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TRADE POLICY EFFECTS ON GLOBAL VALUE CHAIN PARTICIPATION OF SOUTH ASIAN COUNTRIES:

IMPLICATIONS FOR BANGLADESH-SRI LANKA TRADE NEGOTIATIONS

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Table of Contents

LIST OF ABBREVIATIONS	i
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EXECUTIVE SUMMARY	ii
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1. Introduction	1
2. Background: Bangladesh-Sri Lanka Trade Relations	3
3. Methods and Data	13
4. Results and Discussion	17
5. Conclusion	33
References	35
Appendices	37

List of Abbreviations

DVA	Domestic Value-added
FTA	Free Trade Agreement
FVA	Foreign Value-added
GVC	Global Value Chain
IPP	Incidental Parameter Problem
LDC	Least Developed Country
MFN	Most Favoured Nation
MIC	Middle-income country
PPML	Pseudo Poisson Maximum Likelihood
PTA	Preferential Trade Agreement
ROO	Rules of Origin
RTA	Regional Trade Agreement
SAARC	South Asian Association for Regional Cooperation
SAFTA	South Asian Free Trade Area
SAPTA	SAARC Preferential Trading Arrangement
SRCA	Standard Revealed Comparative Advantage Index
WITS	World Integrated Trade Solutions

Executive Summary

Low intra-regional trade characterises South Asian regional integration, despite the regional economies being members of multilateral, regional, and bilateral trade agreements. South Asian countries embarked on regional trade liberalisation in 1995, with the South Asian Association for Regional Cooperation (SAARC) Preferential Trading Arrangement (SAPTA). The region passed a significant milestone in regional trade integration with the South Asian Free Trade Area (SAFTA) enactment in 2006. Parallel to the initiatives for regional trade integration, South Asian countries entered into bilateral trade agreements with SAARC and non-regional countries.¹ Despite a crop of Free Trade Agreements (FTAs) in the region, intra-regional trade has not achieved the full potential predicted by gravity model-based analyses. The strategically used sensitive lists and complex Rules of Origin (ROO) are blamed for the underperformance (Baysan, Panagariya, & Pitigala, 2006; Kathuria, 2018; Kumar & Ahmed, 2014; Raihan, 2008; Weerakoon & Thennakoon, 2006; Weerakoon, 2010). Notwithstanding this scenario, the countries in the region are in negotiations on more bilateral FTA/PTAs. Negotiations for a PTA between Sri Lanka-Bangladesh is one among these.

In this paper, the effect of the existing trade policy of the region on the South Asian countries' trade and its Global Value Chain (GVC) components are estimated to draw lessons for future trade negotiations, including the Bangladesh-Sri Lanka PTA. Then, as the next step, offensive lists are generated which can be used to bargain for concessions. In addition, the outcomes of empirical analysis (gravity model with the GVC components as dependent variables) and proposed ex-ante trade policy evaluation (producing offensive lists and partial equilibrium simulation) can be a basis for negotiation of any other future regional trade agreement (RTA).

The status of bilateral trade between Bangladesh and

Sri Lanka is not up to the theoretical predictions from workhorse gravity models.² In 2019, Sri Lanka exported USD 163 million worth of goods to Bangladesh and imported USD 40 million worth of goods from Bangladesh. Given that Sri Lanka's total exports and imports were USD 11.97 billion and USD 19.47 billion, respectively, Bangladesh is not a significant trade partner. However, exports to Bangladesh from Sri Lanka are growing rapidly (from USD 46 million in 2011 to USD 163 million in 2019). Given Bangladesh's USD 57.92 billion imports from the world, Sri Lanka is an insignificant trade partner for Bangladesh. However, both countries have agreed in principle to negotiate an PTA between them.

The reasons to pursue bilateral trade agreements-FTAs and PTAs- can be various, from economic to political realms. From Bangladesh's perspective, there are economic reasons that justify the pursuit of a PTA. Once Bangladesh graduates from a Least Developed Country (LDC) status, it will face lowered preferential margins in key markets like the European Union (EU), which motivates Bangladesh to seek alternative preferential access. Sri Lanka's motivations for such a trade deal seem more obscure. Bangladesh is emerging as a partner in Sri Lanka's attempts towards foreign reserve management by extending swap arrangements to ease external sector pressures in the wake of COVID-19. A PTA for Bangladesh can be viewed as a gesture of reciprocity from Sri Lanka that has no trade but political-economy rationale. Increased bilateral ties through a preferential trade arrangement can pave the way for tighter financial relations between the two countries in the future. In addition, Sri Lanka will have an opportunity to export partially value-added textiles products to Bangladesh to be used in the textiles sector, enhancing bilateral participation in production value chains. Further, if Sri Lanka is willing, food items, including potatoes, vegetables, and cereals can be imported from Bangladesh, following the comparative cost rationale.

¹ Currently notable bilateral FTAs are India-Sri Lanka FTA, Pakistan-Sri Lanka FTA, India-Nepal FTA and India-Bhutan FTA. Other Plurilateral agreements that the region is involved in are the Asia-Pacific Trade Agreement (APTA), the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) and the Indian Ocean Rim Association for Regional Cooperation (IOR-ARC).

² Gravity model estimates of the previous studies predict that Bangladesh-Sri Lanka trade should be around USD 573 million in 2015. However, the actual bilateral trade was USD 150 million (Kathuria, 2018).

³ According to the 2017 revision.

Currently, Bangladesh and Sri Lanka are members in regional and multilateral partnerships. However, both countries maintain long sensitive lists against each other's exports under SAFTA.³ Sri Lanka maintains 925 products at HS six-digits at a value of USD 4.37 billion (31.6 per cent) in 2020 imports of Sri Lanka.

Bangladesh maintains 993 products at HS six-digits worth USD 17.12 billion or 36.9 per cent of imports by Bangladesh for the same year. Bilaterally, Sri Lanka's sensitive list covers USD 6.18 million or 23.8 per cent of imports from Bangladesh. The sensitive list of Bangladesh covers USD 77.59 million or 62.0 per cent of imports from Sri Lanka.⁴ It is noteworthy that after the enactment of SAFTA, Bangladesh's exports to Sri Lanka grew rapidly. Between 2001 to 2006, the export growth was just 80 per cent, but between 2006 and 2012, the growth was 129 per cent. The comparable values for Sri Lanka's exports to Bangladesh in the two time periods were even more optimistic as the export growth was 85 per cent and 262 per cent, respectively.⁵ However, the overall trade was around USD 200 million even in 2019. The relatively lower trade volume is likely due to the similarity of the production structures but eliminating sensitive lists can have a trade creation effect that may be substantial. An ex-ante partial equilibrium analysis can estimate such potential gains.

The GVC components of gross exports are used in the empirical analyses of this study. These components are the Foreign Value-added (FVA) content of exports, value-added exports directly absorbed by the partner country, and intermediate exports that would be further processed. The motivation for such an analysis is twofold. First, the importance of participation in GVC for economic growth is widely emphasised. Second, countries like Bangladesh and Sri Lanka use FVA content for export-oriented production. Bangladesh and Sri Lanka depend heavily on the textile sector in their exports. Nearly 88 per cent of the export income of Bangladesh or USD 41.54 billion out of USD 47.00 billion total exports realised from the textile industry (HS chapters 61, 62, and 63) in 2019. The comparable value for Sri Lanka in 2019 was 44 per cent or USD 5.31 billion out of USD 11.97 billion of total exports.

Given the importance of intermediate trade for both countries, knowledge of the trade policy impact on GVC participation is vital for a Bangladesh-Sri Lanka PTA for two reasons. Firstly, both Bangladesh and Sri Lanka use foreign inputs in the production process of the textiles sector. As a result, both countries can feed intermediate products to the textile production process. Secondly, intermediate goods dominate the sensitive lists.⁶ In addition, when two countries negotiate for trade concessions, knowledge of the existing trade policy impact might be instrumental in designing the new trade deals. When the overall trade policy is considered, as the norm of global production is through GVC participation, investigating the effect of existing trade policy impact on forward and backward GVC participation provides useful insights. To this end, we estimate the impact on other sectors like agriculture and food exports. In addition, trade policy impact on total exports and the GVC components is also estimated. Such analysis will help trade negotiators to identify bottlenecks that suppress integration into GVCs, and then remove those bottlenecks through bilateral partnerships.

Due to the analytical requirements, the trade policy impact was estimated using a panel dataset for all the South Asian countries. However, advancing from this point further Bangladesh and Sri Lanka specific outcomes that would be directly useful for bilateral trade negotiations, are produced in this study. In this direction, the estimates of trade gains from removing the existing barriers are helpful for the ex-ante evaluation of the benefits and costs of a trade agreement. In addition, knowledge of the commercial interests of each country is of vital importance. Negotiating countries should put forward the products with offensive interests that they produce with comparative advantage and the capacity to expand without being constrained by input scarcities for tariff concessions from the partner country. Thus, the study objectives are:

- 1) to estimate the effect of existing trade policy-mutual participation in RTAs and tariffs at the border for imports on the exports and the GVC components of South Asian countries and their trade partners;

⁴ Bilateral estimates are for 2017. Total exports are for 2020.

⁵ It should be noted that the increased trade volume cannot be attributed to the mutual participation in an RTA as the influence of the confounding factors are not ruled out in a simple comparison.

⁶ In this study, analysis was done using sensitive lists relevant for Bangladesh and Sri Lanka under SAFTA.

- 2) to produce an 'offensive list'-a list that both countries should bargain for trade concessions- for both countries, Bangladesh and Sri Lanka; and
- 3) to estimate trade gains for the scenario of complete removal of tariffs applied for the sensitive lists under SAFTA and the offensive lists.

An econometric specification rooted in the structural gravity model is used to identify the trade policy effect on GVC participation empirically. Using three-way fixed effects, the effect of bilateral import tariffs and changes in trade policy regimes on South Asian bilateral exports and backward and forward GVC participation was estimated. The most recent bias correction method is used to obtain asymptotically unbiased estimates eliminating the bias arising from the Incidental Parameter Problem (IPP) associated with multiple fixed-effects models (Weidner & Zylkin, 2021). The empirical gravity model is controlled for the multilateral resistance term using importer-year and exporter-year fixed effects. As trade policy variables are endogenous, to obtain more reliable estimates, the country-pair fixed effects are used. A method of this nature is supported by the most recent gravity literature (Yotov, Piermartini, Monteiro, & Larch, 2016; Balié et al., 2019; Weidner & Zylkin, 2021).

The recent developments in trade data reporting allow the measuring of backward and forward participation. Backward participation to GVCs is measured by the share of the value-added imported intermediate input from abroad in the final and intermediate goods exported by the reporting country. Forward participation is the share of Domestic Value-added (DVA) in intermediates further re-exported by the partner countries. The DVA content in intermediates and final goods exports absorbed by

the direct importer is a measure of traditional bilateral exports. It should be noted that the component absorbed by the direct importer does not involve in complex GVCs. The partial equilibrium approach simulates the trade gains from eliminating the tariffs for both sensitive and offensive lists.

The gravity estimates show that the current level of tariffs hurts gross exports and GVC components of exports. The direct DVA absorbed by the importing country (dirDVA) is significantly and negatively affected by the importing countries' protectionist tariffs. In the food sector, border tariffs affect the intermediate exports that will be processed and re-exported by the importing country (DVX), negatively.

Here, the impact is statistically significant. A similar negative relationship exists between total intermediates (DVX) and border tariffs of the importing country. Notably, mixed results are obtained for the effect of RTAs. When allowed to adjust trade costs by estimating the gravity models with data in intervals, a weak statistically significant positive impact of RTAs on intermediate agricultural exports is evident. However, the effect of RTAs is strongly negative on all the components of food exports. The RTA effect is weakly significant and negative on GVC components of total trade. Our results imply an offsetting impact of general regulatory measures attached to the RTAs, such as ROO, sensitive lists, and prolonged phasing-in effects. Using lagged RTA variables, the study

finds evidence for phasing-in effects of the RTAs of South Asian countries.

Partial equilibrium simulations show that both countries will realise a relatively significant increase (36-94 per cent) in exports if tariffs are eliminated for the sensitive lists.⁷ However, the monetary value of additional

Sri Lanka will gain more exports to Bangladesh in intermediate textile products while Bangladesh shows potential for increased export gain in agricultural products and rubber products. The produced offensive lists include many intermediate goods. The over-representation of intermediate goods in the sensitive lists and offensive lists indicate a potential for intra-industry trade between the two countries.

⁷The results are reported as a range because of Armington elasticities. As the exact elasticities are not known, the simulations were done using the default value 1.5 in SMART and for two additional scenarios with 3.0 and 4.5 elasticity.

exports is modest (USD 2.1 million for Bangladesh and USD 24.7 million for Sri Lanka at a minimum). Sri Lanka will gain more exports to Bangladesh in intermediate textile products while Bangladesh shows potential for increased export gain in agricultural products and rubber products. The produced offensive lists include many intermediate goods. The over-representation of intermediate goods in the sensitive lists and offensive lists indicate a potential for intra-industry trade between the two countries. Therefore, trade negotiators need to pay attention to the buyers' perspective, deviating from the traditional producer-focussed approach. However, given the modest gains, it is highly doubtful whether allocating limited resources for a costly trade negotiation has an economic rationale. As both sensitive lists and the offensive lists include strategically important products (for example, rubber and agricultural products), Sri Lanka may be defensive in further reducing

gains for Bangladesh. On the other hand, Bangladesh as an LDC will expect special provisions. The ultimate outcome can be a limited PTA with weaknesses in the existing trade agreements. As the gravity model results show, the effectiveness of a PTA with reduced coverage, prolonged phasing-in, and ROO is doubtful.

Thus, it may be appropriate for Bangladesh and Sri Lanka to negotiate to remove tariffs on intermediate products required for export-oriented production. Dyed cotton fabrics (HS 600622), cartons, boxes, and cases (HS 481910), plain woven fabrics of cotton (HS 520931), denim (HS 520942), natural rubber (HS 400129) and smoked sheets of natural rubber (HS 400121) are such products. If a political commitment for a PTA dominates over an economic rationale, it would be wise to enter into a PTA without complex general regulatory measures, including ROO and sensitive lists.

1. Introduction

Sri Lanka and Bangladesh are member countries in SAFTA, Asia Pacific Trade Agreement (APTA), BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Partnership), and both are members of the World Trade Organization (WTO). Therefore, a valid question is what these two countries expect to gain from a bilateral trade integration agreement beyond the existing multilateral and regional trade integration agreements. Within the multilateral WTO framework, bilateral trade agreements fulfil two objectives. One objective is to expand the depth and breadth of the areas already espoused by the WTO. The second objective is to expand the coverage over the areas not covered by the WTO (Chauffour & Maur, 2011). Thus, the proliferation of regional agreements happens, although preferential market access discriminates against a third country. Notably, the consequent trade diversion from an efficient producer reduces overall welfare (Baldwin, 2011; Schiff & Winters, 2003).

Moreover, bilateral and regional approaches are convenient vehicles to deal with the complex variety and opacity of modern trade barriers rather than the multilateral approaches like the WTO (Krugman, 1995). In addition, countries enter into bilateral agreements or RTAs motivated by various other reasons, ranging from preference in market access to non-trade related human rights and geopolitics. Motivations for the governments are improvements in trade and market access, trade integration and investments, security and democracy (pooling sovereignty with others), and enabling for growth and development through technology transfer (Chauffour & Maur, 2011; Schiff & Winters, 2003). Thus, the expressed political will for a PTA between Bangladesh and Sri Lanka might stem from economic and political motives. Bangladesh will lose multilateral

preferences, including the European Union's (EU) Everything But Arms (EBA) initiative, probably in 2027, when it graduates from the United Nations LDC category. Thus, Bangladesh seems keen on securing market access in alternative markets. The United Nations also recommends entering FTAs with countries including China and the EU as a strategy to compensate for the trade losses from Bangladesh's graduation from the LDC category (United Nations, 2019).

As a middle-income country (MIC), entering into a PTA with an LDC is challenging for Sri Lanka, as the LDC is likely to bargain for special status such as prolonging phasing-in and keeping a substantial number of products in a sensitive list. Case studies show that MICs gain more when a bilateral trade agreement is formed with a country/bloc with higher trade ties and willingness to lower tariffs and non-tariff barriers (NTBs) by a higher margin (Cali et al., 2019).⁸ Thus, the expressed political commitment can reflect non-trade related rationale. Bangladesh is emerging as a crucial partner in Sri Lanka's attempts to manage its foreign currency reserves position in the aftermath of the COVID-19 impact on the economy. However, it should be noted that Sri Lanka's exports to Bangladesh show a higher growth over time. Between 2001 and 2019, Sri Lanka's exports to Bangladesh grew by 1,520 per cent from USD 10.10 million to USD 163.31 million.⁹

Sri Lanka's Trade with Bangladesh (2019)



Source: Trade Map, International Trade Centre (2019)

Sri Lanka's increasing export intensity to the Bangladesh market, measured by the export intensity index, also indicates this trend.¹⁰ The higher trade growth indicates that Sri Lanka is expanding its market share in Bangladesh and thus, a PTA can further catalyse this export growth if Sri Lanka manages to receive concessions for products with comparative advantage and the capacity to expand. A bilateral PTA between Bangladesh and Sri

⁸ As an example, a bloc like EU than regional partners in the Regional Comprehensive Economic Partnership (RCEP) in the case of Indonesia. The reasons are less willingness to lower tariffs, and NTBs further by the regional partners, lower trade ties, and relatively lower existing tariffs.

⁹ Sri Lanka's exports to India grew by 975 per cent in the same period. Sri Lanka's exports to Pakistan just grew by 230 per cent irrespective of an FTA between the two countries.

