barriers	Value	4.4	4.4	4	4.2	4	4.2
	Rank	62	61	110	92	105	
Trade tariff (% duty)*	Value	13.5	11.7	16.3	16.7	11.1	13.9
	Rank	132	128	141	142	125	
Burden of customs procedures	Value	3.4	3.8	3.3	3.7	4.1	3.7
	Rank	113	88	125	91	70	
Transparency of government policymaking	Value	3.9	4.2	3.7	3.7	4.1	3.9
	Rank	95	61	110	116	71	

Source: CUTS Internationals, 2015 (The Global Competitiveness Report 2013-2014, World Economic Forum)

Another TF indicator is the ESCAP International Supply Chain Connectivity (ISCC) Index that is developed to measure the overall trade facilitation performance of a country along the international supply chain. ISCC is based on the trading across border (TAB) indicators from the World Bank Doing Business Report and the Liner Shipping Connectivity Index (LSCI) of UNCTAD. The Index provides an

overall performance score for a particular country based on its performance in terms of (1) TAB underlying import indicators (i.e. number of documents, time, and cost involved in import); (2) TAB underlying export indicators (i.e. number of documents, time, and cost involved in export); and (3) the UNCTAD LSCI score.

Table 17: ISCC 2015 ranking of SAARC countries

Economy	ISCC 2015	Ranking
Sri Lanka	46.11	34
India	33.01	71
Pakistan	32.68	73
Bhutan	26.60	115
Nepal	25.34	120
Bangladesh	21.36	148
Maldives	20.57	154
Afghanistan	18.91	161

Source: UNESCAP; ARTNet http://artnet.unescap.org/databases.html#fourth

A simple observation of the ISCC ranking in 2015 for Bangladesh and seven other SAARC countries, as shown in Table 17, portrays the situation in the region where Sri Lanka scores the best rank, 34 and Bangladesh ranks 148 with a ISCC score of 21.36 for the year 2015. It is worth noting that the ISCC Index for Bangladesh has not changed much since 2006 and the score stayed between 21 and 23 for the last ten years.

World Bank Doing Business records the time and cost associated with the logistical process of exporting and importing goods. Under the new methodology introduced this year, Doing Business measures the time and cost (excluding tariffs) associated with three sets of procedures—documentary compliance, border compliance and domestic transport—within the overall process of exporting or importing a shipment of goods. The Trading across Border indicator refers to a case study scenario of a warehouse in the largest business city of an economy trading with the main import and export partner through the economy's main border crossing. Globally, Bangladesh stands at 174 in the ranking of 189 economies on the ease of trading across borders as shown in Table 18. Bhutan and Nepal rank 71 and 99, which are in better positions among others.

Table 18: 2016 Doing business ranking for SAARC countries

Economy	Ease of Doing Business Rank	Filtered Rank	Starting a Business	Dealing with Construction	Getting Electricity	Registering Property	Getting Credit	Protecting Minority Investors	Paying Taxes	Trading Across Borders	Enforcing Contracts	Resolving Insolvency
Bhutan	71	1	3	5	1	1	2	6	1	1	1	8
Nepal	99	2	5	4	4	2	6	4	4	2	4	2
Sri Lanka	107	3	4	3	3	5	3	3	7	3	5	1
Maldives	128	4	2	1	5	6	5	7	5	5	2	4
India *	130	5	8	7	2	4	1	1	6	4	7	5
Pakistan *	138	6	7	2	7	3	6	2	8	6	3	3
Bangladesh *	174	7	6	6	8	8	6	5	2	7	8	6
Afghanistan	177	8	1	8	6	7	3	8	3	8	6	7

* The rankings of economies with populations over 100 million as of 2013 (Bangladesh, Brazil, China, India, Indonesia, Japan, Mexico, Nigeria, Pakistan, the Russian Federation and the United States) are based on data for 2 cities.

Source: World Bank Doing Business; http://www.doingbusiness.org/rankings

Conceptualizing Trade Facilitation

The main objective of trade facilitation is to simplify the process and minimize transaction costs in international trade, while maintaining effective levels of government control. There is no universal definition of trade facilitation; however, all existing definitions emphasize the need for coordination at the border (e.g., between customs, quarantine, and other agencies, often referred to as "integrated border management") and coordination between the border countries' exit and entry posts.

Box 1: Definitions of trade facilitation

World Trade Organization (WTO): The simplification and harmonization of international trade procedures, where trade procedures are the activities, practices, and formalities involved in collecting, presenting, communicating, and processing data and other information required for the movement of goods in international trade.

World Customs Organization (WCO): The avoidance of unnecessary trade restrictiveness. This can be achieved by applying modern techniques and technologies, while improving the quality of controls in an internationally harmonized manner.

United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT): The simplification, standardization, and harmonization of procedures and associated information flows required to move goods from seller to buyer and to make payments.

International Chamber of Commerce (ICC): Improve the efficiency of the processes associated with trading in goods across national borders.

