India's PTAs and their Economic Impacts: Quantitative Assessments using a Partial Equilibrium Modeling Framework

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I. Introduction

Proliferation of bilateral and regional trading arrangements has been a salient feature of global trade since the beginning of the 1990s. India is no exception to this trend. India's impressive economic growth and fast-rising trade volumes have attracted many countries to negotiate bilateral and regional trading block with it. Average tariffs in India are considerably higher than that of the Western developed countries and are also higher than many developing economies. High tariffs and one of fastest growing urban middle class make India an ideal export destination for any country in the world. From India's perspectives, bilateral and regional trading initiatives can also be beneficial if it can ensure market opening for its own exports, which often not possible through the multilateral trade negotiations. Large domestic market can also attract huge foreign investment in India with various spillover effects. Bilateral trade liberalization can help procure capital machinery and other raw materials at lower cost thereby contributing to Indian firms' competitiveness. Furthermore, India is a major economic power in South Asia and highly values the bilateral relationship with its neighbours. In this respect, it has political commitment to promote economic growth through extended regional cooperation of which regional trading arrangement is an important component.

However, there is no guarantee that regional or bilateral trading arrangements will be beneficial to all the countries involved. In fact, the relevant international trade literature strongly suggests that the outcomes of regional arrangements can be ambiguous; some countries can gain while others may face adverse consequences. It may also happen that a member manages to expand its exports after the formation of regional/bilateral trading bloc, but loses out in terms of overall welfare effects and vice versa. Overall positive welfare effects can also be accompanied by large revenue losses, which are likely to have important implications for most developing countries. Another important issue is that, while under the unilateral (i.e. multilateral) liberalization schemes, a country gains (in terms of overall welfare effects) unambiguously, under the regional trading initiative this is not the case. Under regional/bilateral trading schemes, individual member countries' overall welfare consequences are determined by the nature and magnitude of preferences that it can secure from its partner countries. Given all this, assessing the implications of regional trading arrangements is quite a challenging task.

This technical paper examines the economic impacts of three Preferential Trading Arrangements (PTAs) involving India. These are India – Sri Lanka bilateral Free Trade Agreement (ISFTA), South Asian Free Trade Area (SAFTA) and India – Singapore Comprehensive Economic Cooperation Agreement (CECA).

The important feature of this paper is that it uses a partial equilibrium model to simulate for different scenarios under the three different PTAs mentioned above. This partial equilibrium model helps explore the impacts at a very disaggregate product level. Briefly, this paper investigates into the net trade, overall welfare and revenue effects of bilateral/regional liberalisation for India under various preferential trading scenarios.

The organization of the paper is as follows. After the brief introduction, Section II presents in details the methodology of the partial equilibrium modeling technique. Section II provides the simulation results for India – Sri Lanka bilateral FTA. Section IV presents the results of the simulation for SAFTA and finally Section V analyses the simulation results for India – Singapore bilateral FTA.

II. METHODOLOGY: SIMULATION EXERCISES THROUGH WITS/SMART PARTIAL EQUILIBRIUM MODEL

2.1. Rationale for a Partial Equilibrium Model

There is no denying that trade policy analysis is more robust when undertaken within a general equilibrium modeling framework. This can be seen as the first-best option as general equilibrium models, not only measure the first-round effects of simulated changes, but also the second-round effects which include inter-industry effects and macroeconomic adjustments. However, due to lack of data disaggregation in the GTAP modeling methodology, the partial equilibrium modeling framework lends itself as a second-best option.

The main distinction that should be noted at the outset is that as a partial equilibrium model, the inter-sectoral implications (second-round effects) of a trade policy change are not taken into account, as is the case in the general equilibrium model. Similarly, the inter-regional implications are also ignored in a partial equilibrium framework. The only point of convergence of the partial and general equilibrium models is that it is still possible within a partial equilibrium model to analyze the trade policy effects on trade creation and diversion, welfare and even on tariff revenues while holding everything else constant.