¹⁰ Trade intensities between Bangladesh and Sri Lanka are discussed in later sections.

Lanka can deepen trade integration, by meaningfully removing existing trade barriers like sensitive lists. Currently, both Bangladesh and Sri Lanka and other SAFTA partners have a long sensitive list which in turn reduces the effectiveness of SAFTA (Moazzem & Basak, 2013; Weerakoon & Thennakoon, 2006; 2008). A sensitive list is an essential and restrictive feature of the bilateral trade preferences in trade deals like India-Sri Lanka FTA (ISFTA) and Pakistan-Sri Lanka FTA (PSFTA). Another barrier to regional integration through feeding into member countries' supply chains is rules of origin (ROO). The SAFTA agreement requires domestic value addition (DVA) of 40 per cent from the non-LDC member countries of India and Pakistan, 35 per cent for Sri Lanka (as a small economy), and 30 per cent for LDCs. The SAFTA ROOs and other bilateral, regional FTAs are similar (Weerakoon & Thennakoon, 2008). The impact of trade agreements on bilateral trade flows and GVC participation is significant, but complex regulatory rules in trade accords can dampen cross-border GVC participation (Balié, Del Prete, Magrini, Montalbano, & Nenci, 2019).

Nowadays, cross-border fragmentation of production processes is the norm in manufacturing. Domestic production of final goods involve a combination of foreign inputs and domestic inputs. The vertically integrated economies use foreign inputs to produce export goods (backward participation). They also export domestic inputs as intermediates that are absorbed in third country exports (forward participation). The FVA content exceeds 20 per cent of most countries' manufacturing output and, the comparable value exceeds 50 per cent in specific sectors (Blanchard, Bown, & Johnson, 2016). Moreover, domestic intermediates exported by a country re-enter the domestic economy as components in the imported final goods. Agriculture and food industries are also becoming increasingly vertically integrated (Balié et al., 2019; Greenville, Kawasaki, & Beaujeu, 2017; Minten et al., 2009). Developing countries participate in GVCs more deeply than anticipated, and trade policy impacts on the degree of value chain participation are non-trivial (Balié et al., 2019). Empirical decomposition of exports in GVC components allows an analysis of the impact of trade policy on GVC participation (Wang, Wei, & Zhu, 2013). Given this background, this study raises questions on crucial aspects such as what the effect of RTAs on South Asian exports and the GVC components are? What products should be focussed on in the negotiations for tariff concessions in bilateral trade negotiations and what is the impact of tariff elimination in different

scenarios (removing tariffs on sensitive lists and list of products with offensive interests)?

Estimation of a theoretically consistent gravity model with GVC components of exports as dependent variables and mutual participation in RTAs and border tariffs as the key independent variables, answers the first question. GVC components are considered as dependent variables due to two reasons. First, estimating the effect of trade policy on GVC participation is vital as evidence exists that border tariffs depress traditional measures of gross trade and exports through forward and backward GVC linkages. Second, given the FVA input-intensive industries and primary products dominate the export baskets of most South Asian countries, the trade policy impact should be measured not just for the component directly absorbed by the direct importer. Rather, the impact should be assessed on the components that participate in further value chains and foreign components used in exports. The second question can be answered by producing an offensive list identifying the products with offensive interests for a country in trade negotiations. A product has an offensive interest for a country if a country produces it with comparative advantage and the capacity to expand without being constrained by input scarcities. Partial equilibrium simulations answer the third question.

The gravity model which is used for the first objective, needs a panel dataset to accurately identify the effect of trade policy. Thus, the exports between South Asian countries and their trade partners over the years make the gravity dataset for this study. Further analyses are carried out using Bangladesh and Sri Lanka trade, mainly as Bangladesh Sri Lanka trade negotiations are ongoing. In addition, referring Bangladesh as a representative country, it can be estimated whether entering into a PTA with a regional lower MIC like Sri Lanka will generate adequate trade gains. This aspect is essential for LDCs as once they graduate from LDC status, these countries will face lower preferential margins requiring them to find alternative markets. Naturally, they may look upon regional partners to deepen existing trade patterns. For a MIC like Sri Lanka too, options and resources for deepening trade negotiations are limited. Thus, ex-ante analyses for trade gains from further tariff cuts will guide informed decision-making on pursuing trade negotiations and choosing trade partners for deeper integration.

2. Background: Bangladesh-Sri Lanka Trade Relations

Noteworthy similarities between Bangladesh and Sri Lanka trade are sectoral composition and geographical orientation of the exports. The export baskets of both countries are concentrated on products classified under Harmonised Codes (HS) chapters 61-Articles of apparel and clothing accessories, knitted or crocheted- and 62-Articles of apparel and clothing accessories, not knitted or crocheted (Table 2.1). Geographically, ex-

ports of Sri Lanka and Bangladesh overlap substantially within the US and EU markets (Table 2.2). Therefore, the export similarity index can be used to measure the degree of overlap of export profiles in these crucial markets (Figure 2.1).¹¹

The similarity of the export profiles has two implications for a potential PTA between Bangladesh and

Table 2.1
Sectoral Orientation of Bangladesh and Sri Lanka Trade (2020)

Six Digits HS Code	Description	Exports to world (USD million)	Share (%)
Bangladesh			
610910	T-shirts, singlets	5,126.95	12.40
620342	Men's or boys' trousers	4,762.91	11.52
620462	Women's or girls' trousers	3,155.56	7.63
611020	Jerseys, pullovers, cardigans, waistcoats	2,700.49	6.53
611030	Jerseys, pullovers, cardigans, waistcoats	2,099.08	5.08
620520	Men's or boys' shirts of cotton	1,446.23	3.50
610462	Women's or girls' trousers	1,323.16	3.20
611120	Babies' garments	868.18	2.10
610510	Men's or boys' shirts of cotton	771.37	1.87
620343	Men's or boys' trousers	661.15	1.60
Rest of the products		18,429.16	44.57
Total exports to the world		41,344.23	100.00
Sri Lanka			
621210	Brassieres	549.84	5.44
090240	Black fermented tea	440.59	4.36
611610	Gloves, mittens and mitts	349.91	3.46
401290	Solid or cushion tyres	285.82	2.83
090230	Black fermented tea	233.58	2.31
620342	Men's or boys' trousers	220.77	2.19
610463	Women's or girls' trousers	217.81	2.16
610821	Women's or girls' briefs	197.34	1.95
610822	Women's or girls' briefs	197.28	1.95
610990	T-shirts, singlets and vests	190.29	1.88
Rest of the products		7,217.30	71.45
Total exports to the world		10,100.51	100.00

Notes: At six-digit product disaggregation, Sri Lanka's export basket indicates a greater diversity than Bangladesh. All the top 10 exports by Bangladesh are under HS 61 and 62 chapters, predominantly textiles products. On the other hand, Sri Lanka has value-added products like tea and rubber, Sri Lanka's traditional exports. However, export concentration on a few HS chapters is evident at higher aggregations for both countries.

Source: Authors' calculations based on Trade Map data (2020).

¹¹ Mathematical expression of the export similarity index is explained in Appendix (Equation A.1).

Sri Lanka. Firstly, the potential for inter-industry trade would not be significant. However, the similarity in export profiles makes intra-industry trade a possibility. This is because each country can feed the supply chains and be a part of the fragmented production process through bilateral value chains based on the comparative advantage. Hence, a carefully designed free trade deal covering the intermediate products

will increase the cross-border value chain activities and allow the countries to capitalise on the comparative advantage. Secondly, the export similarity for the two countries is materialised through specialisation in textiles. Overall, the export similarity in the world and South Asia is not much higher, implying a substantial trade complementarity in non-textile products.

Table 2.2
Geographical Orientation of Bangladesh and Sri Lanka Trade

Country	Exports (USD million)	Share (%)
Bangladesh		
United States of America	6,139.35	19.35
Germany	4,673.20	14.73
United Kingdom	3,499.88	11.03
Spain	1,845.44	5.82
France	1,755.41	5.53
Italy	1,353.69	4.27
Canada	1,062.63	3.35
Japan	957.37	3.02
Belgium	904.45	2.85
Netherlands	817.50	2.58
Rest of the world	8,725.25	27.49
Total exports to the world	31,734.16	100.00
Sri Lanka		
United States of America	2,920.21	24.87
United Kingdom	1,043.18	8.88
India	789.59	6.73
Germany	547.13	4.66
Italy	531.65	4.53
China	430.44	3.67
Belgium	347.48	2.96
United Arab Emirates	301.18	2.57
Turkey	234.96	2.00
Singapore	233.67	1.99
Rest of the world	4,361.56	37.15
Total exports to the world	11,741.04	100.00

Notes:

The above table shows that Bangladesh and Sri Lanka are competitors in important markets like the EU and US.

Both countries export similar products to these markets.

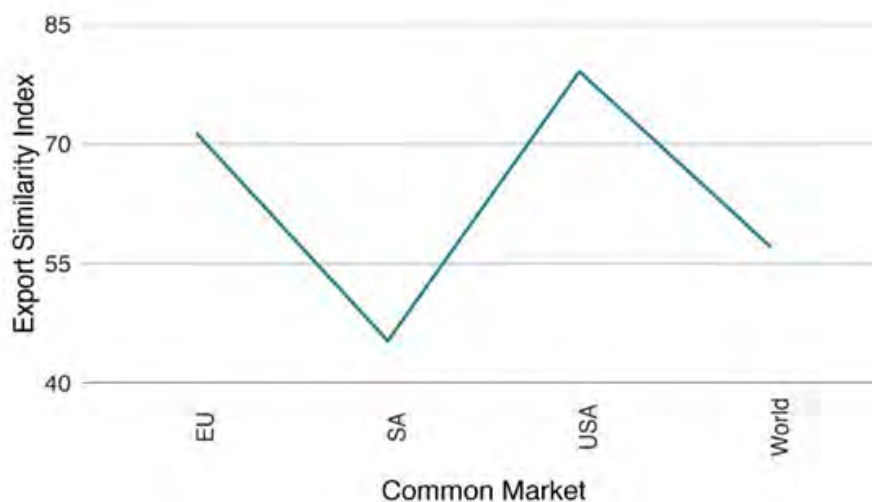
Statistics are based on 2017 for Sri Lanka and 2015 for Bangladesh.

Source: Authors' calculations based on Trade Map data (2015, 2017).

The trade complementarity index compares the degree to which one country's exports profile matches the other country's imports profile.¹² The exports profile of Sri Lanka matches with the import profile of Bangladesh to a greater degree than the match between Sri Lanka's imports and Bangladesh's exports (Tables 2.3 and 2.5, respectively). One potential contributor to the mismatch is the dominance of textiles in the Bangladesh export basket and the lower degree of textile sector contribu-

tion to Sri Lanka imports. Once the complementarity index is calculated, when the textiles sector is excluded, the trade complementarity between Bangladesh exports and Sri Lanka imports rises from 22.01 per cent to 57.6 per cent. The complementarity index values imply that Sri Lanka and Bangladesh can also increase trade in non-textiles sectors and intra-industry trade in the textiles sector, based on the current trade patterns.

Figure 2.1
Export Similarity Index for Sri Lanka in Bangladesh in the Common Markets



Source: Authors' illustration based on Trade Map data (2015).

¹² For the trade complementarity index, refer Appendix (Equation A.2).

Table 2.3

Complementarity of Sri Lanka Exports with Bangladesh Imports (2020)

(A) Sector	(B) HS chapters	(C) Sri Lanka exports (USD million)	(D) Bangladesh imports (USD million)	(E) Sector share of Sri Lanka exports	(F) Sector share of Bangladesh imports	(G) Absolute difference (E-F)
Agriculture Chemical/	01-24	2,050.087	8,188.927	0.203	0.176	0.027
Allied industry Plastics/	28-38	210.059	3,970.240	0.021	0.086	0.065
Rubber Textile/	39-40	976.512	2,309.798	0.097	0.050	0.047
Garment Footwear/	50-63	5,121.350	10,185.974	0.507	0.219	0.288
Umbrella etc.	64-67	46.867	291.305	0.005	0.006	0.002
Base metals	72-83	85.450	4,502.253	0.008	0.097	0.089
Other		1,610.186	16,956.853	0.159	0.365	0.206
Total		10,100.511	46,405.350	1.000	1.000	0.722
					TCI= 1- (0.722/2)	63.910

Notes: The complementarity of Sri Lanka exports with Bangladesh imports in 2020 is substantial. However, because textiles dominate the exports as an individual sector, this is removed, and the complementarity index is recalculated. Then, the complementarity goes up to 68.06 per cent indicating a higher trade potential as Sri Lanka as an exporter and Bangladesh as an importer.

Source: Authors' calculations based on Trade Map data (2020).

Table 2.4

Complementarity of Bangladesh Exports with Sri Lanka Imports (2020)

(A) Sector	(B) HS chapters	(C) Sri Lanka exports (USD million)	(D) Bangladesh imports (USD million)	(E) Sector share of Sri Lanka exports	(F) Sector share of Bangladesh imports	(G) Absolute difference (E-F)
Agriculture Chemical/	01-24	965.218	2,100.922	0.023	0.152	0.129
Allied industry Plastics/	28-38	144.739	1,369.963	0.004	0.099	0.096
Rubber Textile/	39-40	105.679	741.149	0.003	0.054	0.051
Garment Footwear/	50-63	37,402.253	2,168.381	0.905	0.157	0.748
Umbrella etc.	64-67	1,425.045	33.835	0.034	0.002	0.032
Base metals	72-83	112.964	1,036.478	0.003	0.075	0.072
Other		1,188.328	6,378.473	0.029	0.461	0.432
Total		41,344.226	13,829.201	1.000	1.000	1.560
					TCI= 1- (1.560/2)	22.010

Notes: The complementarity of Bangladesh exports with Sri Lanka imports in 2020 is insignificant. However, the complementarity index goes up to 57.67 per cent when the textiles sector is excluded, implying a higher trade potential as Bangladesh as an exporter and Sri Lanka as an importer.

Source: Authors' calculations based on Trade Map data (2020).

Figure 2.2 illustrates the evolution of trade intensity between the two countries over time. The trade intensity index indicates whether a country exports or imports to/from a partner country more than the rest of the world does on average.¹³ From Sri Lanka's perspective, the intensity of exports to Bangladesh is on an upward

trend. Similarly, the intensity of Bangladesh imports from Sri Lanka is increasing over time. However, the export intensity from Bangladesh's perspective and import intensity from Sri Lanka's perspective is low, and the trend is flat over time.

Table 2.5

Sectoral Orientation of Bilateral Trade between Bangladesh and Sri Lanka

Six-digit HS code	Description	Export value (USD million)	% of Total exports
Sri Lanka exports to Bangladesh (2017)			
392690	Articles of plastics	15.22	12.17
271019	Medium oils and preparations	14.377	11.50
600622	Dyed cotton fabrics	11.24	8.99
520939	Woven fabrics of cotton	9.94	7.95
340290	Surface-active preparations	9.283	7.42
761290	Casks, drums, cans, boxes	4.846	3.87
090931	Cumin seeds	3.665	2.93
480511	Semi-chemical fluting paper	3.435	2.75
521142	Denim	2.588	2.07
350790	Enzymes and prepared enzymes	2.534	2.03
	Rest of products	47.932	38.33
	Total exports	125.06	100.00
Bangladesh exports to Sri Lanka (2015)			
300490	Medicaments	16.15	37.06
843143	Machinery parts	8.56	19.65
070190	Potatoes	2.85	6.54
850710	Lead-acid accumulators	1.70	3.89
210690	Food preparations	0.83	1.91
530720	Yarn of jute	0.71	1.63
400129	Natural rubber	0.67	1.54
281511	Caustic soda	0.62	1.43
520932	Woven fabrics	0.59	1.34
630231	Bed linen	0.50	1.15
	Rest of the products	10.39	23.85
	Total exports	43.58	100.00

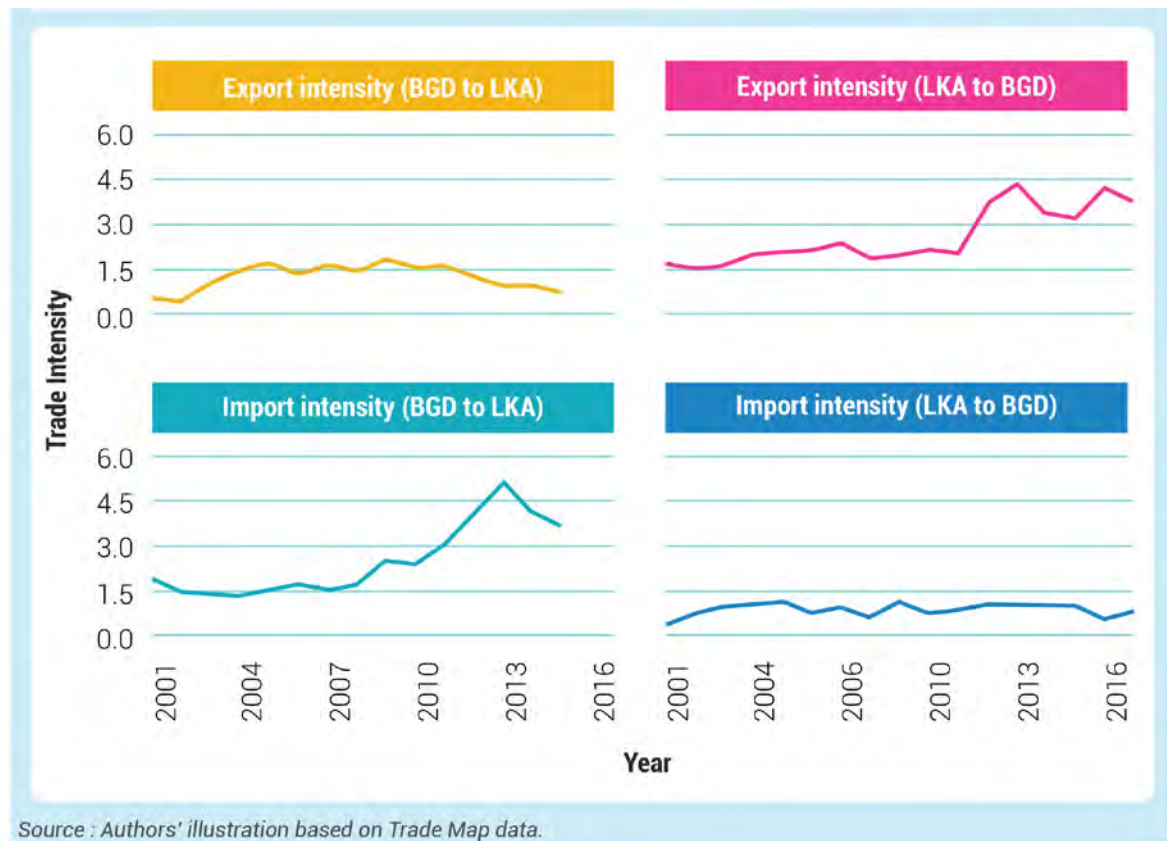
Notes: The trade patterns in 2017 show that Sri Lanka enjoys a trade surplus with Bangladesh. Further, Sri Lanka exports are diverse across product groups, while Bangladesh exports concentrate across the top three export products to Sri Lanka.