Organisation for Economic Co-operation and Development (OECD): The simplification and standardization of procedures and associated information flows required to move goods internationally from seller to buyer and to pass payments in the other direction.

Asia–Pacific Economic Cooperation (APEC): The simplification and rationalization of customs and other administrative procedures that delay or increase the cost of moving goods across international borders.

Source: collected from UNESCAP, 2013

The definitions used by the UN/CEFACT and OECD reflect a broader approach to trade facilitation, covering international trade procedures and associated information flows, and payment along the entire supply chain. These include some behind the-border measures such as product standards and conformity assessment measures, business facilitation, e-commerce, trade finance, and logistics services (UNESCAP, 2013).

Benefits of Trade Facilitation

The benefits of trade facilitation can be evaluated in terms of its effect on trade transaction costs. Estimates of such costs vary significantly, and it is useful to distinguish between direct and indirect costs. Direct costs include the cost of preparing documentation, and complying with various customs and other regulations. These may also include the cost of moving goods from factory to port, handling costs at the port, finance and insurance, and international transport costs. Indirect costs include the

opportunity costs associated with time and delays in moving the goods from the buyer to the seller. These have been estimated to account for about 80 percent of total trade transaction costs.

Reduction in trade transaction costs, which is one of the expected benefits of trade facilitation measures, does not fully capture the potential benefits associated with trade facilitation. Trade facilitation is also expected to reduce uncertainties in trade transactions and a more inclusive participation of the private sector in international trade. Trade facilitation can bring significant benefits to both government and traders. In the medium to long term, trade facilitation may contribute to improved trade competitiveness, increased foreign direct investment (FDI), increased participation of SMEs in international trade and improved economic growth prospects.

It is argued that everyone gains from trade facilitation measure. Governments gain because efficient border procedures make them able to process more goods and improve control of fraud, thus increasing government revenue. Businesses gain because if they can deliver goods more quickly to their customers they are more competitive. Finally consumers gain because they are not paying the costs of lengthy border delays. If a trade process gets delayed and cost rises, it is ultimately the consumers who bear the loss. Studies indicate that even modest reductions in trade transaction costs, such as lengthy border procedures, translate into significantly increased trade. This is true for both rich and poor countries, but developing countries would show higher relative trade gains because of the relative inefficiency of their current systems (Kumar & Mukherjee, 2006).

Cost of Implementing Trade Facilitation Measures

Some developing countries may view costs associated with implementing trade facilitation measures as prohibitive, but evidence suggests otherwise. The introduction and implementation of trade facilitation measures do entail startup costs for government agencies; however, these reforms eventually reduce government expenditures by enhancing transaction efficiency and transparency, eliminating duplicative functions, and allowing a more economical and efficient use of administrative resources. In practice, some of the initial costs are also transferred to traders through charges for services provided. Therefore, several types of cost are involved in implementing trade facilitation reforms such as institutional costs, regulatory and legislative costs, equipment and training costs. However, these cost concerns should not deter countries from pursuing trade facilitation. Trade facilitation can often be significantly achieved without investing in a fully automated and computerized system. Merely simplifying rules, procedures, and regulatory processes, and investing in port and border crossing infrastructure and equipment such as container scanners, can considerably

expedite control and clearance of goods at borders. As such, optimizing the use of the existing infrastructure, equipment, and human resources can yield early and significant efficiency gains.

Current Trade Facilitation Initiatives in Bangladesh

Bangladesh is one of the members of South Asian Association for Regional Cooperation (SAARC) that also formed South Asian Free Trade Area (SAFTA). Even though customs duties on nearly all good traded between countries in the region were to be phased out, South Asia has low intra-regional trade compared with other such regions in the world, amounting to just five per cent of world trade. Studies explain this slow growth of trade in South Asia by the inadequate attention given to trade facilitation issues, especially regarding land routes since most trade concentrated along relatively few land corridors that connect commercial centres in South Asia (CUTS, 2015).

Trade facilitation in South Asia is currently being addressed through a number of initiatives at the national and subregional levels. For instance, South Asia Subregional Economic Cooperation (SASEC) Program is supported by multilateral organizations such as the ADB, the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), WCO, as well as from the Government of Japan. This program brings together Bangladesh, Bhutan, India, the Maldives, Nepal, and Sri Lanka in a project-based partnership that aims to promote regional prosperity, improve economic opportunities, and build a better quality of life for the people of the subregion.

SASEC seeks to strengthen multimodal cross-border transport networks that boost intraregional trade and open up trade opportunities with East and Southeast Asia. The program helps build modern and effective customs administrations that speed up the time and reduce the costs of moving goods, vehicles, and people across borders. Better connectivity will help unleash the tremendous potential for mutually beneficial trade between the six SASEC countries, which remain some of the least economically integrated in the world. SASEC also assists member countries in improving energy security by developing infrastructure and promoting intraregional power trade to reduce costs and import dependence. Since 2001, SASEC countries have implemented 33 regional projects worth more than $6 billion in the energy, transport, trade facilitation, and information and communications technology sectors.