Milner et al. (2002) provides a simple analytical framework explaining the theory behind partial equilibrium modeling and notes that to adequately capture the interactions between sectors and elasticities of substitution between factors, a general equilibrium model would be desirable. However, due to scarcity of individual and regional CGE models for developing countries then partial equilibrium models would be alternative choices. Milner et al. (2002) also raise a valid observation that the database for general equilibrium models lacks the commodity detail to take account of the specific sensitive and special products. Despite its shortcomings, a partial equilibrium framework is more suitable as it allows the utilization of widely available trade data at the appropriate level of detail to capture the principle of special and differential treatment in the simulation analysis. It however remains true that although partial equilibrium models have drawbacks, as a modeling approach they have the advantage of working at very fine levels of details such as at tariff line level.

2.2. The WITS/SMART Model

For the purposes of this study, it is proposed that the WITS/SMART model will be the applied partial equilibrium framework. The World Integrated Trade Solution (WITS) brings together various databases ranging from bilateral trade, commodity trade flows and various levels and types of protection. WITS also integrate analytical tools that support simulation analysis. The SMART simulation model is one of the analytical tools in WITS for simulation purposes. SMART contains in-built analytical modules that support trade policy analysis such as effects of multilateral tariff cuts, preferential trade liberalization and ad hoc tariff changes. The underlying theory behind this analytical tool is the standard partial equilibrium framework that considers dynamic effects constant. Like any partial equilibrium model, it has these strong assumptions allowing the trade policy analysis to be undertaken a country at a time. In spite of this weakness, WITS/SMART can help estimate trade creation, diversion, welfare, revenue effects and effects on exports for those countries whose data is available. WITS database comes from various sources. The external trade statistics comprise of UN COMTRADE, UNCTAD TRAINS and the WTO Integrated Data Base (IDB). The tariffs data is derived from UNCTAD TRAINS, WTO IDB and WTO Consolidated Tariff Schedule Data Base (CTS). The non-tariff measures are compiled from UNCTAD TRAINS database.

The underlying analytics of the theory are clearly defined in Laird and Yeats (1986) and ECA (2000). The derivation begins with a basic trade model composed of simplified import demand and export supply functions and an equilibrating identity:

A simplified import demand function for country j from country k of commodity i:

$$M_{ijk} = f(Y_j, P_{ij}, P_{ik}) \quad (1)$$

The export supply function of commodity i of country k can be simplified as:

$$X_{ijk} = f(P_{ikj}) \quad (2)$$

The equilibrium in the trade between the countries is the standard partial equilibrium equation:

$$M_{ijk} = X_{ikj} \quad (3)$$

In a free trade environment, the domestic price of the commodity i in country j from country k would change with the change in an ad valorem tariff as follows:

$$P_{ijk} = P_{ikj}(1 + t_{ikj}) \quad (4)$$

In order to get the price equation, differentiating (4) we obtain:

$$dP_{ijk} = P_{ikj}dt_{ikj} + (1 + t_{ikj})dP_{ikj} \quad (5)$$

Equations (4) and (5) are substituted into the elasticity of import demand function:

$$\frac{\Delta M_{ijk}}{(M_{ijk})} = \alpha_i^m \frac{\Delta P_{ijk}}{(P_{ijk})} \quad (6)$$

Using this, one obtains the change in imports:

$$\frac{dM_{ijk}}{M_{ijk}} = \alpha_i^m \left(\frac{dt_{ijk}}{(1+t_{ijk})} + \frac{dP_{ijk}}{P_{ijk}} \right) \quad (7)$$

In the similar process one can obtain, with the elasticity of export supply function, the change in exports:

$$\frac{dX_{ijk}}{X_{ijk}} = \alpha_i^x \left(\frac{dP_{ikj}}{P_{ikj}}\right)$$

Using (7) one can calculate the trade creation effect:

$$TC_{ijk} = M_{ijk}\alpha_i^m \frac{dt_{ijk}}{(1+t_{ijk})(1-(\alpha_i^m / \gamma_i^m))} \quad (8)$$

Where TC_{ijk} is the sum of trade created in millions of dollars over *i* commodities affected by tariff change and α_i^m is the elasticity of import demand for commodity *I* in the importing country from the relevant trading partner. M_{ijk} is the current level of import demand of the given commodity *i*, while t_{ijk}^0 and t_{ijk}^1 represent tariff rates for commodity *i* at the initial and end periods respectively. According to the UNCTAD model, trade creation depends on the current level of imports, the import demand elasticity, and the relative tariff change and occurs when there is a shift from higher cost producer to lower cost producer as a result of elimination of tariffs on imports from the partner.