Source: Authors' calculations based on Trade Map data.

¹³ For the trade intensity index, refer Appendix (Equation A.3 (Export Intensity Index) and A.4 (Import Intensity Index)).

Figure 2.2

Trade Intensity Index: Bangladesh and Sri Lanka



A relatively smaller volume of trade reflects the lower number of traded goods between Bangladesh and Sri Lanka. For example, Bangladesh exported 471 products to the US in 2015 but exported just 140 products to Sri Lanka (HS six-digit). In 2017, India exported 3,257 products to Sri Lanka. Similarly, while neighbouring India exported 3,080 products to Bangladesh, Sri Lanka just exported 391 goods. Table 2.3 illustrates that Bangladesh and Sri Lanka trade fewer products than those with significant trade partners.

The smaller volume traded between the two countries might be partially caused by the features of existing tariffs, trade regimes, and trade barriers. The restrictive effect of sensitive lists is widely discussed in the literature (Baysan et al., 2006; Raihan, 2008; Weerakoon & Thennakoon, 2006; 2008; Weerakoon, 2010), in addition to the low complementarity and similar production structures. The signatory countries to SAFTA can maintain a sensitive list that consists of many products that would not be considered for tariff concessions.¹⁴

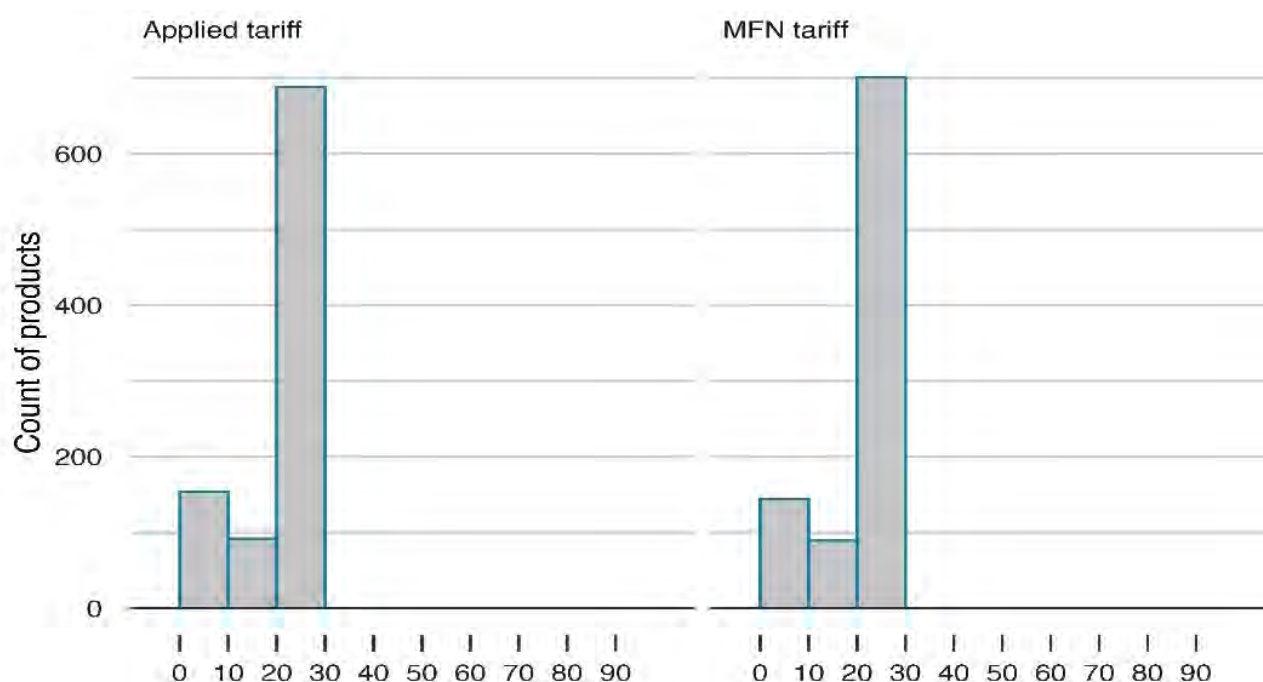
In 2004, when the South Asian countries adopted a framework agreement for SAFTA, the member countries could retain 20 per cent of products on the sensitive list. The outcome brought nearly 53 per cent of regional imports under the sensitive lists. As an LDC state, Bangladesh received better treatment. Initially, it included 65 per cent of imports from SAFTA countries on the sensitive list, while just 22 per cent of Bangladesh exports to SAFTA was under the sensitive lists of SAFTA countries (Weerakoon & Thennakoon, 2006). The coverage of sensitive lists over the bilateral trade between Bangladesh and Sri Lanka was not much better. Around 67 per cent of imports from Sri Lanka were covered by the sensitive list of Bangladesh, while Sri Lanka's sensitive list covered 45.2 per cent of imports from Bangladesh. Though SAFTA needs a quadrennial review of the sensitive lists from the member countries, the most recent -2017- bilateral sensitive lists were still restrictive.

¹⁴ Composition of sensitive lists of member states are given in Appendix Table A.1

Sri Lanka's sensitive list for LDCs-the one relevant to Bangladesh- covered 32 per cent of exports from the world, while the coverage of Bangladesh exports to Sri Lanka stood at 23.8 per cent. Though still high, this is a gradual reduction compared to 2004. However, Bangladesh retains a longer sensitive list of 993 products due to the LDC status for non-least developed contracting states (NLDC) of SAFTA. By trade values, 62 per cent of Sri Lanka's exports to Bangladesh are under the sensitive list coverage, while 37 per cent of imports by Bangladesh from the world are under the sensitive list (Table A.2 in Appendix). Figures 2.3 and 2.4 illustrate the distribution of applied tariffs on products on the sensitive lists of Bangladesh and Sri Lanka, respectively. Overall, there is hardly a difference between the

applied tariffs and the Most Favoured Nation (MFN) tariffs. The majority of products on sensitive lists face 20 per cent – 30 per cent tariffs at the border of both countries. Sri Lanka has higher tariffs above the 20 – 30 per cent range for some products on the sensitive list. Because the tariffs are computed as ad valorem equivalents, the higher range tariffs may be related to the non-tariff measures. For example, rice (HS 100640) is subject to quantitative restrictions, converted to 81 per cent of the ad valorem rate. Certain products are subject to extremely high ad valorem equivalent tariffs ranging from 100 per cent – 3,000 per cent. For example, spirits (220110), ethyl alcohol (HS 220710) and other products in HS chapter Beverages, spirits and vinegar (HS 22) are highly taxed.¹⁵

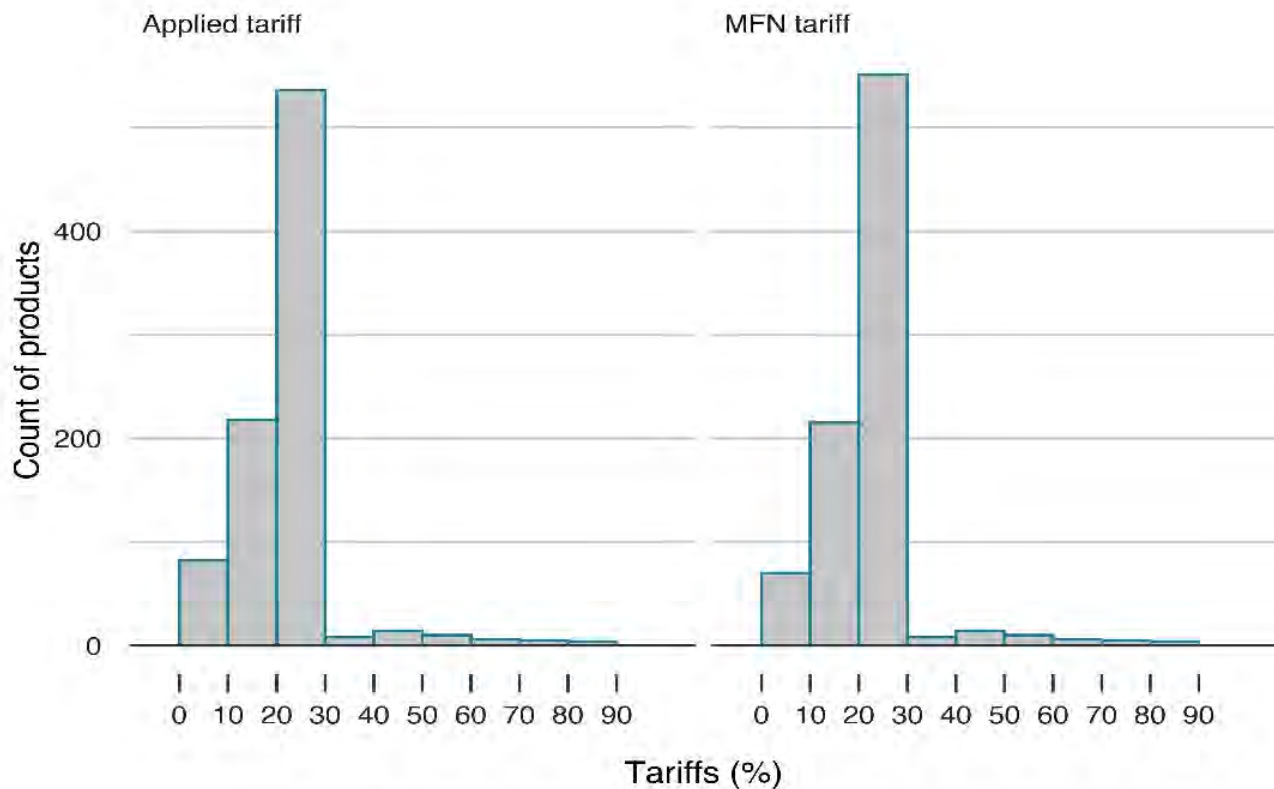
Figure 2.3
Distribution of MFN and Applied Tariffs on the Sensitive List of Bangladesh (For NLDCs)



Source: Authors' illustration based on World Integrated Trade Solutions (WITS) tariff Database.

¹⁵ Alcoholic spirits (HS chapter 22), tobacco products (HS chapter 24) and dairy products (HS chapter 04) are subjected to heavy ad valorem equivalent tariffs by Sri Lanka. The histogram range is pruned beyond 100 per cent for illustration purpose.

Figure 2.4
Distribution of MFN and Applied Tariffs on the Sensitive List of Sri Lanka (For LDCs)



Source: Authors' illustration based on WITS tariff Database.

An essential feature is the disproportionate representation of intermediate goods in the sensitive lists. For example, 414 out of 925 or 44.8 per cent of Sri Lanka's sensitive list for LDCs are intermediate goods. Bangladesh has 559 intermediate goods, which account for 56.3 per cent of its sensitive list.¹⁶ The lower focus on intermediate products in tariff liberalisation is questionable, as currently, the production process is fragmented and intermediate goods pass the country borders multiple times to enter foreign manufacturing. The plausible reason is that the protectionist policies of South Asia generally take account of the interests of producers and revenue losses. Little weight is assigned to buyer interests unless the products are intermediate inputs used in production by powerful producer lobbies (Baysan et al., 2006). The disproportionate representation of intermediate products in sensitive lists motivate an analysis from a value chain perspective to determine the impact of current trade policy on cross-border trade.

¹⁶ Composition of sensitive lists by end use categories are given in Appendix Table A.3.

Table 2.6
Number of Products Traded by Bangladesh and Sri Lanka Bilaterally and, with Major Trade Partners

Exporter	Importer	Number of products traded (six-digit HS code)
Bangladesh (2015)	Sri Lanka	140
	United States of America	471
	Germany	368
	United Kingdom	411
	Spain	287
	France	308
China India Singapore Hong Kong, China Indonesia	Bangladesh (2015)	3481
		3080
		1933
		2382
		621
Sri Lanka (2017)	Bangladesh	391
	United States of America	743
	United Kingdom	804
	India	980
	Germany	617
	Italy	390
India China United Arab Emirates Singapore Japan	Sri Lanka (2017)	3257
		3380
		1285
		1792
		1618

Notes: Both countries import more products than they export, indicating domestic resource constraints. The number of products traded between Bangladesh and Sri Lanka is relatively much less. Further, both countries have major trade partners outside the region. Relevant years for data are indicated in parentheses.

Source: Authors' elaborations based on Trade Map data (2015, 2017).

The degree to which countries participate in GVCs can be measured using forward participation $GVCPT_f$ and backward participation $GVCPT_b$ indexes developed by Wang Z. , Wei, Yu, & Zhu (2017). The forward participation index describes the DVA generated from a country-sector GVC activities through downstream firms as a share of that country-sector's total value-added. Parallel to that, the backward participation index measures the percentage of a country-sector's total production of final goods and services representing the value-added involved in GVC activities through upstream firms. Figure 2.5 illustrates the distribution of the two measures

for agriculture, food, textiles, and total sectors across selected countries. The lowest GVC participation is in the South Asian countries. Notably, Viet Nam, a success story in export promotion, has a higher GVC participation on par with Singapore. Figures 2.6 and 2.7 exhibit the evolution of indexes between 2000 and 2019. It can be noticed that the contribution of value chain activities to the total value added of Sri Lanka decreased over time, while Bangladesh improved the GVC component.

Figure 2.5
GVC Participation Indexes for Selected Countries 2019

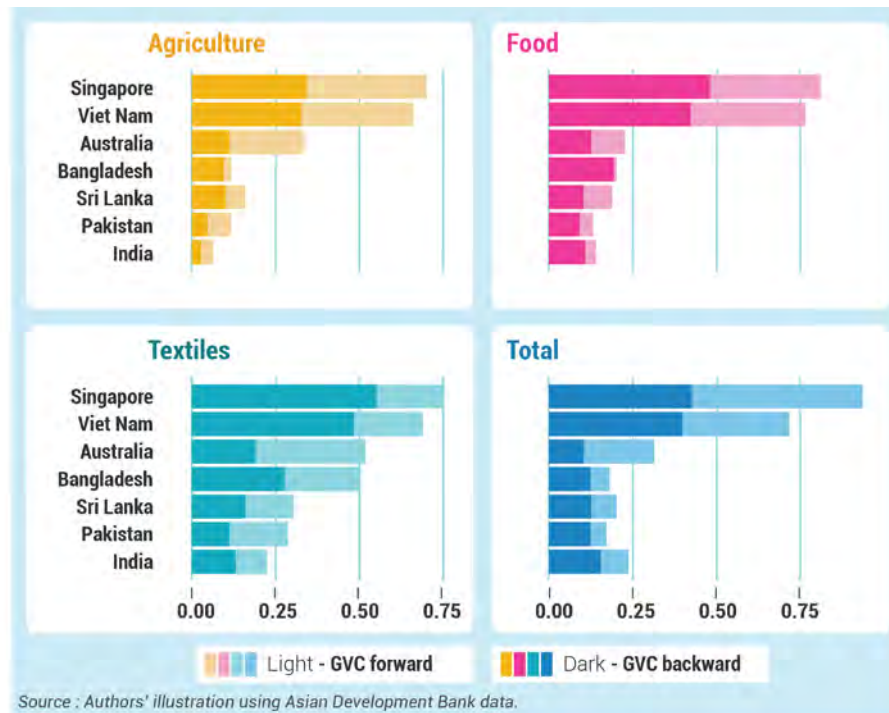


Figure 2.6
Backward GVC Participation:
Evolution from 2000 to 2019

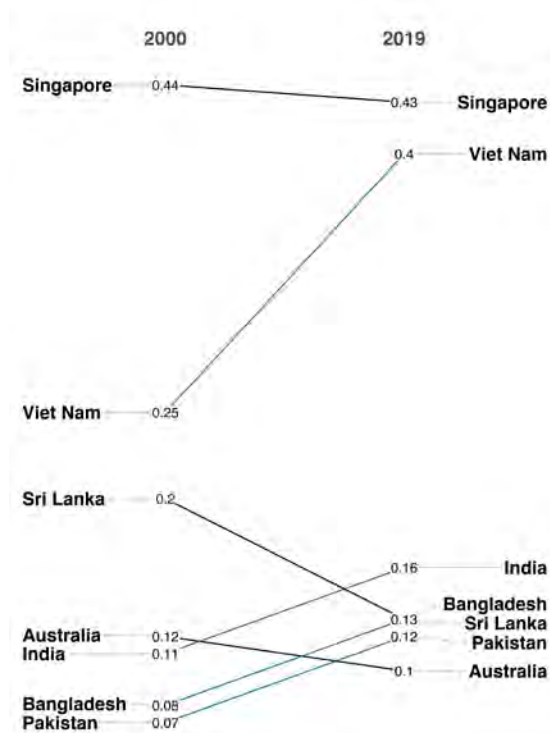
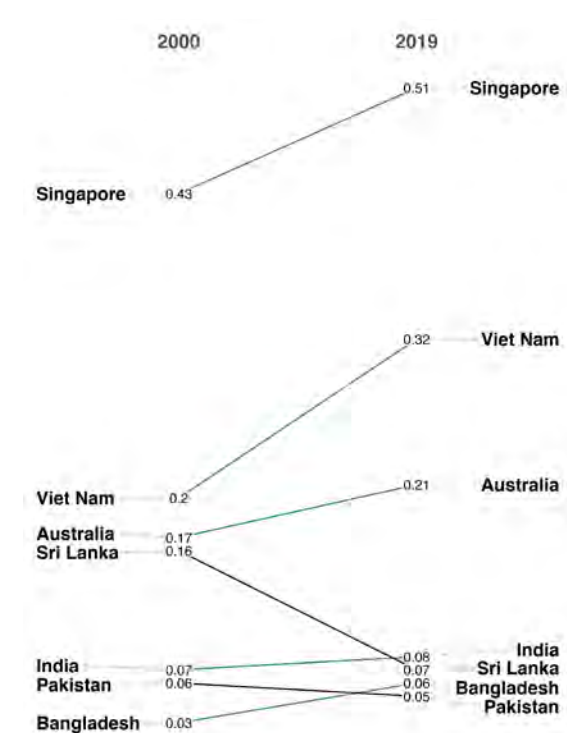


Figure 2.7
Forward GVC Participation:
Evolution from 2000 to 2019



Source: Authors' illustrations using ADB data.