The TF Strategy supports the mission of the SASEC Transport and Trade Facilitation Strategy "to promote the prosperity of the subregion by facilitating the efficient movement of trade across the borders". The goal for the trade facilitation sector for the period 2014-2018 is to increase intra-regional trade through increased intra- regional trade facilitation efficiency and a reduction of the time

and costs to trade. The Trade Facilitation Strategic Framework will focus on five priority areas, namely: (i) customs modernization and harmonization; (ii) standards and conformity assessment strengthening; (iii) cross-border facilities improvement; (iv) through transport facilitation; and (v) institution and capacity building.

It is well understood that to develop and to pilot bilateral transport facilitation arrangements for through transport is of utterly important for South Asian countries and Bangladesh is no exception to that. Providing transit and transshipment facilities to neighboring and other countries in proximity through all modes of transport has been a priority agenda for Bangladesh. Both Nepal and Bhutan have transit agreements with India, but there is no similar transport agreement between Bangladesh and India. Bhutan is currently working out a transit agreement with Bangladesh. There is no transport agreement between Bangladesh and India to allow vehicles in each other's territory, making the transloading of goods necessary in either side of the border.

SASEC countries recognize that a more comprehensive arrangement may be needed for intra-SASEC transit traffic. Technological solutions such as the Secure Cross-Border Transport Model developed by UNESCAP, are also being considered to track the location of vehicles carrying transit goods. These could be implemented on a pilot basis along SASEC corridors. Through transport arrangements based on legal agreements may be a long-term solution to address the absence of traffic rights exchange. In the meantime, in the absence of through transport arrangements, SASEC countries could develop and pilot simplified and streamlined procedures at border crossings, including efficient transshipment and trailer and container swaps to reduce the time and cost of cross-border transport of cargo at the priority border crossing points.

Table 19 displays all projects undertaken in Bangladesh under SASEC supervision since 2001, in the energy, transport and trade facilitation sectors

Table 19: SASEC projects in Bangladesh

Project Name	Sector	Year of Approval	Value US$
Chittagong Port Trade Facilitation Project	Transport/Ports	2003	500,000
Chittagong Port Trade Facilitation	Transport/Ports	2004	41 million
Development of Transport Corridors for Trade Facilitation	Transport/Road	2006	950,000
Railway Sector Investment Program (Subproject 1)	Transport/Rail	2007	163 million
Regional Rail Traffic Enhancement (Supplementary)	Transport/Rail	2007	118,000
Bangladesh-India Electrical Grid Interconnection	Energy	2010	159 million
Subregional Transport Project Preparatory Facility	Transport	2010	23 million
Bangladesh-India Electrical Grid Interconnection Project	Energy	2010	285,000
Railway Sector Investment Program - Tranche 2	Transport/Rail	2011	165 million
Strategic Master Plan for Chittagong Port	Transport/Ports	2011	1 million
Bangladesh: SASEC Road Connectivity Project	Transport/Road	2012	315 million
Dhaka-Chittagong Expressway PPP Design Project	Transport/Road	2012	13 million
SASEC Road Connectivity Project	Transport/Road	2012	2 million
SASEC Bangladesh-India Electrical Grid Interconnection Project: Additional Financing	Energy	2013	40 million
SASEC Railway Connectivity Investment Program	Transport/Rail	2013	2 million
Supporting Bangladesh's Participation in SASEC Trade Facilitation	Trade Facilitation	2013	2 million
SASEC Railway Connectivity: Akhaura-Laksam Double Track Project	Transport/Rail	2014	630 million
SASEC Railway Connectivity Akhaura-Laksam Double Track Project	Transport/Rail	2014	1 million
SASEC Bangladesh-India Electrical Grid Interconnection Project II	Energy	2014	200,000
Second SASEC Bangladesh-India Electrical Grid Interconnection Project	Energy	2015	183 million
Subregional Transport Project Preparatory Facility - Additional Financing	Transport	2015	36 million

Source: SASEC, 2015 http://sasec.asia/index.php?page=projects

The benefits of trade facilitation can be evaluated in terms of its effect on trade transaction costs. De and Kumar (2014) explain that in general, transit leads to a decrease in transportation costs, which subsequently increases transport volume. The net regional effects of this are difficult to predict in a more-than-one-sector model as intermediate deliveries between the countries in a particular region or between the regions within a country play a complicating role. When both import and export become cheaper as an effect of lower transportation cost, net effect would be difficult to assess if we

do not know the internal trade of intermediate products between the export and import sectors within a country. In addition, there may be compensating forces in the regions in which employment is negatively affected by increased competition, particularly when there is a rise in imports.

Nevertheless, reduction in transport cost and time will decrease the price of the products, which enables consumers to include additional products—including those produced within the region—in their consumption baskets. Moreover, efficient transit arrangement facilitates trade of intermediate goods, which enables economies to integrate themselves into the regional/global supply chains and thus raise overall productivity (De & Kumar, 2014).