If γ approaches infinity, then equation 8 can be simplified as follows:

$$TC_{ijk} = \alpha_i^m M_{ijk} \frac{(1+t_{ijk}^1) - (1+t_{ijk}^0)}{(1+t_{ijk}^0)} \quad (9)$$

The elasticity of substitution is expressed as the percentage change in relative shares of imports from two different sources due to a 1 percent change in the relative prices of the same product from the two sources. Conceptually, the elasticity of substitution is a measurement of the ease with which various imports can be substituted for one another. Technically, it is measured as the slope of the import isoquant.

$$\sigma_M = \frac{\Delta(\sum(M_{ijk}/M_{ijK}) / \sum(M_{ijk}/M_{ijK})}{\Delta(P_{ijk}/P_{ijK})(P_{ijk}/P_{ijK})} \quad (10)$$

In this equation, k denotes imports from the RTA member countries and K denotes imports from the rest of the world.

Trade diversion occurs when an efficient producer from outside the free trade area is displaced by less efficient producers in the preferential area. Essentially, trade diversion depends on the current level of imports from RTA member countries and the ROW, the percentage change of tariffs facing imports from RTA member countries with those from ROW remaining unchanged, and the elasticity of substitution σ_M of the imports between the RTA member countries and ROW into the concerned country. In the SMART framework, the trade diverted to the RTA member countries can be expressed as:

$$TD = \frac{M^{RTA} M^{ROW} ((1 + t^1_{RTA} / 1 + t^0_{RTA}) - 1)\sigma_m}{M^{RTA} + M^{ROW} + M^{RTA} ((1 + t^1_{RTA} / 1 + t^0_{RTA}) - 1)\sigma_m} \quad (11)$$

The strength of trade diversion depends on whether one assumes that goods are perfectly substitutable or whether goods are imperfectly substituted and whether calculations are made at official rates or on actual collected rates.

The WITS/ SMART framework has a very precise and elegant methodology for calculating revenue effects. The tariff revenue is the product of the tariff rate and the tariff base (value of imports). Thus, before the change in the ad valorem incidence of trade barriers, the revenue is given as:

$$R_0 = \sum_i \sum_k t^0_{ijk}, P_{ijk}, M_{ijk} \quad (12)$$

After the change in tariff rate, the new revenue collection will be given by:

$$R_1 = \sum_i \sum_k t^1_{ijk}, P_{ijk}, M_{ijk} \quad (13)$$

The revenue loss as a result of the implementation of any RTA is the difference between R_0 and R_1.

The WITS/SMART model estimation of welfare effects is quite simple. This is unlike the equivalent variations measurement in general equilibrium models. Essentially, the welfare effect is mainly ascribed to the consumer benefits in the importing country as a result of lower import prices. This allows them to substitute more expensive domestic or imported products with the cheaper imports that are affected by the relevant tariff reduction. Increased imports leads to a net welfare gain that can be thought as the increase in consumer welfare and is measured as follows:

$$w_{ijk} = 0.5(\Delta t_{ijk} \Delta M_{ijk}) \quad (14)$$

The coefficient of 0.5 captures the average between the ad valorem incidence of the trade barriers before and after their elimination/reduction. Equation (14) assumes that the elasticity of export supply is infinite. If this is not the case, the import prices in the importing countries fall by less than the full reduction in trade barriers. Therefore, while the equation can be used to measure welfare effect, it is no longer a representation of consumer surplus alone but has some element of producer surplus (Laird and Yeats, 1986).

III. INDIA-SRI LANKA BI-LATERAL FTA

3.1. Overview of the Agreement

The Free Trade Agreement between India and Sri Lanka came into full existence from 1st March 2000. This FTA basically deals with the modalities of the Duty Free Import of the goods manufactured in Sri Lanka which exempts specified goods imported under Indo- Sri Lanka Free Trade Agreement from the Import Duty up to 100 percent. There was a clear business opportunity for manufacturers from India to set up unit in Sri Lanka so that the goods produced in Sri Lanka can be brought to India duty free availing the exemption provided in the Free Trade Agreement. Since there is no Excise Duty in Sri Lanka or Import Duty the goods produced there would be cheaper.