3. Methods and Data

3.1 Gravity Model

For the present study, a gravity model is estimated with country-time fixed effects and country-pair fixed effects (Baier & Bergstrand, 2007; Balié et al., 2019; Head & Mayer, 2014; Yotov, Piermartini, Monteiro, & Larch, 2016). This alternative form of the structural gravity equation does not consider countries' size, bilateral distance and a set of dummy variables such as common languages, common colonies, and common borders. The benefits of using such a model is one that is more grounded in theoretical underpinnings and the possibility of using a parsimonious model (Balié, et al., 2019). Such a model allows identification of the effects of trade policy without separately quantifying the impact of other time-varying gravity determinants (such as economic size) and bilateral time-invariant characteristics such as geographical distance and common languages. Though such determinants are not separately included, these are still controlled and absorbed by the fixed effects. The country-time fixed effects capture time-varying

determinants. These factors could influence trade and account for 'multilateral resistance' terms (Anderson, 1979; Anderson & Van Wincoop, 2003). The country-pair fixed effects capture time-invariant determinants, accounting for endogeneity bias between bilateral protection and trade flows. These also capture the time-invariant reasons for signing trade agreements and prevent possible 'reverse causality' bias between trade flows and tariffs. Further, the country-pair fixed effects control for self-selection bias (Balié et al., 2019).

The Pseudo Poisson Maximum Likelihood (PPML) estimator is used in the present study to estimate the empirical gravity model. The PPML estimator circumvents the zero trade flows issue by estimating the gravity model in multiplicative form instead of logarithmic form. Further, with potential heteroscedasticity in trade data, the PPML estimator performs well compared to OLS counterparts (Silva & Tenreyro, 2006; 2011a; 2011b; Yotov et al., 2016).

$$GVC_{ijt} = \alpha_0 + \alpha_1 tariff_{ijt} + \alpha_2 rta_{ijt} + \theta_{it} + \lambda_{jt} + \phi_{ij} + \varepsilon_{ijt}$$

Where:

- i = Reporter country
- j = Partner country
- t = Time
- GVC = Selected bilateral components of exports in value-added
- $tariff_{ijt}$ = Tariff rate of the partner country j on the reporter country i
- rta_{ijt} = Dummy for the mutual participation in the same trade agreement
- θ_{it} = Reporter-time FE
- λ_{jt} = Partner-time FE
- ϕ_{ij} = Country-pair FE

The above model is estimated for South Asian countries and their trade partners with regard to the trade flow of South Asian countries to trade partners and trade partners to South Asian countries;¹⁷ considering the GVC components of gross exports as dependent variables.¹⁸ At this level, a brief discussion about the decomposition of gross exports to the GVC components is needed. The recent availability of Multi-Region-

Input-Output (MRIO) tables combined with bilateral trade data allow linking the value-added embedded in trade flows to countries and sectors of origin. Further, the gross exports can be decomposed into their main components based on the location and value addition that occurred and absorbed. This study uses the Wang-Wei-Zhu (WWZ) decomposition method to calculate the components of gross exports and these are considered

¹⁷ All the South Asian countries are considered due to the data requirement for panel gravity estimates to reliably estimate trade policy effects.

¹⁸ The dataset covers majority of exports, total and sectoral, of the South Asian countries. See Table A.4 in the Appendix.

as the dependent variables (Wang, Wei, & Zhu, 2013). Firstly, the WWZ method decomposes gross exports into three main components. The first component is the DVA_G: the value-added exported in final goods or intermediates produced at home, either absorbed by the direct importer or embedded in re-exports to a third country. The second component is the foreign value added in final and intermediate exports. The third component is pure double counting (PDC) which is the component accounts for the intermediate goods that pass national borders multiple times. Double count value-added sources are either domestic or foreign. Wang, Wei, and Zhu (2013) decomposed the three major components into 16 value-added terms as given in the Appendix. The GVC components of gross trade are calculated using these 16 value-added terms. These components are explained below.

The first dependent variable is dirDVA: direct domestic value addition. The DVA intermediate and final goods exports absorbed and consumed by the direct importers represent dirDVA component. This variable provides a baseline estimate to proxy the impact of bilateral trade policies on gross exports and captures the part of value-added that does not enter the GVCs (Balié et al., 2019). The second component is DVX: indirect DVA; i.e., the DVA in intermediate goods that is further re-exported by the partner country. It captures the contribution of the domestic sector to the exports of other countries and indicates the extent of involvement in GVC for relatively upstream industries. Thus, DVX is a measure of forward GVC participation. The third dependent variable is FVA: foreign value added content, which captures the extent of involvement in GVC for relatively downstream industries. Thus, FVA is a measure of backward GVC participation.

The gravity models are estimated for GVC components of agriculture, food, textiles, sectors and total trade.¹⁹ When the dependent variables are GVC components,

the associated coefficient indicates the impact of trade policy on cross-border value chain participation. Bilateral tariffs may affect GVC participation in two ways. The first mechanism is referred as the ‘magnification effect’. In GVCs, goods pass the national borders multiple times and incur considerable trade costs. As a result, tariffs are applied to gross exports though the net domestic value addition is smaller. The second mechanism is the ‘chain effect’, which influences backward and forward participation. A negative sign for α_1 is expected, which implies that higher bilateral tariffs inhibit not only i ’s exports to j ’s for final consumption (dirDVA) but also i ’s participation in backward and forward participation (*FVA and DVX*). The sign of α_2 would take either negative or positive. This is because RTAs do not come alone with just lower tariffs, but these may include possible non-tariff issues as general regulatory policies. For example, any positive effect of RTAs can be offset by the strict rule of origins.

3.1.1 Offensive List

A product that is included on country i ’s offensive list has the following characteristics. Those are (i) the particular product is imported by country j from anywhere in the world, (ii) it is produced by country i with a capacity for expansion, (iii) country i has a comparative advantage in exporting that good, and (iv) country j already has a tariff on the product. Using the same procedure, Graham, Kravchenko, Ratna, & Mikic (2018) produced an offensive list for Sri Lanka in China-Sri Lanka trade negotiations. Six-digit HS codes are considered to produce the offensive lists and the subsequent partial equilibrium analysis because the SMART partial equilibrium analysis tool only supports the HS six-digit level. Further, data availability is not sparse at the six-digit level. For example, the procedure for producing offensive lists is further explained, considering Sri Lanka’s potential offensive list for a Bangladesh-Sri Lanka trade deal.

¹⁹ GVC components were calculated through ADB sectoral classification. The 35-sector classification is used at the two-digit ISIC revision 3. ‘Agriculture, hunting, forestry, and fishing’ as agriculture sector and ‘Food, Beverages and Tobacco’ was considered as the food sector. Agriculture, hunting, forestry, and fishing sector cover activities of growing crops, raising animals, harvesting timber, harvesting other plants and animals from a farm or their natural habitats, using of fishery resources from marine or freshwater environments, with the goal of capturing or gathering fish, crustaceans, molluscs and other marine products; also this includes fish farming and aquaculture activity which produces similar products.

The food industry processes the products of agriculture, animal husbandry and fishing into food and drink for humans or animals, and includes the production of various intermediate products. The food sector also includes processing of tobacco, into a form suitable for final consumption.

As explained above, Sri Lanka's potential to increase the market share of a product imported by Bangladesh depends on several factors. Firstly, Bangladesh should import the particular product substantially from the world. The logic behind the criterion is that only the products that Bangladesh has shown interest in buying should be considered in the offensive list, and it is also an indicator for market access granted by Bangladesh. If there were quantitative restrictions and prohibition, one might not see substantial exports from Bangladesh. Therefore, a three-year average is calculated and only the products that exceeded USD 1 million in import value are considered.²⁰ USD 1 million is considered as a threshold for the substantial export opportunity. Secondly, Sri Lanka should have the capacity to export the product. The threshold of USD 1 million annual exports to the world is used as a proxy for the export capacity. A tariff removal by Bangladesh on a product that Sri Lanka cannot export, is in effect, irrelevant. Thirdly, Bangladesh must have a tariff on the product. Fourthly, Sri Lanka must have a comparative advantage in exporting that product. The logic behind this criterion is that the industries with more significant potential for expansion are products with comparative advantage. Therefore, the liberalisation of their tariffs should be a priority in a PTA. Balassa's Standard Revealed Comparative Advantage Index (SRCA) used for this step indicates a country's above-average ex-post or realised export performance (Balassa, 1964).

The SRCA (Equation A.5 in Appendix) is based on the observed export flows. A value higher than unity implies that the country *i* exports *k* disproportionately compared to the world. This analysis uses more than unity SRCA as an indicator for country *i*'s capacity for expansion in the respective good. However, it should be noted that Balassa's SRCA does not reveal the ex-ante nature of the Ricardian comparative advantage. The SRCA measures the ex-post revealed comparative advantage in exports, which does not distinguish between the exporter, importer, and the sector-specific factors that determine the country's exports.²¹

Graham et al. (2018) used bilateral RCA to filter the offensive list in one more step. A bilateral RCA value that exceeds unity indicates that country *i*'s exports in product *k* to country *j* are disproportionately larger than the world exports to country *j*. However, suppose a country (Sri Lanka or Bangladesh) uses a tariff to discourage imports of a product from another country. In that case, the Bilateral Revealed Comparative Advantage (BRCA) value may not represent the true comparative advantage in the Ricardian sense. Further, most products under a Bangladesh or Sri Lanka tariff are on the SAFTA sensitive lists. A significant motivation for the sensitive list is to discourage exports. Therefore, using bilateral RCA may not be appropriate when the countries considered are among SAFTA countries. Moreover, using SRCA to gauge the capacity for expansion is adequate, as a country can find alternative markets in the world for products it produces efficiently; even the partner country uses tariff and non-tariff barriers to discourage exports.

3.2 Partial Equilibrium Analysis

Trade gains from the elimination of tariffs for products on the sensitive and offensive lists are simulated using partial equilibrium model.²² Partial equilibrium analysis can be conducted with data generally available for ex-ante trade policy analysis. The WITS has an in-built partial equilibrium modelling tool-SMART- which is used in this paper (Amjadi, Schuler, Kuwahara, & Quadros, 2011; Jammes & Olarreaga, 2005; Laird & Yeats, 1986). It generates sectoral export changes, welfare changes, and revenue changes as responses to a tariff change. Importantly, SMART decomposes the trade effect into trade creation and diversion effects. Trade creation is the immediate surge in imports following a tariff cut for goods exported by a particular country. A tariff reduction for a variety assuming the same product exported by different countries are imperfect substitutes or varieties- imported from a partner country causes a reduction in the price in the preference granting country.

²⁰ Years 2012, 2013 and 2015 are considered for calculations, as these are the latest available data. Data for 2014 is not available for Bangladesh.

²¹ The issue is discussed in detail in Costinot, Donaldson, and Komunjer, 2012; Leromain and Orefice, 2014.

²² As Bangladesh is an LDC, it may negotiate for special and differential (S & D) treatment which allows special provisions for LDCs. Some provisions include, prolonging phasing-in of tariff reduction and lowering tariff by a smaller percentage. However, it is not possible to fully capture such deviations from full tariff elimination in partial equilibrium settings due to uncertainty over which products will be requested for S & D treatment. Potentially, Bangladesh will be defensive in opening sectors that absorb the labour force substantially. This caveat will be discussed whenever necessary throughout the text.

As the price reduction entails a revenue effect, consumers in the preference granting country can reach an increased consumption level for the same expenditure. The outcome is the increased imports from the country which receives preferential access. If assumed two countries -A and B, export the same good but two varieties- to a third market, C, a preferential tariff for A from C affects the relative price. The preferential tariff reduces the relative price of A compared to B. For a given composite consumption level, the outcome is that the consumers in country C increase the consumption of variety from A at the expense of country B. Country A now realises increased exports to C while country B realises an asymmetric loss of exports to C. In sum, this is the trade diversion effect.

It is assumed that export supply elasticity is infinite. This assumption is not overly strong as it is plausible for Sri Lanka and Bangladesh to have spare capacity to export products in the sensitive and offensive lists.²³ System-generated import elasticities by SMART are also used in this study. Thus, these estimates are contingent upon these elasticities. Importantly, SMART is a partial-equilibrium model, hence the model does not capture the spillover effects. Furthermore, the model runs for one product at a time, whereas the SMART models' demand side is based on the Armington assumption. Here, a representative agent maximises welfare through a two-stage optimisation process. First, given a general price index, the agent allocates spending on the composite good. In the second stage, the agent segregates the allocated spending among different varieties within the composite good. The Armington substitution elasticity determines the relationship between variety-specific spending allocation and the relative price change. Here, SMART uses 1.5 as the default, although in general, the empirically estimated elasticities are much higher. Feenstra, Luck, Obstfeld and Russ (2018) reported that Armington elasticity between foreign varieties is 4.4. The present study illustrates the effect of Armington elasticity using 1.5, 3.0 and 4.5 Armington elasticities for simulations.

3.3. Data

We obtained the fragmented data using the WWZ GVC decomposition method from the Asian Development Bank's (ADB) Multi-Regional Input-Output (MRIO) dataset. This dataset includes rich sector-level data from 2007 to 2019 for 35 sectors. Using 16 GVC components, the GVC components are computed for agriculture, food and textiles sector exports and total exports. These are considered dependent variables and are indicated in nominal dollars. Tariffs data were extracted from the WITS database. Tariffs weighted by imports extracted from the WITS database and data for the RTA variable was compiled using various sources, including Centre d'Études Prospectives et d'Informations Internationales (CEPII) gravity dataset. The descriptive statistics for key variables are given in Table A.5 in the Appendix.

²³ There is a caveat, however, as for LDCs especially, supply constraints are argued to be an important factor that explain why even available preferences under FTAs are unutilised/applied. A counterargument is that underutilisation is due to restrictive ROOs and cumulation rules such that the EU imposes under GSP+. Additionally, partial equilibrium estimates do not generate abnormally high gains in our analyses.

4. Results and Discussion

4.1 Trade Policy on Trade and GVC Participation

Tables 4.1 and 4.2 report the result of empirical analysis for agriculture, food, textiles and total exports. For each GVC component, the nearby column with the same heading reports the bias-corrected estimates accounting for the IPP issue.

Once results are interpreted, the bias-corrected estimates will be used. As expected, the partner's tariff (Applied tariff_{ji}) consistently and negatively correlates with the GVC components. In the agriculture sector, importing countries' tariffs negatively and significantly correlate with the direct DVA of the exporting countries: dirDVA. As the tariff variable is defined in logarithm, the coefficient can be interpreted as elasticity. Thus, a 10 per cent increase in tariff should be accompanied by a 7.17 per cent decrease in direct DVA exports in the agriculture sector.

Importantly, dirDVA best proxies the gross exports. Thus, results reflect the general negative relationship between tariffs and exports. The relationship between tariffs and GVC components of the agriculture sector, i.e., forward (DVX) and backward (FVA) GVC participation of the countries, is negative but not statistically significant. However, a strong negative and significant effect of tariffs on the forward GVC participation can be noticed in the food sector. A 10 per cent increase in tariffs is accompanied by a 7.83 per cent decrease in DVA in partner countries' exports.

Furthermore, a negative but weakly significant effect of

tariffs can be observed in forward GVC participation in total exports. On the other hand, the impact of tariffs on gross exports and the GVC-related trade in the textiles sector is trivial. Overall, evidence indicates a negative impact of protectionist tariffs on bilateral trade transactions and participation in longer value chains. Moreover, the depressing effect of protection is more prominent on food sector value-added that is not absorbed by

the direct importer but subjected to further processing and re-exporting. The finding of a negative impact of tariffs on gross trade and GVC participation align with those of similar studies (Balié et al., 2019).