This study thus realizes that it is time to take trade facilitation issue seriously and that action in this area is needed which is based on country specific situations. Observing the situation, this study is contemplating two broad categories of SASEC trade facilitation projects, road and rail, under transport sector programs undertaken in Bangladesh. Information for these projects is assembled from 2001-2014 SASEC project portfolio. Selected projects follow three specific objects. Firstly, projects are explicitly under SASEC supervision. Secondly, projects approved on 2012 or onward are selected to observe future benefits. This is in line/consistent with the SAM of Bangladesh that is 2012, implemented for the CGE model. Thirdly, only transport sector projects are selected to detect direct interventions regarding trade facilitation. Other trade facilitation categories like customs, standards and border facilities under SASEC projects are not considered in this paper.

Brief description and discussion on current status of these projects are stated below (Table 20) and project detail is described in Annex A and Annex B.

Table 20: SASEC transport projects in Bangladesh

Project Name	Sector	Time period/ Year of Approval	Year of completion (Estimated)	Project Cost USD(million)
SASEC Road Connectivity Project	Transport/Road	2012	2018	346.2
SASEC Railway Connectivity: (Investment program; Akhaura-Laksam Double Track Project)	Transport/Rail	2014	2022	807.5

Source: SASEC, 2015 http://sasec.asia/index.php?page=projects

Methodology of Assessing the Impact of Trade Facilitation: The SAM Multiplier Model

By facilitating transportation, two SASEC transport projects, as mentioned in Table 20, is expected to lead to a greater integration of regional markets within the Bangladeshi national economy. Given the interdependence of economic activities/sectors, the direct impacts of the SASEC transport projects on individual sectors and factor markets are likely to induce a chain of changes in the rest of the sectors of the economy. This in turn is expected to result in subsequent feedback effects. These indirect and induced impacts can be estimated utilizing Social Accounting Matrix (SAM) multiplier model. The 2012 SAM for Bangladesh, as presented in Table 2, has been modified to incorporate regional dimension both in production and institutional accounts. The 2012 SAM is transformed into a fixed price demand driven model to assess the impacts of additional demand on the national economy of Bangladesh. A SAM is a square matrix with columns for expenditure and rows covering income accounts. It combines input-output data with national accounts data to reflect the circular flow of income at a particular point in time. In this context, its key use is to assess the economy wide effects of a particular exogenous impact that leads to different expenditure patterns.

The move from a SAM data framework to a SAM model or multiplier framework requires decomposing the SAM accounts into "exogenous" and "endogenous" as well as to introduce a set of assumptions pertaining to the Generalized Leontief Model (Alarcon, 2002). Generally accounts intended to be used as policy instruments (e.g. government expenditure, investment, exports) are made exogenous and accounts a priory specified as objectives or targets must be made endogenous (e.g. activity, commodity demand, factor return and household income).

For any given injection into the exogenous accounts (i.e. instruments) of the SAM, influence is transmitted through the interdependent SAM system among the endogenous accounts. The interwoven nature of the system implies that the incomes of factors, households and production are all derived from exogenous injections into the economy via a multiplier process. The multiplier process is developed here on the assumption that when an endogenous income account receives an exogenous expenditure injection, it spends it in the same proportions as shown in the matrix of average propensities to spend (APS). The elements of the APS matrix is calculated by dividing each cell by its corresponding column sum totals.

The multiplier analysis using the SAM framework helps to understand the linkages between the different sectors and the institutional agents at work within the economy. Accounting multipliers have been calculated according to the standard formula for accounting (impact) multipliers, as follows:

$$Y = A Y + X = (I - A)^{-1} X = M_a X$$

Where:

Y is a vector of incomes of endogenous variables

X is a vector of expenditures of exogenous variables

A is the matrix of average expenditure propensities for endogenous accounts

$M_a = (I - A)^{-1}$ is a matrix of aggregate accounting multipliers (generalized Leontief inverse).

Variations in any one of the exogenous account (i.e. in this case ΔX) will produce total impacts (ΔY) of endogenous entries via the multipliers. More specifically they are expressed as:

$$\Delta Y = M_a \times \Delta X.$$

The economy wide effect is thus equal to $\Delta Y = M_a \times \Delta X$. Thus ΔY captures the economy wide impacts on the four endogenous accounts namely: (i) gross output; (ii) commodity demand; (iii) factor returns and (iv) household. Table 21 provides the description of the endogenous and exogenous accounts and multiplier effects.