Under the agreement Zero duty on around 1,000 items has been provided by India with 50 per cent margin of preference on all items, except for those in the Negative List. Tariffs have been brought down to zero over a period of three years. Concessions on textile items have been restricted to 25 per cent. Four chapters under the textiles sector have been retained in the Negative List. India has retained less 429 items in its Negative List. These mainly include garments, petro-chemicals, alcoholic spirits and coconuts and coconut oil. Sri Lanka has 1180 items in its Negative List. Items in the Negative List do not enjoy tariff concessions.
Domestic value-addition requirements have been kept at 35 percent. If the raw-material/inputs are sourced from each other's country, this is reduced to 25 percent within the overall limit of 35 percent. The criterion of 'substantial transformation' has been provided in the Rules.

3.2. Simulation Design and Results

Using the proposed methodology two simulations have been carried out, viz:

- **Simulation 1.1: India-Sri Lanka BFTA: No negative list restriction**
- **Simulation 1.2: India- Sri Lanka BFTA: With negative list restriction**

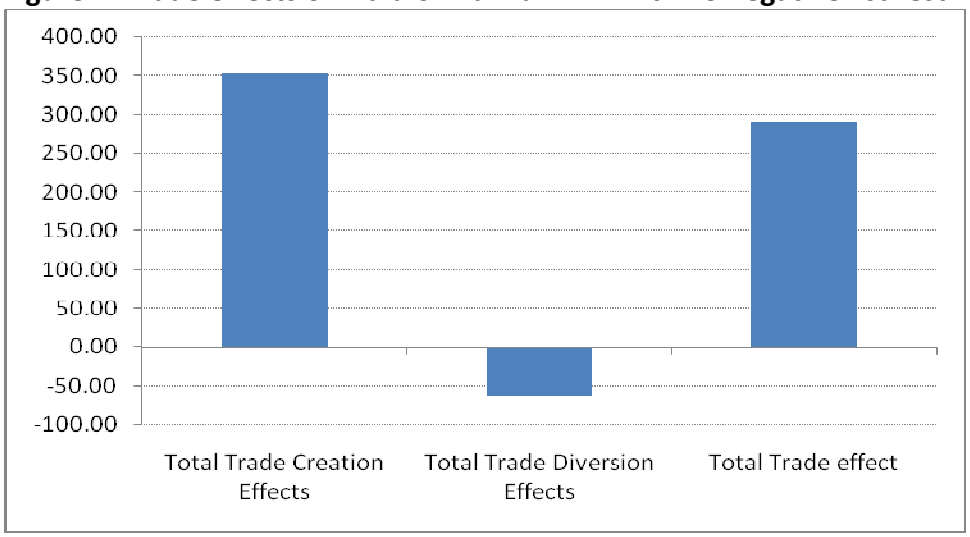
The results of the simulations are discussed in the following sections.

3.2.1. Simulation 1.1: India- Sri Lanka BFTA: No negative list restriction

Under this scenario, no negative list is considered. That is, all trade in goods between India and Sri Lanka is being liberalized. The main simulation results in terms of trade and welfare

consequences for India are presented in Annex Table 1. The trade creation effect is caused by increase in exports from Sri Lanka that replaces domestic production. Figure 1 shows that the estimated trade creation for India is $350 million. Trade diversion, on the other hand, is the cost due to displacement of trade from a low cost source to a higher cost source. That is, it occurs when Sri Lanka replaces imports from the rest of the world taking advantage of the bilateral tariff preferences granted by India. The trade diversion effect is estimated to be about $62 billion. As trade creation effect is much larger than that of trade diversion, there is a net large positive trade effect for India, amounting to $291 million.

Figure 1: Trade effects of India-Sri Lanka BFTA with no negative list restrictions



The bilateral tariff reduction schemes contribute to rising trade between the two countries. The import from Sri Lanka to India is increased by $414 million, which is estimated to be 115 percent rise from the base (i.e. from a situation of no bilateral FTA). On the other side, the export from India to Sri Lanka increases by $110.5 million, which is just 14 percent higher than the base case. One reason for relatively small increase in India's export to Sri Lanka could be due to initial low MFN tariffs maintained by Sri Lanka.