All in all, it is evident that protectionist tariffs by the partner country depress exports in conventional measures and disaggregated GVC components. A border tariff on the partner country's exports can depress the protectionist importer's intermediate exports to the partner country. For example, protectionist tariffs have a weakly significant effect on FVA content in gross exports. A product-specific example may explain this scenario much better. If Sri Lanka has a tariff on imported cereals, cereal exports from a partner country to Sri Lanka will be depressed. However,

assuming Sri Lanka exports an input (agrochemical) to the cereal exporter to be used in cereal production, Sri Lanka's tariff may now have a negative effect on its own agrochemical exports.²⁴

As discussed earlier, it is expected that the sign of the RTA coefficient would be ambiguous as the general regulatory measures, ROO, sparse coverage, and more extended phasing-in periods associated with RTA

As discussed earlier, it is expected that the sign of the RTA coefficient would be ambiguous as the general regulatory measures, ROO, sparse coverage, and more extended phasing-in periods associated with RTA might offset the positive effects attributed to lowering tariffs. This study provides strong support for such an offsetting mechanism.

²⁴ Note that FVA captures value added foreign content from all the trade partners, not just from Sri Lanka.

might offset the positive effects attributed to lowering tariffs. This study provides strong support for such an offsetting mechanism. The sixth row of Tables 4.1 and 4.2 reports the total effect of RTA on the agriculture, food, and textile sectors. The total impact is consistently negative in the agriculture sector across all the exports components but statistically trivial. However, the total RTA effect is negative and highly significant in all the exports components of the food sector. The trade volume effect of mutual participation in an RTA on the direct DVA (dirDVA) trade of the food sector is $(e^{(-0.376)} - 1) 100 = -31.34$ per cent. Similar calculations show that mutual participation in an RTA reduces forward and backward GVC participation in the food sector by 46.31 per cent and 37.69 per cent, respectively. The total RTA effect is trivial in the textiles sector but negative and weakly significant in forward and backward GVC participation in total exports. The overall negative impact of RTA indicates likely trade diversion effects of strict regulatory measures, including ROO and sensitive lists in trade agreements of South Asian countries.

Table 4.1
Effect of Trade Policy on GVC Components of Agriculture and Food (Tariffs are Weighted Averages)

Dep. Var	dirDVA	dirDVA	Agriculture		FVA	FVA	dirDVA	dirDVA	Food	FVA	FVA
			DX	DX					DX	DX	
Applied tariffj	-0.677*** (0.256)	-0.717** (0.331)	-0.013 (0.165)	-0.036 (0.208)	-0.464* (0.248)	-0.470 (0.306)	-0.424 (0.303)	-0.531 (0.377)	-0.741*** (0.239)	-0.783*** (0.272)	-0.513 (0.316)
RTA (yes=1)	-0.163 (0.109)	-0.172 (0.139)	-0.072 (0.106)	-0.056 (0.136)	-0.152 (0.150)	-0.157 (0.175)	-0.070 (0.083)	-0.079 (0.103)	-0.076 (0.087)	-0.072 (0.111)	-0.168* (0.097)
RTA (2 years)	-0.148** (0.075)	-0.158* (0.095)	-0.015 (0.084)	-0.004 (0.115)	-0.249*** (0.088)	-0.252** (0.109)	-0.168*** (0.052)	-0.176*** (0.062)	-0.119* (0.063)	-0.112 (0.083)	-0.218*** (0.070)
RTA (4 years)	0.079 (0.075)	0.068 (0.099)	0.250** (0.100)	0.251** (0.125)	-0.023 (0.065)	-0.023 (0.084)	0.035 (0.096)	0.055 (0.138)	-0.218*** (0.075)	-0.243** (0.095)	0.262* (0.148)
RTA (6 years)	-0.048 (0.146)	-0.058 (0.192)	-0.225 (0.142)	-0.288 (0.204)	0.046 (0.116)	0.070 (0.153)	-0.142* (0.073)	-0.176* (0.105)	-0.175** (0.070)	-0.195** (0.085)	-0.347*** (0.103)
RTA total effect	-0.279 (0.242)	-0.320 (0.305)	-0.063 (0.261)	-0.097 (0.334)	-0.378 (0.283)	-0.363 (0.349)	-0.345** (0.156)	-0.376** (0.183)	-0.588*** (0.130)	-0.622*** (0.149)	-0.471** (0.209)
Pseudo R2	0.972		0.939		0.877		0.977		0.927		0.921
Observations	8,329		7,607		8,213		8,675		7,943		8,579
Reporter Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Partner Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country Pair FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bias correction		YES		YES		YES		YES		YES	YES

Notes:

Standard errors are clustered by importer-exporter pair *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations based on ADB data and WITS tariff database

Table 4.2
Effect of Trade Policy on GVC Components of Textiles and Total (Tariffs are Weighted Averages)

Dep. Var	dirDVA	dirDVA	Textiles		FVA	FVA	dirDVA	dirDVA	Total		FVA	FVA
			DVX	DVX					DVX	DVX		
Applied tariffji	-0.539 (0.910)	-0.539 (1.110)	0.602 (0.794)	0.502 (1.019)	0.999 (0.846)	1.267 (1.030)	-0.343 (0.475)	-0.387 (0.580)	-1.018* (0.557)	-1.169* (0.708)	-0.077 (0.472)	-0.079 (0.567)
RTA (yes=1)	0.004 (0.076)	0.004 (0.099)	0.104 (0.146)	0.131 (0.204)	-0.027 (0.061)	-0.017 (0.077)	-0.108 (0.083)	-0.121 (0.101)	-0.243* (0.145)	-0.299 (0.210)	-0.203 (0.124)	-0.239 (0.163)
RTA (2 years)	0.129 (0.080)	0.153 (0.135)	0.080* (0.045)	0.084 (0.065)	0.101 (0.084)	0.139 (0.128)	-0.006 (0.038)	-0.017 (0.049)	0.046 (0.043)	0.033 (0.054)	-0.124** (0.061)	-0.145* (0.085)
RTA (4 years)	0.123 (0.095)	0.150 (0.163)	-0.066 (0.057)	-0.059 (0.089)	0.076 (0.090)	0.097 (0.139)	-0.015 (0.031)	-0.026 (0.040)	-0.082 (0.050)	-0.089 (0.061)	-0.028 (0.031)	-0.036 (0.038)
RTA (6 years)	-0.077 (0.071)	-0.060 (0.085)	-0.175** (0.084)	-0.174 (0.112)	-0.101 (0.064)	-0.099 (0.077)	0.047 (0.065)	0.048 (0.086)	-0.127 (0.078)	-0.140 (0.098)	-0.010 (0.055)	-0.013 (0.074)
RTA total effect	0.179 (0.273)	0.247 (0.411)	-0.057 (0.298)	-0.018 (0.421)	0.048 (0.227)	0.119 (0.317)	-0.082 (0.153)	-0.115 (0.195)	-0.406** (0.205)	-0.496* (0.282)	-0.366** (0.184)	-0.433* (0.248)
Pseudo R2	0.989		0.963		0.968		0.994		0.990		0.989	
Observations	8,629		7,990		8,502		9,264		9,264		9,264	
Reporter Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Partner Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country Pair FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bias correction		YES		YES		YES		YES		YES		YES

Notes:

Standard errors are clustered by importer-exporter pair *** p<0.01, ** p<0.05, * p<0.1.

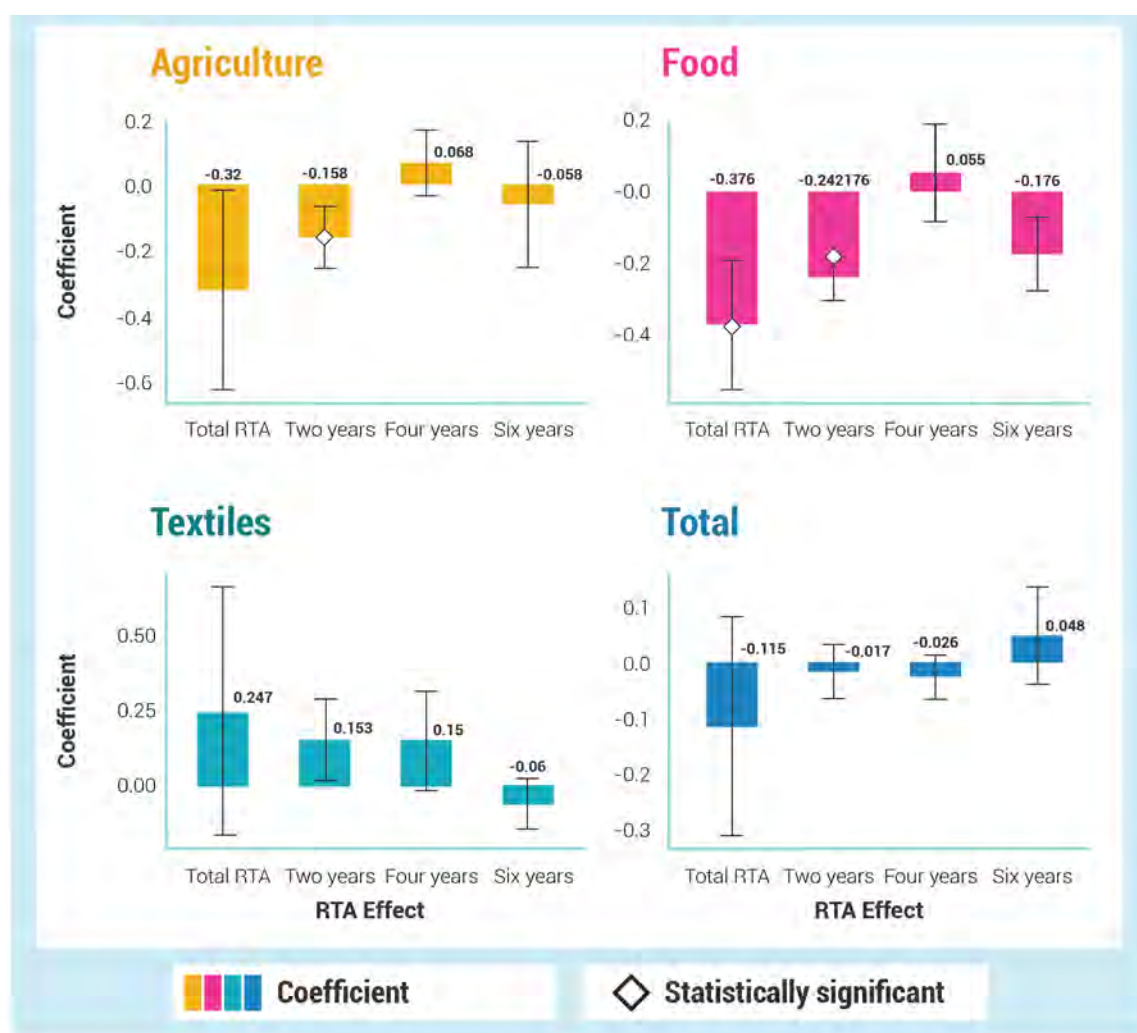
Source: Authors' calculations based on ADB data and WITS tariff database.

Figures 4.1, 4.2, and 4.3 graphically illustrate the phasing-in effect of RTAs on direct DVA exports, forward GVC participation, and backward GVC participation, respectively. The non-monotonic RTA effect shows a similar pattern for agriculture, food, and direct DVA exports. Notably, the relatively negative effect of RTA moves towards the positive side in the second two-year period. Then, in the third two-year period, the average effect declines to the opposing side. However, the overall effect remains negative. For example, in the second two-year period, the agriculture sector DVA exports that enter into longer value chains (DVX) are positively affected by RTAs. However, the effect declines by more than double in the third two-year period. When it comes to backward GVC participation (FVA), again, similar patterns can be noticed of the non-monotonic effect of

RTA on food and textiles exports. The coefficients move towards the positive side monotonically in agriculture sector exports and total exports.

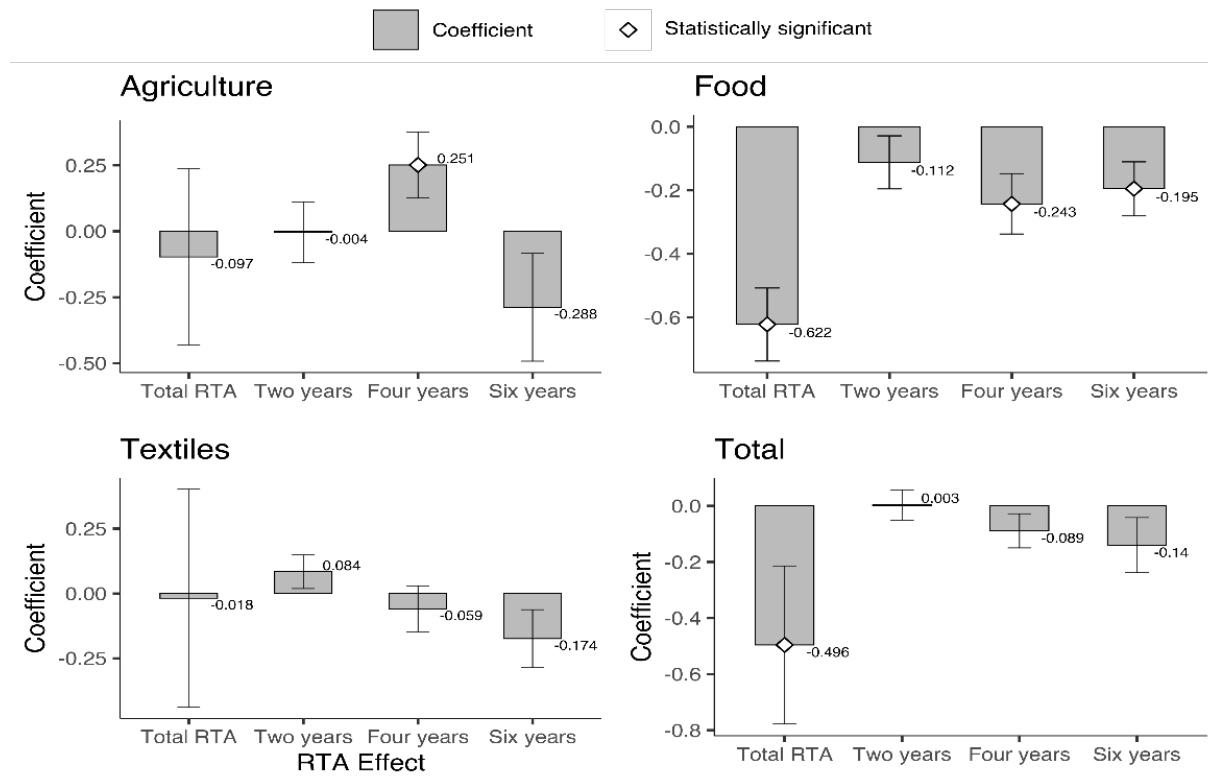
Overall, there is an initial negative effect of RTA on GVC components of exports and the effect on direct DVA exports turns to less negative or positive in the second two-year period. The movement is, however, not sustained, and the RTA effect moves toward the negative region. In the second two-year period, the RTA effects movements towards the positive side might result from increased tariff reduction over a new set of products. These results are consistent with the findings in the literature (Anderson & Yotov, 2016; Baier & Bergstrand, 2007; Piermartini & Yotov, 2016).

Figure 4.1
Phasing-in Effect of RTA on Direct Domestic Value-added Exports (dirDVA)



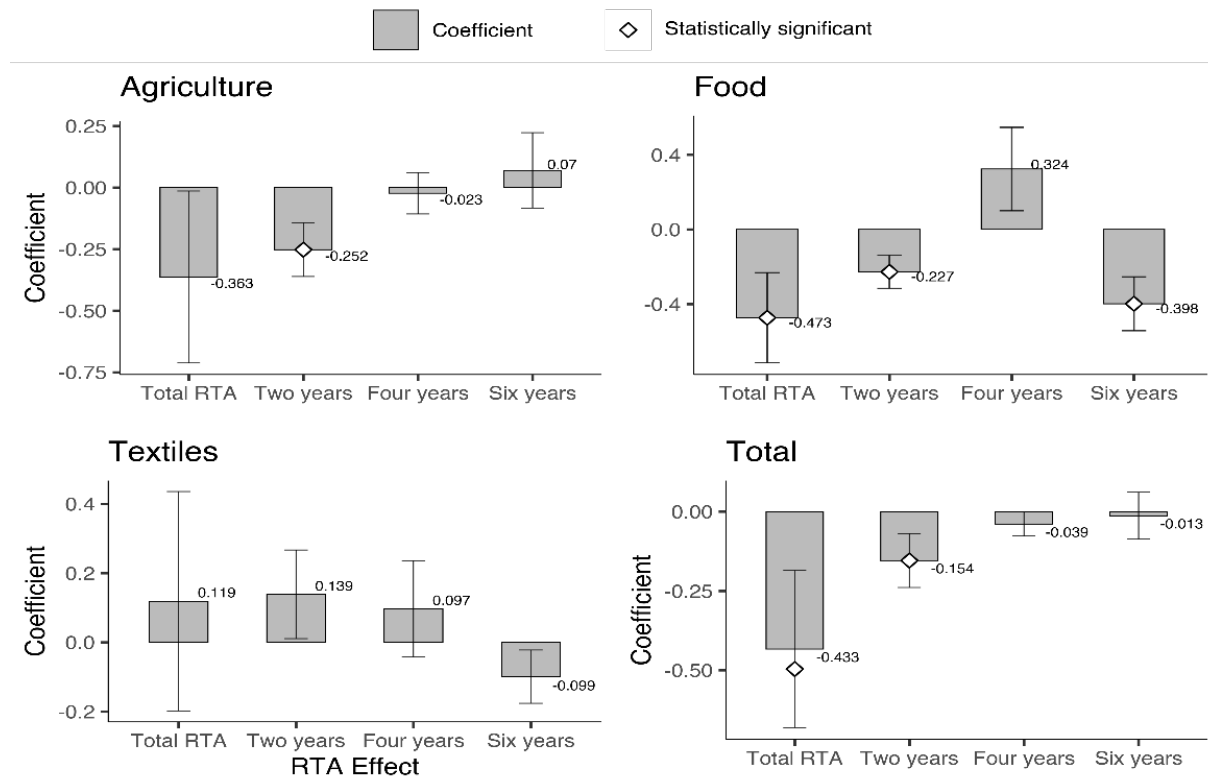
Source: Authors' illustration using the results from gravity estimates.