Table 21: **Description of the Endogenous and Exogenous Accounts and Multiplier Affects**

Endogenous (y)	Exogenous (x)
The activity (gross output multipliers), indicates the total effect on the sectoral gross output of a unit-income increase in a given account *i* in the SAM, and is obtained via the association with the commodity production activity account *i*.	
The consumption commodity multipliers, which indicates the total effect on the sectoral commodity output of a unit-income increase in a given account *i* in the SAM, is obtained by adding the associated commodity elements in the matrix along the column for account *i*.	Intervention into through activities (x = i + g + e), where i= GFC + ST (GFCF) Exports (e) Government Expenditure (g) Investment Demand (i) Inventory Demand (i)
The value added or GDP multiplier, giving the total increase in GDP resulting from the same unit-income injection, is derived by summing up the factor-payment elements along account *i*'s column.	
Household income multiplier shows the total effect on household and enterprise income, and is obtained by adding the elements for the household groups along the account i column.	Intervention via households (x = r + gt + ct), where Remittance (r) Government Transfers (gt) Corporation Transfers (ct)

The economy-wide impacts of the SASEC projects are examined by changing the total exogenous injection vector, especially investment demand (investment in construction and utilities. More specifically, the total exogenous account is manipulated to estimate their effects on output (through an output multiplier), value-added or GDP (through the GDP multiplier), and household income (through household income multiplier) and commodity demand (via commodity multipliers).

In the SAM multiplier framework, we introduce an injection of an amount of 1153.7 million US$ (two SASEC projects from Table 20) or 89988.6 million taka (considering the exchange rate of 1 US$= 78 taka) through raising the investment in the 'Utilities and Construction' sector. Simulated outcomes by four endogenous accounts according to the national level 'intermediate classification' are reported in Table 22. As a result of the 89988.6 million taka injection, the gross output of the economy would increase by 1.08 percent compared to the base year value. The largest increase of 2.58 percent has been reported for the 'Utilities and Construction' activity (i.e. due to increase in construction commodity demand) followed by linked activities such as 'Mining and Extraction' (1.65 percent), Heavy Manufacturing (1.35 percent) and 'Light Manufacturing' (1.1 percent).

Changes in commodity demands are similar to those of gross outputs. Value-added or gross domestic product of the Bangladesh is expected to increase by 1.17 percent compared to the base case. Largest return would accrue to the capital factor (1.48 percent) followed by land (1.17 percent).

Due to leakages of different types (e.g. savings and direct taxes), increase in household consumption is less than the increase in value-added or GDP. More specifically, total household consumption would increase by 0.95 percent compared to the base case. Among the household groups, largest increase is found for the non-farm household group (1.05 percent) followed by urban high-educated households (0.96 percent).

Table 22: **Economy-wide Benefit of SASEC Trade Facilitation Projects Using the SAM Multiplier Model**

	Endogenous SAM Accounts (Intermediate Classification)	**% Change over Base**
1	Grains and Crops	0.97
2	Livestock and Meat Products	1.06
3	Mining and Extraction	1.65
4	Processed Food	1.04
5	Textiles and Clothing	0.40
6	Light Manufacturing	1.10
7	Heavy Manufacturing	1.35
8	Utilities and Construction	2.58
9	Transport and Communication	0.79

	Endogenous SAM Accounts (Intermediate Classification)	% Change over Base
10	Other Services	0.82
	Gross Output	**1.08**
1	Grains and Crops	0.97
2	Livestock and Meat Products	1.06
3	Mining and Extraction	1.65
4	Processed Food	1.04
5	Textiles and Clothing	0.40
6	Light Manufacturing	1.10
7	Heavy Manufacturing	1.35
8	Utilities and Construction	2.58
9	Transport and Communication	0.79
10	Other Services	0.82
	Total Commodity Demand	**1.08**
1	Value added by Labor Unskilled	0.90
2	Value added by Labor Skilled	0.88
3	Value added by Capital	1.48
4	Value added by Land	1.17
	Value added	**1.17**
1	Rural Landless	0.94
2	Rural Marginal Farmers	0.95
3	Rural Small Farmers	0.89
4	Rural Large Farmers	0.89
5	Rural Nonfarm	1.05
6	Urban Low Education	0.76
7	Urban High Education	0.96
	Household consumption	**0.95**

Note: Gross output = intermediate use + factor payments; Total commodity demand = commodity demanded by households; Value added = factor payments; Household income = Incomes of different household categories

Benefit-cost Analysis of Trade Facilitation Intervention

In our current exercise, we consider that benefit would be the change in the aggregate gross output (which is 330757.4736 million taka) of the economy because of the intervention and the cost would be the aggregate amount of the investment under two SASEC projects (which is 89988.6 million taka).

The formula for the benefit-cost ratio is as follows:

$$BCR = \frac{\sum_{t=o}^{n} Bt/(1+i)^t}{\sum_{t=o}^{n} Ct/(1+i)^t}$$

Where, BCR = benefit-cost ratio; B = benefit; C= cost; t = time period; i = discount rate

Since, we are considering a trade facilitation project, we assume that the impact of such an intervention would be realized over a longer time period. In this context, we assume a period between

2016 and 2040. Considering 2022 as the completion year of the project, we derive the annualized cost of the project during 2016 and 2022 by dividing the total cost of the project (89988.6 million taka) by 7. Since, the first SASEC project will be completed in 2018 and second one in 2022, the full benefits of the first and second projects would be realized only after 2018 and 2022 respectively. During 2019 and 2022, there will be benefit only from the first project. We have, therefore, adjusted the annualized benefits by considering that only 30 percent of the annualized benefit would be realized during 2019 and 2022, as the cost of the first project is 30 percent of the total project cost. Accordingly, we have also adjusted the annualized benefits for the years during 2023 and 2040.