The welfare effect in this partial equilibrium model is driven by improved consumers' welfare resulting from lower prices of goods imported under the bilateral FTA. The results suggest a net welfare gain of about $67 million for India.

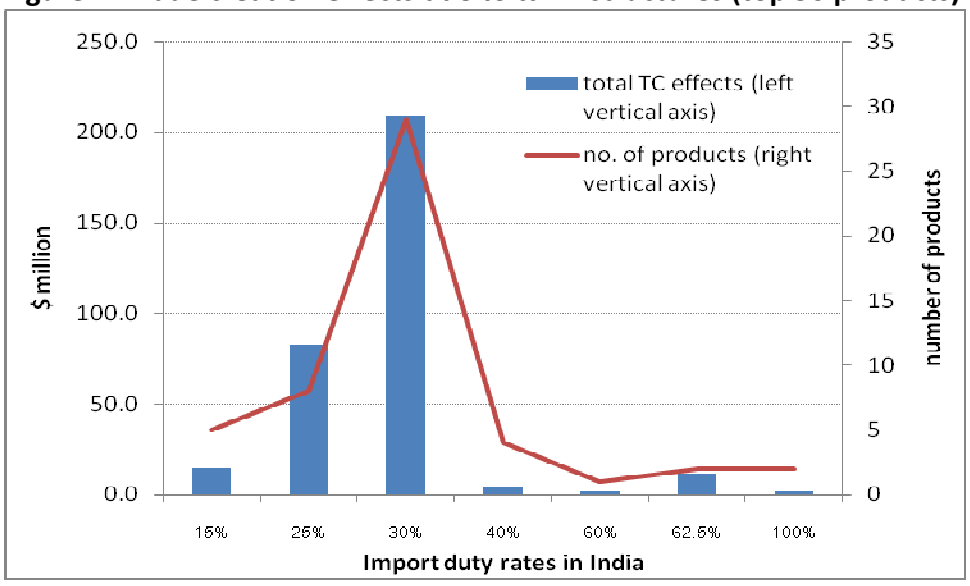
Another important consideration is the impact of bilateral liberalization on tariff revenues collected by India. The higher the additional import is sourced from Sri Lanka, the higher will be the amount of forgone tariff revenues. Given the import surge of more than $400 million taking place in the aftermath of bilateral FTA, a sizeable revenue loss (of $110 million) occurs.

Annex Table 2 lists the top 50 products with highest trade creation effects. At the six digit level of Harmonised system (HS) of trade classification, HS 741300 (copper and copper articles) turns out to be the product with the single largest trade creation effects. It alone contributes to $120

million of trade creation, which is about 37 per cent of total trade creation. Copper and related articles, certain nuclear reactor materials, articles of stone, plaster and cement, and animal and vegetable fats are the most important five products that together account for about two-thirds of the trade creation effects generated in India. The top 50 products (as provided in Annex Table 2) provide about 95 percent of total trade creation.

Trade creation in this model depends on the nature of the products involved, initial imports and tariff structures. Figure 2 shows the distribution of trade creation effects by Indian tariff structures. It shows that of the top 50 trade creating lines, there are about 30 products each facing an import duty rate of 30 percent. These product lines account for about 60 percent of trade creation. The next most important trade creation effects arise from the abolition of tariff rate of 25 percent involving 8 commodities.

Figure 2: Trade creation effects due to tariff structures (top 50 products)