Figure 4.2
Phasing-in Effect of RTA on Forward GVC Participation DVX



Source: Authors' illustration using the results from gravity estimates.

Figure 4.3
Phasing-in Effect of RTA on Backward GVC Participation FVA



Source: Authors' illustration using the results from gravity estimates.

In addition to the above models, a series of robustness tests are conducted. First, the above models are re-estimated using data in three-year intervals. It means that data for 2007, 2010, 2013, 2016 and 2019 are used to estimate models. The rationale behind such an exercise is to allow the trade flows to adjust to evolving trade costs (Piermartini & Yotov, 2016; Yotov et al., 2016). Tables 4.3 and 4.4 report the results of the models estimated with data in intervals. The overall results do not change from the estimates obtained from the complete dataset. However, the RTA total effect on forward GVC component of agriculture exports is positive and significant. Yet, the overall negative impact on the food sector and total exports are unchanged from the estimates obtained from the complete dataset. Secondly, the possibility of reverse causality is tested by estimating the effect of future RTA dummies on current trade flows following the gravity literature (Baier & Bergstrand, 2007; Piermartini & Yotov, 2016; Yotov et al., 2016). For this purpose, 'future level of RTA' or 'future lead variable' are included in the regressions. In the panel data context as in this paper, if RTA changes are strictly exogenous to trade flow changes, the RTA future lead variable should be uncorrelated with the current trade flow. The results, which are omitted for brevity, show that the effect of the RTA future lead variable is statistically insignificant.

Table 4.3
Effect of Trade Policy on GVC Components of Agriculture and Food: Interval (Tariffs are Weighted Averages)

Dep. Var	dirDVA	Agriculture			FVA	dirDVA	FVA	Food			FVA	FVA
		dirDVA	DVX	DVX				dirDVA	DVX	DVX		
Applied tariffiji	-0.791** (0.322)	-0.858* (0.441)	-0.285 (0.267)	-0.372 (0.335)	-0.836** (0.382)	-0.491 (0.452)	-0.933* (0.521)	-0.643 (0.566)	-1.073*** (0.290)	-1.150*** (0.373)	-0.430 (0.364)	-0.470 (0.425)
RTA (yes=1)	0.431** (0.215)	0.481* (0.275)	0.548** (0.228)	0.603** (0.291)	0.706** (0.338)	-0.049 (0.139)	0.825* (0.452)	-0.110 (0.174)	-0.011 (0.157)	-0.018 (0.208)	-0.220 (0.201)	-0.305 (0.268)
RTA (2 years)	-0.322*** (0.112)	-0.360** (0.155)	-0.150 (0.116)	-0.150 (0.176)	-0.378*** (0.139)	-0.271*** (0.086)	-0.399** (0.192)	-0.264** (0.106)	-0.130 (0.095)	-0.107 (0.122)	-0.315*** (0.113)	-0.313** (0.137)
RTA (4 years)	0.006 (0.157)	-0.008 (0.205)	0.058 (0.093)	0.056 (0.131)	-0.308 (0.227)	-0.057 (0.215)	-0.338 (0.325)	-0.026 (0.300)	-0.526** (0.240)	-0.587 (0.438)	0.293 (0.321)	0.398 (0.529)
RTA (6 years)	0.271 (0.197)	0.279 (0.256)	0.218 (0.173)	0.196 (0.213)	0.612** (0.293)	-0.018 (0.194)	0.668 (0.416)	-0.087 (0.259)	0.137 (0.244)	0.147 (0.402)	-0.387 (0.290)	-0.507 (0.465)
RTA total effect	0.386 0.272	0.392 0.349	0.675** 0.332	0.704* 0.402	0.632 0.484	-0.394* 0.209	0.756 0.671	-0.487* 0.255	-0.530*** 0.168	-0.565*** 0.216	-0.623** 0.277	-0.727** 0.348
Pseudo R2	0.973		0.940		0.871	0.978			0.928		0.919	
Observations	3,249		3,064		3,249	3,372			3,187		3,367	
Reporter Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Partner Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country Pair FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bias correction		YES		YES			YES	YES		YES		YES

Notes:
Standard errors are clustered by importer-exporter pair *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations based on ADB data and WITS tariff database.

Table 4.4
Effect of Trade Policy on GVC Components of Textiles and Total: Interval (Tariffs are Weighted Averages)

Dep. Var	dirDVA	Textiles		FVA	dirDVA	FVA	Total		FVA	FVA
		dirDVA	DVX				DVX	DVX		
Applied tariff	-0.337 (1.078)	-0.425 (1.316)	0.666 (1.002)	1.499 (1.004)	1.755 (1.238)	-0.333 (0.640)	-0.402 (0.818)	-0.947 (0.720)	-1.143 (0.946)	-0.097 (0.592)
RTA(yes=1)	-0.090 (0.062)	-0.114 (0.078)	0.065 (0.154)	-0.062 (0.078)	-0.084 (0.149)	-0.030 (0.123)	-0.051 (0.156)	-0.320 (0.241)	-0.406 (0.387)	-0.054 (0.135)
RTA (2 years)	0.199* (0.112)	0.236 (0.213)	0.100 (0.067)	0.150 (0.136)	0.215 (0.237)	-0.005 (0.081)	-0.028 (0.106)	0.023 (0.095)	0.000 (0.131)	-0.176 (0.127)
RTA (4 years)	-0.110** (0.047)	-0.108 (0.072)	-0.128 (0.084)	-0.124** (0.051)	-0.125* (0.075)	0.020 (0.089)	0.037 (0.111)	0.142 (0.126)	0.159 (0.176)	0.084 (0.097)
RTA (6 years)	0.194 (0.150)	0.227 (0.214)	-0.102 (0.190)	0.181 (0.111)	0.205 (0.158)	-0.024 (0.147)	-0.055 (0.197)	-0.464*** (0.164)	-0.517** (0.231)	-0.152 (0.121)
RTA total effect	0.193 0.284	0.241 0.404	-0.065 0.351	0.145 0.217	0.211 0.302	-0.040 0.206	-0.097 0.272	-0.619** .278	-0.763* 0.418	-0.299 0.210
Pseudo R2	0.989		0.964	0.969		0.994		0.990		0.989
Observations	3,386		3,182	3,341		3,088		3,088		3,088
Reporter Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Partner Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country Pair FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bias correction		Yes			YES		YES		YES	YES

Notes:

Standard errors are clustered by importer-exporter pair *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations based on ADB data and WITS tariff database.

4.2. Partial Equilibrium Estimates and Offensive Lists

4.2.1 Trade and Welfare Effects of Removing Tariffs on Sensitive Lists

The removal of tariffs on the applicable sensitive lists generate significant relative trade gains for Bangladesh and Sri Lanka. The magnitude of the change of exports depends on the used Armington substitution elasticity. Sensitivity of the estimates are illustrated by reporting the relevant variables under three Armington elasticity scenarios, i.e., 1.5, 3.0 and 4.5. However, detailed results are reported only for the scenarios with Armington elasticity value at 1.5. It can be noted that with higher Armington elasticities, trade gains increase.

Table 4.5 reports the change in exports, revenue, and welfare resulting from the scenario in which Bangladesh removes tariff on the sensitive list applicable to Sri Lanka. Based on the different Armington elasticity scenarios, Sri Lanka will realise a 46 per cent to 94 per cent increase of exports from 2016 exported value.²⁵ The change is equivalent to USD 24.7- 49.72 million exports gain. Moreover, the welfare change resulting from reduced deadweight loss for Bangladesh is between USD 2.63-2.66 million. Theoretically, it is composed of the additional tariff revenue entailed by the increase in imports-when tariff cut is not down to zero but at a positive level- and the additional consumer surplus generated due to increased imports. As we consider complete tariff elimination, the welfare change comes solely from the increased consumer surplus. However, by eliminating tariffs completely, Bangladesh will realise a USD 13.51-19.21 million tariff revenue loss. The Bangladesh government's tariff revenue loss is now the gain for Bangladesh consumers. In addition, due to increased consumption at a lower price, they realise increased welfare of USD 2.63-2.66 million. This reduction of the total deadweight loss is directly unobservable, but revenue loss will be directly observed by the government, which may discourage complete tariff elimination for Sri Lanka. During negotiations, Bangladesh may request S&D treatments such as prolonging phasing-in, maintaining longer sensitive lists, and partial tariff cuts. It should be emphasised that the grav-

ity estimates used in this study show that prolonged phasing-in delays RTA gains of RTAs and additional regulatory measures might depress bilateral trade and GVC participation.

Table 4.6 reports the changes resulting from the scenario when Sri Lanka removes tariffs on the sensitive list applicable to Bangladesh. In relative terms, Bangladesh gains 35.49 per cent to 75.68 per cent more exports from the 2019 exports level. However, the absolute change is not much higher. It implies that trade diversion from Sri Lanka's existing trade partners to Bangladesh is minimal, even with the discriminatory market access given to Bangladesh. It further suggests a lower trade creation effect. Notably, after removing tariffs on the sensitive list, Sri Lanka's revenue loss is reported to be just around USD 1.37-1.91 million. The welfare change associated with the deadweight loss reduction is less than USD one million. Overall, the elimination of tariffs on the sensitive list for Bangladesh generate neither significant benefits to Bangladesh (trade gain) and Sri Lanka (welfare gain) nor costs to Sri Lanka (revenue loss).



²⁵The base year was selected based on the availability of data.

Table 4.5

Change in Export (Sri Lanka to Bangladesh) Volume, Tax Revenue and Welfare from Eliminating Tariff by Bangladesh on the Sensitive List Applicable to Sri Lanka

Variable	Armington elasticities		
	1.5	3.0	4.5
Exports before (USD million)	52.789	52.789	52.789
Exports after (USD million)	77.513	90.025	102.501
Gain of exports for Sri Lanka (USD million)	24.724	37.236	49.712
Gain of exports for Sri Lanka (%)	46.836	70.537	94.171
Revenue effect for Bangladesh (USD million)	-13.508	-16.362	-19.208
Welfare change-Bangladesh (USD million)	2.660	2.645	2.630

Source: Authors' calculations based on SMART partial equilibrium estimates.

Table 4.6

Change in Export Volume, Tax Revenue and Welfare from Eliminating Tariff by Sri Lanka on the Sensitive List Applicable to Bangladesh

Variable	Armington elasticities		
	1.5	3.0	4.5
Exports before (USD million)	5.880	5.880	5.880
Exports after (USD million)	7.967	9.154	10.330
Gain of exports for Bangladesh (USD million)	2.087	3.274	4.450
Gain of exports for Bangladesh (%)	35.493	55.680	75.680
Revenue effect for Sri Lanka (USD million)	-1.372	-1.645	-1.914
Welfare change-Sri Lanka (USD million)	0.184	0.181	0.179

Source: Authors' calculations based on SMART partial equilibrium estimates.

Table 4.7

Trade Diversion and Trade Creation from the Elimination of Tariffs on Sensitive Lists

Exporter	Trade effect	Trade creation (USD million)	Trade diversion (USD million)
Sri Lanka	24.724	12.174	12.550
Bangladesh	2.087	0.887	1.200

Source: Authors' calculations based on SMART partial equilibrium estimates

The top 10 products at HS codes six-digits with the highest export gain for Sri Lanka are provided in Table 4.8. Among these, the majority of products are textiles-related (either HS chapters 52, 60 and 62). Therefore, it implies that a tariff removal on the sensitive list will increase intra-industry trade between Sri Lanka and Bangladesh. In addition, market access expansion for Sri Lanka will generate increased GVC activity as most of the top 10 products are intermediates used in the textiles industry. On the other hand, the top 10 products with the highest exports gain for Bangladesh are

diverse industries (Table 4.9). Among these, Sri Lanka may exhibit defensive interests in rubber products (HS 400121 and 400129) given the export economic importance of the industry. In addition, due to the current domestic food production drive, Sri Lanka may be reluctant to remove tariffs on potatoes (HS 200520). However, it is noteworthy that RTA may generate negative effects on bilateral trade, as the gravity estimates show if the gains are offset by regulatory measures attached to the RTA.

Table 4.8
Change in Exports (Bangladesh Removes Tariff on the Sensitive List for Sri Lanka)-Top 10 Products

HS code	Product	Tariff before (%)	Exports before (USD million)	Exports after (USD million)	Change of exports (USD million)	Change (%)	End-Use category
	Full sensitive list		52.789	77.513	24.724	46.84	
600622	Dyed cotton fabrics	25	8.546	13.890	5.345	62.53	Intermediate
621710	Made-up clothing accessories	25	10.303	15.306	5.003	48.56	Consumption
271019	Medium oils and preparations, of petroleum or bituminous	16	4.129	6.732	2.603	63.04	Consumption
481910	Cartons, boxes and cases	25	0.491	1.804	1.313	267.41	Intermediate
520931	Plain woven fabrics of cotton	25	1.863	2.746	0.883	47.40	Intermediate
520842	Plain woven fabrics of cotton	25	1.195	1.895	0.700	58.58	Intermediate
520942	Denim	25	1.113	1.715	0.603	54.09	Intermediate
520843	Cotton: Woven fabrics of cotton	25	1.192	1.781	0.590	49.41	Intermediate
340290	Surface-active preparations	20	1.520	2.033	0.513	33.75	Intermediate
520521	Single cotton yarn, of combed fibres	10	1.778	2.176	0.398	22.38	Intermediate
	Rest of the Products		20.660	27.435	6.775	32.79	

Notes: The results are from the scenario in which Armington elasticity is 1.5.
Source: Authors' calculations based on SMART partial equilibrium estimates.

Table 4.9
Change in Exports (Sri Lanka Removes Tariff on the Sensitive List for Bangladesh)-Top 10 Products)

HS code	Product	Tariff before (%)	Exports before (USD million)	Exports after (USD million)	Change of exports (USD million)	Change (%)	End-Use category
	Full sensitive list		5.880	7.967	2.087	35.49	
850710	Lead-acid accumulators	30	1.695	2.586	0.892	52.57	Intermediate
210690	Food preparations	13	0.831	1.067	0.235	28.40	Consumption
400129	Natural rubber in primary forms	15	0.672	0.847	0.175	26.04	Intermediate
400121	Smoked sheets of natural rubber	15	0.347	0.464	0.117	33.72	Intermediate
482110	Paper or paperboard labels	30	0.135	0.212	0.077	57.04	Intermediate
560749	Twine, cordage, ropes and cables	17.5	0.141	0.209	0.068	48.23	Intermediate
392321	Sacks and bags	20	0.165	0.233	0.068	41.21	Intermediate
200520	Potatoes, prepared or preserved	30	0.136	0.194	0.058	42.65	Consumption
960899	Parts of ball-point pens	17.5	0.161	0.219	0.057	36.02	Intermediate
871495	Saddles for bicycles	15	0.180	0.237	0.057	31.67	Intermediate
	Rest of the Products		1.416	1.699	0.283	19.99	

Notes: The results are from the scenario in which Armington elasticity is 1.5.

Source: Authors' calculations based on SMART partial equilibrium estimates.

4.2.2 Offensive Lists and Partial Equilibrium Estimates

The offensive list of Bangladesh includes 39 products at HS six-digits. Similar to the sensitive lists, a significant percentage of products represent intermediate goods (Table 4.10). Out of 39 products on Bangladesh's

offensive list, 21 are intermediate goods, while the remaining 18 are consumption goods. Similarly, 75 out of 115 products on Sri Lanka's offensive list are intermediate goods. The offensive lists for Sri Lanka and Bangladesh are in the Appendix (Tables A.6 and A.7, respectively).

Table 4.10
Summary of the Offensive Lists of Bangladesh and Sri Lanka

Country	Number of products	Number of consumption goods	Number of intermediate goods	Number of capital goods
Sri Lanka	115	34	75	6
Bangladesh	39	18	21	0

Source: Authors' calculations based on Trade Map data.

Tariff elimination for the products on Sri Lanka's offensive list will result in USD 18.53 million to USD 35.35 million extra exports from Sri Lanka to Bangladesh. Although the gain is modest in value, the relative change is substantial, ranging between 36.10 per cent to 68.87 per cent. In all the three Armington elasticity scenarios, the exports gain for Bangladesh is around USD 2 million (Table 4.11). A relatively low trade gain is recorded for Bangladesh, resulting from tariff elimination for products on the offensive list (Table 4.12). Even with discriminatory market access, Bangladesh products may not be competitive in Sri Lanka. Assuming produc-

tion costs are lower due to the wage cost advantage of Bangladesh, this outcome is possible when Sri Lanka's current suppliers of products on the offensive list are more competitive than Bangladesh. For example, Sri Lanka's leading supplier of lead-acid accumulators (HS 850710), which would realise Bangladesh's highest trade gain from a tariff cut, is India. Around 61 per cent of the product is imported from India (out of USD 14 million total imports). Another 21 per cent imports are from Thailand and China. In the world exports, China, Thailand, and India are among the top 15 exporters of lead-acid accumulators.