Table 23 presents the net present values of benefit and cost and associated BCRs under three different discount rates. It is seen from Table 23 that, under all three discount rates, the BCR is more than 1, which suggests an overall net benefit of trade facilitation in Bangladesh. The largest BCR is observed with the 3 percent discount rate (BCR = 2.62) and the smallest one is observed with the 10 percent discount rate (BCR = 1.34).

Table 23: Net present value in 2016 of benefits and costs (in 2012 million taka) of trade facilitation

3% discount rate			5% discount rate			10% discount rate		
Benefit	Cost	BCR	Benefit	Cost	BCR	Benefit	Cost	BCR
215912.62	82496.30	2.62	166051.34	78106.15	2.13	92244.38	68844.63	1.34

Source: Authors' calculation

Conclusion

The importance of tariff liberalization for export promotion and diversification can't be undermined; however, tariff liberalization alone can't by itself be sufficient to trigger 'auto' large supply responses in terms of expanding export volumes and diversifying the export basket. A number of supply-side constraints can prevent local producers from expanding exports, and the lack of an enabling environment can strangle entrepreneurship and innovation. Bangladesh faces several supply-side constraints. High lead-time is an important challenge in many LDCs. Inefficiencies at ports and related internal road transportation further aggravate the problem. Amongst others, lack of investment fund and working capital, high interest rate, poor physical infrastructure, shortage of skilled workers, technological bottlenecks, lack of entrepreneurship and management skills, poor law and order situation, lack of information, invisible costs of doing business, etc. are major impediments to export prospects and export diversification. Therefore, the policy options and support measures for exports are much more difficult and involved than mere reduction of tariffs.

This study also supports the conventional belief and finds that, under all considered closures, the BCR is more than 1, which suggests an overall net benefit of tariff liberalization in Bangladesh. The largest BCR (4.74) is observed in the case of closure 4 that considers fixed wage rates, flexible supply of all categories of labor, fixed current account balance, flexible total investment, fixed government expenditure, flexible government savings, and full mobility of capital across sectors. On the other hand, the smallest BCR (1.34) is observed in the case of closure 2 that applies for flexible wage rates, fixed supply of all categories of labor, fixed current account balance, flexible total investment, fixed government expenditure, flexible government savings, and full mobility of capital across sectors.

In today's globalized world, making trade between economies easier is increasingly important for business. Excessive document requirements, burdensome customs procedures, inefficient port operations and inadequate infrastructure all lead to extra costs and delays for exporters and importers, stifling trade potential. In terms of the Logistic Performance Index (LPI) of World Bank, Bangladesh stood at 107th position out of 160 countries in 2014. While the overall LPI score was 2.56, the index for infrastructure was only 2.11 with the rank of 138. Further export diversification and integrating with the global value chain will require significant improvement in the quality of logistics in Bangladesh. ADB (2015) observed that in terms of infrastructure quality, Bangladesh is less competitive relative to its potential contenders including Cambodia, the People's Republic of China, India, and Sri Lanka. Bangladesh needs to increase the quality of roads, ports, railways, electricity supply, and water supply and sanitation. Capacity constraints in government agencies also need to be addressed. According to the World Bank's Doing Business 2015, Bangladesh ranked 188th of 189 countries on the ease of electricity delivery. Cost of power outages has been estimated to be about 0.5 percent of GDP. It is necessary to take steps for improving the quality of business environment in Bangladesh; otherwise prospect of gains achieved so far would be lost.

Establishing the facts, this study has found that under all three discount rates, the BCR is more than 1, which suggests an overall net benefit of considered trade facilitation interventions in Bangladesh. The largest BCR is observed with the 3 percent discount rate (BCR = 2.62) and the smallest one is observed with the 10 percent discount rate (BCR = 1.34). Hence, it is well understood that trade facilitation is an important element of current trade and development agendas. This paper thus acknowledges the role of trade facilitation in increasing benefits and minimizing losses that have also been widely acknowledged in existing studies that trade facilitation ultimately benefits all the entities associated with trade, i.e. business, consumers and government.

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Annex A: Project Details: South Asia Subregional Economic Cooperation Road Connectivity Project

The project will, together with parallel co-financing, support the Government of Bangladesh to upgrade about 70 kilometers (km) of the Dhaka–Northwest corridor to four lanes (Joydeypur–Chandra–Tangail–Elenga Road, which is part of a major subregional artery). The project will also (i) improve two land ports at Benapole and Burimari, and (ii) strengthen the capacity of the road sector and the land port operations. By increasing the road capacity of a major international trade corridor and enhancing land port capacity, the project will not only boost the national economy but also facilitate subregional cooperation and increase trade. The project has been endorsed by the SASEC trade facilitation and transport working group meeting held in Kolkata on 5 March 2012.