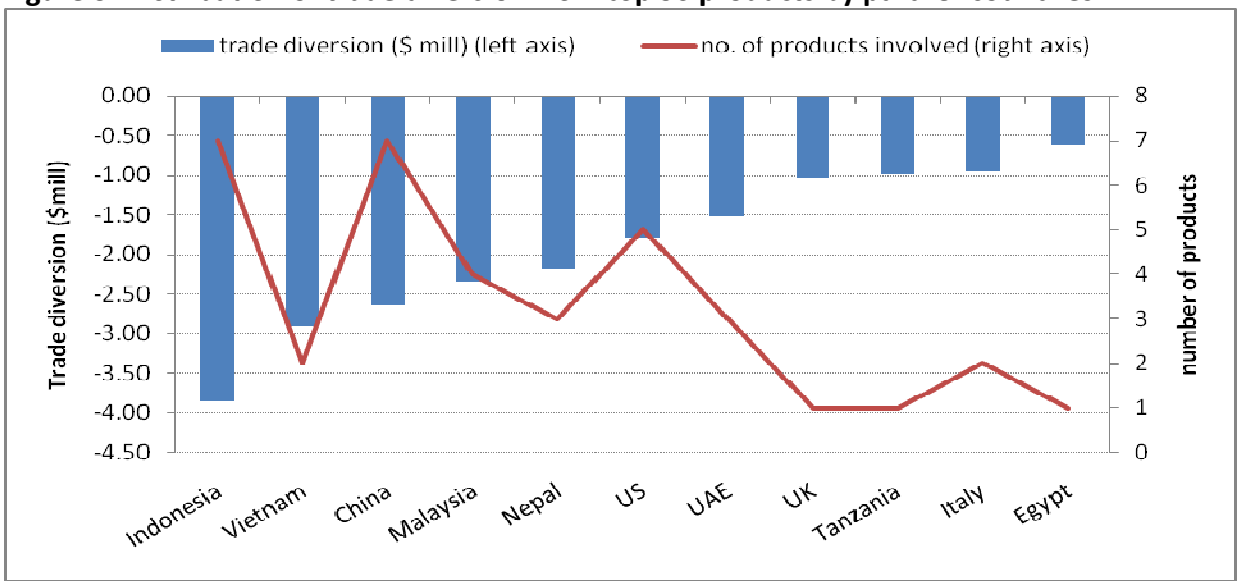


Annex Table 3 provides the information on top 50 products in terms of the source of trade diversion effects. The listed products combined together account for 41.03 percent of total trade diversion effects. Therefore, in comparison with the trade creation, diversion effects are much more widespread. This also implies that despite their overall small magnitude, tariff preferences under the bilateral deal provide Sri Lanka with some competitive advantage in a range of products.

Figure 3 gives the distribution of trade diversion from top 50 countries across partners. It is found that in the first 50 items of trade diversion there are eight commodities in which Indonesia is affected, resulting in a trade diversion of about $4 million. Vietnam and China are the next two worst affected countries as the tariffs on Sri Lanka are reduced bilaterally. In the top 50 products generating trade diversion effects for India, Vietnam has two and China has seven products. Amongst others, Nepal, which has a free trade agreement with Nepal, is also

considerably affected. Tariff preferences to Sri Lanka undermine export competitiveness of Nepal in four product lines, triggering trade diversion of $2.25 million.

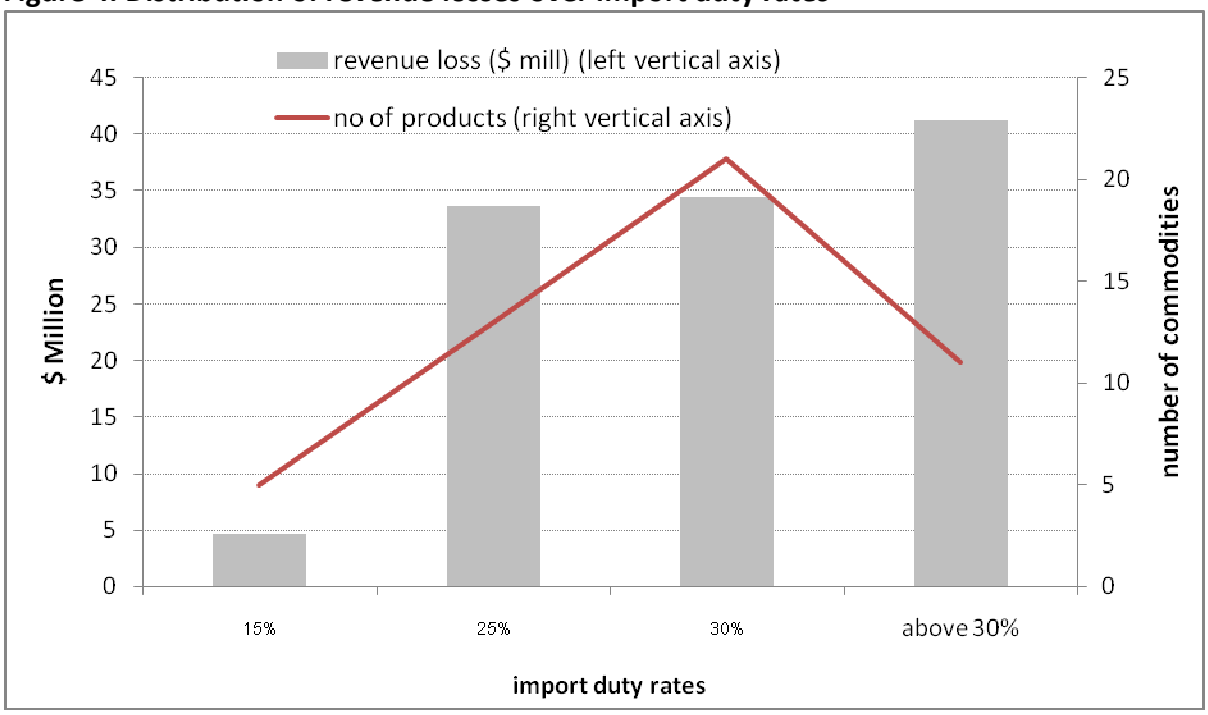
Figure 3: Distribution of trade diversion from top 50 products by partner countries