Table 4.11

Change in Export Volume, Tax Revenue and Welfare from Eliminating Tariff on Sri Lanka's Offensive List by Bangladesh

Variable	Armington elasticities		
	1.5	3.0	4.5
Exports before (USD million)	51.332	51.332	51.332
Exports after (USD million)	69.866	78.294	86.688
Gain of exports for Sri Lanka (USD million)	18.534	26.962	35.356
Gain of exports for Sri Lanka (%)	36.106	52.525	68.877
Revenue effect for Bangladesh (USD million)	-9.283	-11.265	-13.238
Welfare change-Bangladesh (USD million)	2.231	2.216	2.201

Source: Authors' calculations based on SMART partial equilibrium estimates.

Table 4.12

Change in Export Volume, Tax Revenue and Welfare from Eliminating Tariff on Bangladesh's Offensive List by Sri Lanka

Variable	Armington elasticities		
	1.5	3.0	4.5
Exports before (USD million)	2.425	2.425	2.425
Exports after (USD million)	3.593	4.254	4.904
Gain of exports for Bangladesh (USD million)	1.168	1.829	2.479
Gain of exports for Bangladesh (%)	48.165	75.423	102.227
Revenue effect for Sri Lanka (USD million)	-0.813	-0.992	-1.169
Welfare change-Sri Lanka (USD million)	0.123	0.121	0.119

Source: Authors' calculations based on SMART partial equilibrium estimates.

Table 4.13
Change in Exports (Bangladesh Removes Tariff on the Offensive List for Sri Lanka) (Top 10 Products)

HS code	Product	Tariff before (%)	Exports before (USD million)	Exports after (USD million)	Change of exports (USD million)	Change (%)	End-Use category
	Full Offensive list		51.332	69.866	18.534	36.11	
600622	Dyed cotton fabrics	25	8.546	13.890	5.345	62.53	Intermediate
621710	Made-up clothing accessories	25	10.303	15.306	5.003	48.56	Consumption
520939	Woven fabrics of cotton	5	16.382	19.658	3.276	20.00	Intermediate
481910	Cartons, boxes and cases	25	0.491	1.804	1.313	267.41	Intermediate
520942	Denim	25	1.113	1.715	0.603	54.09	Intermediate
401150	New pneumatic tyres	25	0.792	1.158	0.366	46.21	Intermediate
350790	Enzymes and prepared enzymes	4.5	3.629	3.950	0.321	8.85	Intermediate
580620	Narrow woven fabrics of textile materials	25	0.457	0.765	0.308	67.40	Intermediate
380991	Finishing agents, dye carriers	4.5	2.628	2.915	0.287	10.92	Intermediate
392620	Articles of apparel and clothing accessories	2.5	1.261	1.435	0.174	13.80	Consumption
	Rest of the Products		5.731	7.270	1.539	26.85	

Notes: The results are from the scenario in which Armington elasticity is 1.5.

Source: Authors' calculations based on SMART partial equilibrium estimates.

Table 4.14

Change in Exports (Sri Lanka Removes Tariff on the Offensive List for Bangladesh)-Top 10 Products

HS code	Product	Tariff before (%)	Exports before (USD million)	Exports after (USD million)	Change of exports (USD million)	Change (%)	End-Use category
	Full Offensive list		2.425	3.593	1.168	48.16	
850710	Lead-acid accumulators	30	1.695	2.586	0.892	52.57	Intermediate
400121	Smoked sheets of natural rubber	15	0.347	0.464	0.117	33.72	Intermediate
560749	Twine, cordage, ropes and cables	18	0.141	0.209	0.068	48.23	Intermediate
392321	Sacks and bags	20	0.165	0.233	0.068	41.21	Intermediate
560790	Twine, cordage, ropes and cables	20	0.019	0.027	0.008	42.11	Intermediate
482190	Paper or paperboard labels	30	0.011	0.017	0.006	54.55	Intermediate
650500	Hats and other headgear	5	0.032	0.036	0.004	12.50	Consumption
401150	New pneumatic tyres, of rubber	30	0.006	0.010	0.004	66.67	Intermediate
960711	Slide fasteners	5	0.008	0.008	0.001	0.00	Intermediate
481910	Cartons, boxes and cases	30	0.0001	0.0003	0.0001	200.00	Intermediate
	Rest of the Products		0.001	0.001	0.0002	0.000	

Notes: The results are from the scenario in which Armington elasticity is 1.5.

Source: Authors' calculations based on SMART partial equilibrium estimates.

The top 10 products on the offensive list with the highest exports gain for Sri Lanka are predominantly textiles-related intermediate products. Notably, consumption goods consist of clothing accessories (HS 621710) and articles of apparel and clothing accessories (HS 392620). Given that the apparel industry is a significant industry that absorbs Bangladesh's labour force, Bangladesh would act defensively over tariff cuts

in trade negotiations. However, Sri Lanka's offensive list also indicates a potential for intra-industry trade, similar to the partial equilibrium results for the sensitive list. A comparison between the top 10 export gaining products on the sensitive and the offensive lists of Bangladesh shows similarities. Again, Sri Lanka will be defensive about eliminating tariffs on rubber products.

5. Conclusion

Sri Lanka and Bangladesh are signatories to regional and international trade treaties. Nevertheless, the two countries are negotiating a PTA, implying the importance of regionalism in trade integration. A valid question is what these two countries expect to gain from a bilateral trade integration agreement beyond the existing multilateral and regional trade integration agreements. A bilateral PTA with minimum regulatory barriers will open a window for increased trade between the two economies if it eliminates the existing weaknesses, including long sensitive lists and ROOs. The magnitude of the opportunity depends on competitiveness in each market and preference for each other's products. Thus, this study empirically estimates the effects of existing RTAs on exports and GVC components to draw lessons for the trade negotiations from existing policies. In addition, study findings can help create lists of products with offensive interests for Sri Lanka and Bangladesh. A partial equilibrium analysis complements this step to estimate the gains from tariff elimination for products on the offensive and sensitive lists.

The gravity results evidence that the current level of tariffs hurt gross exports and GVC components of exports. In the food sector, intermediates exports that will be processed and re-exported by the importing country (DVX) significantly and negatively correlate with the tariffs. A similar negative relationship exists between total intermediates (DVX) and border tariffs of the importing country. The negative correlation indicates the importance of lowering tariffs to increase cross-border exports and participation in GVCs.

The scant evidence for a positive effect of RTAs on agricultural exports and the overwhelmingly negative effect of RTAs on food sector exports and GVC participation are crucial findings of the study. The effect is weakly significant and negative on GVC components of total trade. These results suggest a possible offsetting effect of general regulatory measures attached to the RTAs, such as ROO, sensitive lists, and prolonged phasing-in effects. Lagged RTA variables provide evidence for the phasing-in effects of the RTAs. This study points to the need to restructure existing trade agreements to realise its full potential.

Learning lessons from the disappointing performance of the existing RTAs, Bangladesh and Sri Lanka can formulate a PTA to maximise bilateral trade. First, a bilateral trade agreement between the two countries should be devoid of the existing weaknesses like long sensitive lists, prolonged phasing-in, and complex ROO. However, partial equilibrium estimates show modest trade gains for Bangladesh and Sri Lanka in absolute terms if eliminating tariffs on the sensitive lists. Overall, Sri Lanka will gain USD 24.7 million worth exports to Bangladesh, while Bangladesh will gain USD 2.1 million worth exports to Sri Lanka.

Second, past evidence shows that the countries in the region provide tariff concessions to goods not produced with a comparative advantage. Trade arrangements of that nature obstruct capitalising on the comparative advantage, where Bangladesh and Sri Lanka need to negotiate for tariff concessions on products produced with a comparative advantage. The findings of this study enable creating a list for each country with products of offensive interest. The common characteristics are that these products are being exported with a comparative advantage, have the potential for expansion, and already face a tariff by the partner country. Sri Lanka has 115 products on its offensive list, and Bangladesh has 39 products. Among 115 products on Sri Lanka's offensive list, 75 are intermediate goods. Similar over-representation of intermediate goods appear on the offensive list of Bangladesh. Eliminating tariffs on the offensive lists will generate USD 18.53 million in Sri Lanka to Bangladesh exports. However, the export gains for Bangladesh are not substantial.

The composition of the offensive and sensitive lists reveals that intermediate goods are subject to tariffs under the existing trade policy. Generally, policymakers pay more attention to protecting the producers while buyers' expectations are neglected. However, Bangladesh and Sri Lanka need to negotiate tariffs concessions for intermediate goods to increase value chain participation between the two countries. Moreover, it will allow both countries to capitalise on the comparative advantage. When raw materials are sourced from cheap sources-sources that export with a comparative advantage- the expensive domestic substitution can

be avoided and the cost competitiveness of production goes up. Thus, eliminating tariffs on the intermediate textile products on Sri Lanka's offensive lists will benefit both countries.

The policy recommendations arising from this study are summarised below. The existing tariffs depress the bilateral trade and GVC participation of the South Asian countries and their trade partners. In addition, the RTAs of the South Asian countries do not show a significant positive effect on gross exports and the GVC components. When allowed for adjustment of trade costs over time, a weakly significant positive effect of RTAs is evident on intermediate exports of agriculture which are further processed and involved in GVCs. However, the RTA effect is strongly negative and significant in the food sector. On the whole, evidence from this study shows that the existing trade policy in the region-border tariffs and RTAs- depresses gross exports and the GVC components. The explanation for the trade depressing effect of RTAs is that the negative effects of general regulatory measures such that ROO, prolonged phasing-in, and strategic sensitive lists offset the positive trade creation effect of lowering trade costs by the RTAs. Thus, in future regional trade negotiations, governments need to focus on general regulatory measures attached to trade agreements. Our findings may be useful for the ongoing Bangladesh and Sri Lanka trade negotiations.

There are two potential methods to maximise trade gains in Bangladesh and Sri Lanka trade negotiations. The first is to remove sensitive lists under the SAFTA. If total elimination is not possible, the second approach is to target the most competitive products for tariff cuts. Such lists-namely offensive lists- are produced for both countries in this study. As gravity estimates point out, border tariffs and trade agreements of the nature of current practice negatively affect intermediate good trade. Partial equilibrium analyses in this study show the trade and welfare effect tariff elimination. Modest gains are reported in absolute terms for Sri Lanka, whereas gains are insignificant for Bangladesh. However, in relative terms, gains are substantial. All in all, even in the most optimistic scenario (total elimination of sensitive lists), expensive trade negotiations for just modest gains cannot be economically rationalised. The rationality of a PTA is further reduced given that Bangladesh will enter the negotiations as an LDC expecting S & D treatment, and Sri Lanka may act defensively on

requests regarding concessions on rubber products. The outcome will be prolonged phasing-in, sensitive lists, partial coverage, and complex ROOs resulting in a trade agreement with existing weaknesses.

A PTA that will generate modest gains can be justified based on a value chain participation perspective. Bangladesh and Sri Lanka can opt for selective negotiations for removing tariffs on intermediate goods. Dyed cotton and fabrics (HS 600622), cartons, boxes, and cases (HS 481910), plain woven fabrics of cotton (HS 520931), denim (HS 520942), natural rubber (HS 400129) and smoked sheets of natural rubber (HS 400121) are such products. The rationale for this approach is that the comparative advantage of both countries lie in the finished products that embed these intermediate products. In addition, as a growing economy, Bangladesh provides a market for Sri Lanka's value chain integration through forward and backward GVC linkages. Finally, if the political commitment for a PTA overtakes the economic rationale, a PTA can be recommended with minimum general regulatory measures, rapid phasing-in, and substantially covering products in the offensive lists.

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Appendix A

Equation A.1

Export Similarity Index

$$ESI_{ij,k} = \left\{ \sum_s \min \left(\frac{X_{ik}^s}{X_{ik}}, \frac{X_{jk}^s}{X_{jk}} \right) \right\} \times 100 \quad (A.1)$$

Where:

- i and j = Two different reporter countries
- k = Common Market (Export destination)
- $ESI_{ij,k}$ = Export Similarity Index of countries i and j with the common market k
- s = Sector with a similar group of commodities
- X_{ik}^s = Country i 's export value of sector s to the common market k
- X_{ik} = Country i 's total exports to the common market k
- X_{jk}^s = Country j 's export value of sector s to the common market k
- X_{jk} = Country j 's total exports to the common market k

Equation A.2

Trade Complementarity Index

$$TCI_{sd} = \left[1 - \left(\sum_i \left| \frac{\sum_w m_{iwd}}{\sum_w M_{wd}} - \frac{\sum_w x_{isw}}{\sum_w X_{sw}} \right| \right) \div 2 \right] \times 100 \quad (A.2)$$

Where:

- d = Importing country of interest
- s = Exporting country of interest
- i = Set of industries
- w = Set of all the countries in the world
- x_{isw} = Commodity export flow of country s to w
- X_{sw} = Total export flow of country s to w
- m_{iwd} = Commodity import flow of country d from w
- M_{wd} = Total import flow of country d from w
- TCI_{sd} = Trade Complementarity Index between s and d

Equation A.3

Export Intensity Index

$$XII_{ij} = \frac{\left(\frac{X_{ij}}{X_{iw}} \right)}{\left(\frac{M_{wj}}{M_w - M_i} \right)} \quad (A.3)$$

Where:

- i = Reporter country
- j = Partner country
- X_{ij} = Country i 's exports to country j
- X_{iw} = Country i 's exports to the world
- M_{wj} = Country j 's imports from the world
- $M_w - M_i$ = World imports minus country i 's total imports
- XII_{ij} = Export Intensity Index of country i in exports to country j

Equation A.4

Import Intensity Index

$$MII_{ij} = \frac{(M_{ij}/M_{iw})}{(X_{wj}/(X_w - X_i))} \quad (A.4)$$

Where:

- i = Reporter country
- j = Partner country
- M_{ij} = Country i 's imports from country j
- M_{iw} = Country i 's imports from the world
- X_{wj} = Country j 's exports to the world
- $X_w - X_i$ = World exports minus country i 's total exports
- MI_{ij} = Import Intensity Index of country i in imports from country j

Equation A.5

Ex-post Revealed Comparative Advantage

$$SRCA_i^k = \frac{x_{i,w}^k/x_{i,w}}{x_{w,w}^k/x_{w,w}} \quad (A.5)$$

Where:

- i = Reporter country
- k = Product
- $x_{i,w}^k$ = Value of exports of product k from country i to the world
- $x_{i,w}$ = Value of country i 's total exports to the world
- $x_{w,w}^k$ = Value of total exports of the world for the product k
- $x_{w,w}$ = Value of total world exports

Table A.1

Sensitive List of SAFTA

Member states	Number of products in the revised sensitive lists (in HS 2012 version)
Afghanistan	850
Bangladesh	987 (LDCs) and 993 (NLDCs)
Bhutan	156
India	25 (LDCs) and 614 (NLDCs)
Maldives	154
Nepal	998 (LDCs) and 1036 (NLDCs)
Pakistan	936
Sri Lanka	925 (LDCs) and 1058 (NLDCs)

Source: Authors' tabulations based on Department of Commerce (SAFTA) data.

Table A.2
Sensitive List Coverage of Sri Lanka and Bangladesh

	Sri Lanka sensitive list for LDCs		Bangladesh sensitive list for NLDCs	
	Number/ value	% of total	Number/ value	% of total
Products (HS6 Code)	925		993	
Export value (total) (USD million)	4362.782	31.55%	17122.27	36.90%
Export value (bilateral total exports) (USD million)	6.182	23.79%	77.592	62.04%
Intermediate products (HS6 Code)	414	44.76%	559	56.29%

Source: Authors' calculations based on Trade Map data.

Table A.3
Sensitive List by End-Use Categories

End-Use category	No. products	No. products in sensitive list	% of Products in sensitive list
<i>Sri Lanka</i>			
Capital	6	1	1.89%
Intermediate	75	29	54.72%
Consumption	34	23	43.40%
Total	115	53	100.00%
<i>Bangladesh</i>			
Capital	0	0	0.00%
Intermediate	21	14	56.00%
Consumption	18	11	44.00%
Total	39	25	100.00%

Source: Authors' calculations based on Department of Chamber (SAFTA) data.

Table A.4

Total and Sectoral Export Coverage of South Asian Countries to the Partner (61) Countries

Year	South Asian country as exporter	Agriculture % coverage of the dataset	Food % coverage of the dataset	Textile % coverage of the dataset	Total % coverage of our dataset
2018	India	74.81	53.65	72.15	54.86
2018	Bangladesh	100.00	24.47	64.88	60.75
2018	Bhutan	87.13	49.75	70.02	64.33
2018	Maldives	80.59	62.97	30.98	53.63
2018	Nepal	84.50	71.30	85.88	77.51
2018	Pakistan	96.28	76.44	72.17	75.77
2018	Sri Lanka	73.49	63.53	84.91	74.99

Source: Authors' calculations based on ADB data (2018).