The government will upgrade about 70 km of the Joydeypur–Chandra–Tangail–Elenga Road, which is part of Asian Highway 2 and SHC 4 and 8, to a fourlane highway with safety features including a separate lane for slow-moving traffic and construction of flyovers at the busiest junctions. Civil works will be financed by ADB jointly with OFID for about 60 km and in parallel by the Abu Dhabi Fund for International Development (ADFD) for about 10 km. The project implementation consultant (PIC) will be financed by ADB to support implementation of the entire 70 km road works.

The project will modernize Roads and Highways Department (RHD) headquarters and provide equipment and consulting services in line with the institutional development action plan. A technical assistance grant attached to the project for institutional development in RHD will be provided to support implementation of the action plan. The TA consultants will identify the timing and details of equipment and services to be procured under the loan. Equipment to be procured will include weighbridges and laboratory equipment.

he project will improve two land ports at Benapole and Burimari. For Benapole Land Port, which has a larger master plan comprising several modules, the project will focus on those that will cater for the increasing trade volumes: (i) redevelopment of old sheds including road access and drainage; (ii) redevelopment of the old truck terminal yard, and (iii) construction of shelter in the transshipment area. For Burimari Land Port, the project will focus on more effective reconfiguration of traffic flows, and provision of covered shipment yards for perishable goods. The PIC will undertake detailed design, procurement assistance, construction supervision, and capacity development for operational efficiency.

Annex B: Project Details: South Asia Subregional Economic Cooperation Railway Connectivity: Akhaura–Laksam Double Track Project

The project will support the Government of Bangladesh in upgrading the 72-kilometer (km) Akhaura–Laksam section of the Dhaka–Chittagong railway corridor to a double track railway line with modern signaling equipment. The section is part of a major subregional corridor and the Trans-Asia Railway network. The project will also (i) improve 11 railway stations and (ii) strengthen the capacity of the railway sector in project management and implementation as well as in accessing climate mitigation funds. By increasing the capacity of a major international trade corridor, the project will boost the national economy and facilitate subregional cooperation and trade.

Dhaka and Chittagong are the two major metropolitan areas of Bangladesh. Dhaka is the main commercial and administrative center of the country, while Chittagong is the primary seaport, accounting for about 90% of imports and exports. More than a quarter of Bangladesh's population of 142 million lives in the Dhaka–Chittagong corridor. The high demand for intercity service in the Dhaka–Chittagong corridor cannot be met fully because of insufficient line capacity, thus, no additional trains can be scheduled to tap into these lucrative markets for Bangladesh Railway with high revenue potential. About 203 km out of the 321 km Dhaka–Chittagong railway line is still only single track, constraining the demand to increase the number of trains in the corridor. There are two projects under construction for laying double tracks on the railway line: (i) the 64 km Tongi–Bhairab Bazar section4 is financed by ADB's Railway Sector Investment Program5, and (ii) the 61 km Chinki Astana–Laksam section is financed by the Japan International Cooperation Agency.6 Both projects are scheduled to be completed in 2015. The Government of India finances the construction of the second Bhairab and the second Titas river bridges with about 7 km of approach railway lines.7 India is also supporting the construction of the Akhaura–Agartala railway line on a grant basis, which will link the Dhaka–Chittagong railway corridor to the Indian state of Tripura. Thus, the only remaining 72 km single track section between Akhaura and Laksam will become the critical bottleneck for domestic and subregional traffic in this corridor.

Railway infrastructure will be upgraded by (i) double-tracking 72 km of railway lines including the construction of the new second track and upgrading and reconstruction of the existing track in accordance with the requirements of the Trans Asia Railways network for future conversion to broad gauge; (ii) installing modern signaling and interlocking equipment to enhance the safety of railway operation; and (iii) reconstructing 11 stations with integrated design features for the elderly, women,

children and disabled. The project will support Bangladesh Railway in project management and project implementation. The project will also support capacity development for the permanent project management unit to be established in Bangladesh Railway and for accessing climate mitigation funding. Output 1 will upgrade railway infrastructure by (i) double-tracking 72 km of railway lines including the construction of the new second track and upgrading and reconstruction of the existing track in accordance with the requirements of the Trans Asia Railways network for future conversion to broad gauge; (ii) installing modern signaling and interlocking equipment to enhance the safety of railway operation; and (iii) reconstructing 11 stations with integrated design features for the elderly, women, children and disabled.

Benefit-Cost Analysis of Trade Liberalization and Trade Facilitation Interventions in Bangladesh

Bangladesh Priorities

Dr. Brad Wong
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Introduction

I have with great interest read "Benefit-Cost Analysis of Trade Liberalization and Trade Facilitation Interventions in Bangladesh" by Selim Raihan and Farazi Binti Ferdous (R&F). I will here just discuss the trade liberalization component of their paper.

I think the paper makes a solid short-term static analysis of the costs and benefits for Bangladesh if it chooses to reduce its commodity tariffs by 50%. With R&F's assumptions, and taking the median scenario from their six closures, they correctly find a benefit-cost ratio of about 3.

However, their assumptions are cautious, and it may be worth analyzing the impact of reducing the caution in the model's assumptions. If one wishes to examine the effect of this, one could assess two different changes to R&F's assumptions. First, assessing more years with growth and reduced long-term costs and second, including dynamic benefits. Given that I only had access to the paper and the spreadsheet, my comments here are more along the lines of order-of-magnitude estimates.

Longer-term static model with eventually reducing adaptation costs

R&F assess five years of impact from trade liberalization. This could be considered conservative, given the benefits of liberalization may play out over many years and decades. I will here look at the opportunity to increase the horizon to 30, 40 and infinity (here modeled as 100 years).

R&F assumes that reductions in output in all sectors which experience a decline after liberalization, are equal to costs. This is an accurate proxy of the true costs in the short run, as it describes the real costs of loss of income to people who have to look for work elsewhere and stranded capital (Matusz and Tarr 2000; Francois 2003). However, over the medium to long run it may be an increasingly inaccurate proxy as the economy rebalances (Porto and Hoekman 2010). For example, Michaely, Papageorgiou and Choksi (1991) assessed 13 liberalization efforts across developing countries, and found employment was higher after a year in all cases, but one. Thus, a less conservative assumption would be for costs to start out as found by R&F but then reduce each following year. For consistency with the current study, let us assume that costs are constant and high for the first five years as estimate by R&F but then decline by 50% for each following year.

Finally, most static trade liberalization models (e.g Rutherford and Tarr (2002)) find that the net benefit scale with the growth of the economy, or that the benefit is a percentage increase in GDP (a one-time bump in the GDP growth curve). In the current model it is instead presented as a fixed

income. Over a five-year period, this matters little, but over a longer period with decreasing costs, it obviously makes a big difference. It is here modeled as a one-time bump in GDP for a Bangladesh with an average GDP growth rate of 6%.

Just extending the time period would make no difference to R&Fs BCR as the costs and benefits remain constant. But with a mostly completed transition after five years and reducing costs thereafter, the BCR goes (for 5%) from about 3 to about 10. Including the growth of the economy at 6% per year increases the BRC further, as costs go to zero but the benefits grow. Here are the median benefit-cost ratios across all six closures for 3%, 5% and 10%, and for 30, 40 and 100 year periods:

Benefit-cost ratio   *Discount rate*

Time horizon	3%	5%	10%
30 years	**23**	**17**	**10**
40 years	**35**	**24**	**12**
100 year	**262**	**80**	**15**

Author's calculations

Longer-term dynamic model with eventually reducing adaptation costs

We also know from the literature that a significant part of the benefit from reduced tariffs would come from the dynamic benefits of slightly more vigorous growth (see the surveys by USITC 1997, Winters 2004, Billmeier and Nannicini 2009 and Francois and Martin 2010). In the global case of a successful Doha round, Anderson (2015) estimates the dynamic growth benefit at 0.6 percentage point increase in annual growth for ten years, declining to zero after 25 more years.

Of course, ideally we would conduct a more detailed study of Bangladesh and run a full-scale dynamic CGE model, but for an order-of-magnitude estimate, it is useful to assume that the growth-rate of the Bangladesh economy would increase, say, one-tenth of the impact of the full Doha round, or 0.06 percentage points for ten years, declining to zero over the next 25 years. This is somewhat in line with Annabi et al. (2006) who conducted an ex-ante analysis of full trade liberalization in Bangladesh using CGE modelling and found that after 15 years GDP was 1.4% higher than in the base scenario (though negative in the first two years post-liberalization). Using my simplified assumption, after 15 years, GDP is 0.8% higher and after 40 years 1.3% higher than in the base scenario.

Adding this to the above reductions in cautious assumptions would give the following median BCRs across all six closures of R&F, for a discount rate of 3%, 5% and 10%, and a time horizon of 30, 40 and 100 years:

Benefit-cost ratio *Discount rate*

Time horizon	3%	5%	10%
30 years	**112**	**81**	**40**
40 years	**199**	**127**	**50**
100 year	**1822**	**523**	**70**

Author's calculations

Summary remarks

As is evident above, the analysis of R&F is a good starting point for looking at the impact of trade liberalization for Bangladesh, but perhaps on some levels it is cautious in its assumptions, leading to a rather small BCR of about 3. With the above arguments I find that less conservative assumptions lead to a BCR, for 5% discount rate and evaluated over 40 years, of 24 or with a dynamic growth benefit, about 100. I leave it to the Eminent Panel to evaluate how cautious they will want to be in ranking trade liberalization for Bangladesh.

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