Table A.5

Descriptive Statistics of the Variables

Variable	N	Mean	Standard deviation	Minimum	Maximum
Agriculture (dirDVA) (USD million)	10,556	15.85	83.82	0.00	2195.93
Agriculture (DVX) (USD million)	10,556	2.89	17.12	0.00	490.34
Agriculture (FVA) (USD million)	10,556	1.24	7.06	0.00	331.86
Food (dirDVA) (USD million)	10,556	20.26	173.08	0.00	7970.79
Food (DVX) (USD million)	10,556	2.06	15.26	0.00	7970.79
Food (FVA) (USD million)	10,556	3.01	20.65	0.00	868.07
Textiles (dirDVA) (USD million)	10,556	44.54	268.24	0.00	7482.10
Textiles (DVX) (USD million)	10,556	7.87	40.71	0.00	1300.10
Textiles (FVA) (USD million)	10,556	8.70	52.93	0.00	1635.06
Total (dirDVA) (USD million)	9,744	379.20	1818.67	0.00	52049.80
Total (DVX) (USD million)	9,744	81.00	416.33	0.00	10350.20
Total (FVA) (USD million)	9,744	111.26	474.46	0.00	9854.38
Agriculture tariff rate	8,722	0.08	0.15	0.00	3.96
Food tariff rate	9,196	0.17	0.24	0.00	1.50
Textiles tariff rate	9,355	0.10	0.10	0.00	1.42
Total tariffs rate	9,264	0.08	0.09	0.00	1.50

Source: Authors' calculations based on ADB data and WITS Database.

Table A.6
Offensive List for Sri Lanka

HS code	Product description	End-Use category
30279	Fresh or chilled, Nile perch and snakeheads	consumption
30559	Dried fish, even salted but not smoked	consumption
30617	Frozen shrimps and prawns, even smoked	consumption
80290	Nuts, fresh or dried, whether or not shelled or peeled	consumption
81090	Fresh tamarinds, cashew apples, jackfruit etc.	consumption
81340	Dried peaches, pears, papaws “papayas”, tamarinds and other edible fruits	consumption
90240	Black fermented tea and partly fermented tea	consumption
90411	Pepper of the genus Piper, neither crushed nor ground	consumption
90611	Cinnamon (excluding crushed and ground)	consumption
90710	Cloves, whole fruit, cloves and stems, neither crushed nor ground	consumption
100620	Husked or brown rice	intermediate
121190	Plants, parts of plants, incl. seeds and fruits	consumption
140490	Vegetable products n.e.s	intermediate
151311	Crude coconut oil	intermediate
151319	Coconut oil and its fractions	intermediate
210690	Food preparations, n.e.s.	consumption
230990	Preparations of a kind used in animal feeding	intermediate
240120	Tobacco, partly or wholly stemmed or stripped	intermediate
282490	Lead oxides (excluding monoxide “litharge, massicot”)	intermediate
350790	Enzymes and prepared enzymes, n.e.s.	intermediate
380210	Activated carbon	intermediate
380991	Finishing agents, dye carriers	intermediate
392321	Sacks and bags, incl. cones, of polymers of ethylene	intermediate
392620	Articles of apparel and clothing accessories	consumption
400110	Natural rubber latex, whether or not prevulcanised	intermediate
400121	Smoked sheets of natural rubber	intermediate
400599	Compounded, unvulcanised rubber in primary forms	intermediate
400821	Plates, sheets and strip, of non-cellular rubber	intermediate
401120	New pneumatic tyres, of rubber	intermediate
401150	New pneumatic tyres, of rubber, of a kind used for bicycles	intermediate
401199	Pneumatic tyres, new, of rubber	intermediate
401290	Solid or cushion tyres	intermediate
401320	Inner tubes, of rubber, of a kind used for bicycles	intermediate
401691	Floor coverings and mats, of vulcanised rubber	consumption
401699	Articles of vulcanised rubber (excluding hard rubber), n.e.s.	intermediate
420310	Articles of apparel, of leather or composition leather	consumption
441112	Medium density fibreboard “MDF” of wood	intermediate
441114	Medium density fibreboard “MDF” of wood	intermediate
481910	Cartons, boxes and cases, of corrugated paper or paperboard	intermediate
481920	Folding cartons, boxes and cases	intermediate
482110	Paper or paperboard labels of all kinds, printed	intermediate
482190	Paper or paperboard labels of all kinds, non-printed	intermediate

490700	Unused postage, revenue or similar stamps	intermediate
490810	Transfers "decalcomanias", vitrifiable	intermediate
491199	Printed matter, n.e.s.	intermediate
520523	Single cotton yarn, of combed fibres	intermediate
520829	Woven fabrics of cotton	intermediate
520839	Woven fabrics of cotton	intermediate
520929	Woven fabrics of cotton	intermediate
520932	Woven fabrics of cotton	intermediate
520939	Woven fabrics of cotton	intermediate
520942	Denim	intermediate
540120	Sewing thread of artificial filaments	intermediate
540231	Textured filament yarn of nylon or other polyamides	intermediate
540245	Filament yarn of nylon or other polyamides	intermediate
540720	Woven fabrics of strip or the like, of synthetic filament	intermediate
550810	Sewing thread of synthetic staple fibres	intermediate
551011	Single yarn	intermediate
551012	Multiple "folded" or cabled yarn	intermediate
551211	Woven fabrics containing	intermediate
551311	Plain woven fabrics containing	intermediate
560410	Textile-covered rubber thread and cord	intermediate
560790	Twine, cordage, ropes and cables	intermediate
580421	Mechanically made lace of man-made fibres in the piece	intermediate
580429	Mechanically made lace in the piece	intermediate
580620	Narrow woven fabrics of textile materials	intermediate
580710	Labels, badges and similar articles	intermediate
580790	Labels, badges and similar articles	intermediate
580890	Ornamental trimmings of textile materials	intermediate
590390	Textile fabrics impregnated, coated	intermediate
591000	Transmission or conveyor belts or belting, of textile material, whether or not impregnated, ...	intermediate
600490	Knitted or crocheted fabrics, of a width of > 30 cm, containing >= 5% by weight elastomeric ...	intermediate
600622	Dyed cotton fabrics, knitted or crocheted, of a width of > 30 cm (excluding warp knit fabrics ...	intermediate
600644	Printed fabrics, knitted or crocheted, of artificial fibres, of a width of > 30 cm (excluding ...	intermediate
600690	Fabrics, knitted or crocheted, of a width of > 30 cm (excluding of man-made fibres, cotton, ...	intermediate
610910	T-shirts, singlets and other vests of cotton, knitted or crocheted	consumption
610990	T-shirts, singlets and other vests of textile materials, knitted or crocheted (excluding cotton)	consumption
611090	Jerseys, pullovers, cardigans, waistcoats and similar articles, of textile materials, knitted ...	consumption
611692	Gloves, mittens and mitts, of cotton, knitted or crocheted (excluding impregnated, coated or ...	consumption
611780	Ties, bow ties, cravats and other made-up clothing accessories, knitted or crocheted, n.e.s. ...	consumption

611790	Parts of garments or clothing accessories, knitted or crocheted, n.e.s.	consumption
620342	Men's or boys' trousers, bib and brace overalls	consumption
620349	Men's or boys' trousers, bib and brace overalls	consumption
620462	Women's or girls' trousers, bib and brace overalls	consumption
621290	Corsets, braces, garters, suspenders	consumption
621710	Made-up clothing accessories	consumption
621790	Parts of garments or clothing accessories	consumption
630533	Sacks and bags, for the packing of goods	intermediate
630590	Sacks and bags, for the packing of goods	intermediate
640590	Footwear with outer soles of rubber or plastics	consumption
640610	Uppers and parts thereof	consumption
691110	Tableware and kitchenware	consumption
701090	Carboys, bottles, flasks, jars, pots, phials and other containers	intermediate
701990	Glass fibres, incl. glass wool	intermediate
710239	Diamonds, worked, but not mounted or set	intermediate
711719	Imitation jewellery, of base metal	consumption
730290	Sleepers "cross-ties", check-rails, rack rails	intermediate
761410	Stranded wire, cables, plaited bands	intermediate
780110	Unwrought lead, refined	intermediate
830810	Hooks, eyes and eyelets, of base metal	intermediate
830890	Clasps, frames with clasps without locks	intermediate
841850	Furniture "chests, cabinets, display counters	capital
850421	Liquid dielectric transformers	capital
850431	Transformers having a power handling capacity ≤ 1 kVA	capital
853225	Fixed electrical capacitors, dielectric of paper or plastics	capital
853720	Boards, cabinets and similar combinations of apparatus	intermediate
853810	Boards, panels, consoles, desks, cabinets and other bases	intermediate
853890	Parts suitable for use solely or principally with the apparatus	intermediate
854430	Ignition wiring sets and other wiring sets for vehicles, aircraft or ships	intermediate
860900	Containers, incl. containers for the transport of fluids	capital
871200	Bicycles and other cycles, incl. delivery tricycles, not motorised	consumption
890190	Vessels for the transport of goods	capital
940350	Wooden furniture for bedrooms (excluding seats)	consumption
940429	Mattresses, fitted with springs or stuffed	consumption
950300	Tricycles, scooters, pedal cars and similar wheeled toys	intermediate

Table A.7
Offensive List for Bangladesh

HS code	Product description	End-Use category
30329	Frozen, Nile perch and snakeheads	consumption
30369	Frozen fish	consumption
30389	Frozen fish, n.e.s.	consumption
50690	Bones and horn-cores	intermediate
51191	Products of fish or crustaceans, molluscs	intermediate
70190	Fresh or chilled potatoes (excluding seed)	consumption
80290	Nuts, fresh or dried, whether or not shelled	consumption
91030	Turmeric “curcuma”	consumption
91099	Spices	consumption
140490	Vegetable products n.e.s	intermediate
190190	Malt extract; food preparations	intermediate
190410	Prepared foods obtained by swelling or roasting cereals	consumption
200819	Nuts and other seeds, incl. mixtures	consumption
200989	Juice of fruit or vegetables, unfermented	consumption
240110	Tobacco, unstemmed or unstripped	intermediate
240120	Tobacco, partly or wholly stemmed or stripped	intermediate
392321	Sacks and bags, incl. cones, of polymers of ethylene	intermediate
400121	Smoked sheets of natural rubber	intermediate
401150	New pneumatic tyres, of rubber	intermediate
401320	Inner tubes, of rubber, of a kind used for bicycles	intermediate
401590	Articles of apparel and clothing accessories	consumption
410449	Hides and skins of bovine	intermediate
410799	Leather “incl. parchment-dressed leather”	intermediate
411310	Leather further prepared after tanning or crusting	intermediate
420219	Trunks, suitcases, vanity cases etc.	consumption
420229	Handbags, whether or not with shoulder strap	consumption
420330	Belts and bandoliers, of leather or composition leather	consumption
481910	Cartons, boxes and cases, of corrugated paper or paperboard	intermediate
482190	Paper or paperboard labels of all kinds, non-printed	intermediate
560749	Twine, cordage, ropes and cables	intermediate
560790	Twine, cordage, ropes and cables	intermediate
640620	Outer soles and heels, of rubber or plastics	consumption
650500	Hats and other headgear, knitted or crocheted	consumption
691110	Tableware and kitchenware, of porcelain or china	consumption
721041	Flat-rolled products of iron or non-alloy steel	intermediate
850710	Lead-acid accumulators	intermediate
871200	Bicycles and other cycles	consumption
960711	Slide fasteners fitted with chain scoops of base metal	intermediate
960719	Slide fasteners (excluding 960711)	intermediate

Appendix B

B.1. Multilateral Resistance Term and Trade Cost Variables

The exports from country i to country j can be given from the following structural gravity equation:

$$x_{ijt} = \frac{y_{it}}{\Pi_{it}^{-\theta}} \frac{y_{jt}}{P_{jt}^{-\theta}} \tau_{ijt}^{-\theta} \quad (1)$$

In equation (1) x_{ijt} is exports from country i to country j in year t , $y_{it} = \sum_j x_{ijt}$ and $y_{jt} = \sum_i x_{ijt}$ are the market sizes of the two countries in a given year t , τ_{ijt} is bilateral trade cost factor between i and j , $\theta > 0$ is the trade elasticity, and Π_{it} and P_{jt} are the outward and inward multilateral resistance terms. As in (Anderson & Van Wincoop, 2003) higher multilateral resistance of importer j raises its trade with i and higher multilateral resistance of the exporter i also raises trade. The inward multilateral resistance term is a measure of the importer's ability to import from more capable exporters. Similarly, exporters' ability to export goods to more desirable import destination is captured by the outward multilateral resistance term. The multilateral resistances can be written as in (2) and (3) for a world with N countries.

$$\Pi_{it}^{-\theta} = \sum_{j=1}^N \frac{y_{jt}}{P_{jt}^{-\theta}} \tau_{ijt}^{-\theta} \quad (2)$$

$$P_{jt}^{-\theta} = \sum_{i=1}^N \frac{y_{it}}{\Pi_{it}^{-\theta}} \tau_{ijt}^{-\theta} \quad (3)$$

As we estimate the trade costs exponentially, trade costs can be written τ_{ijt} as in equation (4).

$$\tau_{ijt}^{-\theta} = e^{X'_{ijt}\beta + \phi_{ij}} \omega_{ijt} \quad (4)$$

Here, X_{ijt} is a vector of trade cost components and ω_{ijt} is the unobserved trade cost term. Combining (4) with (1) we get the estimation equation.

$$x_{ijt} = \exp(\alpha_{it} + \lambda_{jt} + \phi_{ij} + x'_{ijt}\beta) \omega_{ijt} \quad (5)$$

Here, $\alpha_{it} = \ln y_{it} / \Pi_{it}^{-\theta}$ and $\lambda_{jt} = \ln y_{jt} / P_{jt}^{-\theta}$ are respectively the origin-year and destination-year fixed effects. Additionally, ϕ_{ij} are the country-pair fixed effects.

We used three-way fixed effects to estimate the gravity models mainly to capture multilateral resistance terms (Anderson, 1979; Anderson & Van Wincoop, 2003) and to account for the endogeneity of trade policy (Baier & Bergstrand, 2007; Balié et al., 2019; Head & Mayer, 2014; Yotov et al., 2016). The fixed effects capture most of the time-varying and time-invariant exporter and importer specific factors. These factors include traditional gravity covariates like the size of country, bilateral distance and a set of dummy variables such as common languages, common colonies, and common borders. However, we can still estimate the effects of trade policy variables as these are time varying.

In addition to the absorption of all time-invariant bilateral trade cost determinants-both observable and unobservable-, the country-pair fixed effects account for possible "reverse causality" bias between trade flows and trade policy- rta_{ijt} and $tariff_{ijt}$ - (Yotov et al., 2016). A country may most likely liberalise trade with a partner country already a significant trade partner. The country-pair fixed effects in our models will account for the unobservable linkages between the endogenous trade policy variables and the error term, making us more confident in treating it as the true measurement error (Piermartini & Yotov, 2016; Yotov et al., 2016).

Appendix C: Wang, Wei, Zhu (WWZ) decomposition

Wang et al. (2013) which is updated by the authors in 2018 decomposes gross trade at the sector, bilateral, or bilateral-sector level into the sum of various value-added and double-counted components. As explained by Wang et al. (2013) gross exports from a particular country sector can be decomposed into the sum of value-added components from the domestic sector, other sectors from the exporting country, sectors from all other countries, and double-counted components. Using multi-regional input-output data tables Wang et al. (2013) decompose gross exports into three major components. The first component is the domestic value-added (DVA_G): the value-added exported in final goods or intermediates produced at home, which are either absorbed by the direct importer or embedded in re-exports to a third country. The second component is the foreign value added (FVA): foreign value added in

final exports and intermediate exports. The third component is pure double counting (PDC): the component accounts for the intermediate goods that cross borders multiple times. Double count value-added sources are either domestic or foreign. Wang et al. (2013) decompose the three major components into 16 value-added terms as given in Table C.1. For more technical details readers may refer to Wang et al. (2013).

Table C.1. Definition of the Sixteen Value-Added Terms

Number	Label	Description
T1	DVA_FIN	Domestic Value Added in final goods exports
T2	DVA_INT	Domestic Value Added in intermediate exports used by direct importer to produce its domestic final goods and consumed there
T3	DVA_INTrex1	Domestic Value Added in intermediate exports used by the direct importer to produce intermediate exports for production of domestic used final goods in third countries
T4	DVA_INTrex2	Domestic Value Added in intermediate exports used by the direct importer to produce final goods exports to third countries
T5	DVA_INTrex3	Domestic Value Added in Intermediate exports used by the direct importer to produce intermediate exports to third countries
T6	RDV_FIN1	Returned Domestic Value Added in final goods imports -from the direct importer
T7	RDV_FIN2	Returned Domestic Value Added in final goods imports -via third countries
T8	RDV_INT	Returned Domestic Value Added in intermediate imports used produce final goods consumed at home
T9	DDC_FIN	Double counted Domestic Value Added used to produce final goods exports
T10	DDC_INT	Double counted Domestic Value Added used to produce intermediate exports
T11	MVA_FIN	Direct importer's Value Added in exporting country's final goods exports
T12	MVA_INT	Direct importer's Value Added in exporting country's intermediate goods exports
T13	MDC	Direct importer's Value Added double counted in home country's exports production
T14	OVA_FIN	Third countries' Value Added in exporting country's final goods exports
T15	OVA_INT	Third countries' Value Added in exporting country's intermediate goods exports
T16	ODC	Third countries' Value Added double counted in home country's exports production

Source: Wang et al. (2017)

The dependent variables are calculated using the components given in Table C.1 as below. Direct Domestic Value Addition (dirDVA) which measures domestic value-added intermediate and final goods exports absorbed and consumed by the direct importers is the sum of T1 and T2. Indirect Domestic Value Added (DVX)-the measure for domestic value in intermediate goods further re-exported by the partner country- is calculated by summing T3 to T8. Foreign Value Added

(FVA) which captures the extent of involvement in GVC for relatively downstream industries/backward GVC participation is calculated by summing T11 to T15.

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