One direct consequence of any bilateral trade arrangements is forgone tariff revenues as duty-free and/or reduced duty rate access of FTA partners' goods are allowed. Simulation results show that bilateral FTA with Sri Lanka would cause a revenue loss of US$134 million. In terms of adverse revenue consequences, the top 50 products are identified in Annex Table 4. They account for 84.86 percent of the revenues forgone. Products classified as HS740319, HS09700, HS720449, HS740312, and HS090411 are the five most important products leading to revenue losses. These are mainly copper, beverage (coffee and tea), and iron and steel related products. According to the results, the above-mentioned 5 HS-digit products result in losses of $51 million, i.e. about 38 per cent of all revenues forgone.

Distribution of revenue losses over import duty rates is depicted in Figure 4. The basic objective of this exercise is to find out the liberalization of tariff slabs that can have most impact on revenues lost. It is found that liberalization of products that face relatively high import duties (e.g. 25 per cent and above) has profound impact. Liberalisation of products that initially faced import tariffs of above 30 per cent has generated a revenue loss of more than 40 million. Products under tariff slab of 25 and 30 per cent accounting for about another $70 million reduced revenues. Amongst the top 50 products of Annex Table 4, there are 12 products with an import duty of 25 per cent while the comparable figure for 30 per cent is 21.

Figure 4: Distribution of revenue losses over Import duty rates



The disaggregated data used in the empirical analysis also help identify the commodities that register largest increase in imports into and exports from India. Tables 1 and 2 list 50 such products respectively. In terms of imports from Sri Lanka to India, top 50 products account for 87.87 per cent of increase in total import rise under the bilateral FTA. Animal and vegetable fats (mainly vegetable oils), wood and paper products, copper and related products, and certain textiles and clothing items turn out to be major Sri Lankan export beneficiaries.

Turning to India's exports, as reported in Table 2, the most important 50 products account for 67.5 percent of total increase in India's exports to Sri Lanka. That is, the export structure of India's export basket to Sri Lanka appear to be more diversified than that of the latter's to India. Skill and technology intensive industrial goods; rubber, paper and tobacco related items; ceramic; and iron and steel products are amongst major India's export items that benefit from the bilateral FTA.

Table 1: ISFTA – List of 50 products with the largest increases in Imports from Sri Lanka to India

HS Code		Import Before ($ '000)	Import After (% '000)	Change In Import ($ '000)	% change from base
30613	Fish, crustaceans & aquatic	143.13	1390.46	1247.33	871.47
80111	Edible fruit, nuts, peel of	6165.77	7901.13	1735.36	28.15
90220	Coffee, tea, mate and	25.87	1414.11	1388.24	5366.43
90240	Coffee, tea, mate and	859.13	2293.19	1434.06	166.92
90411	Coffee, tea, mate and	7530.77	12381.89	4851.12	64.42
90700	Coffee, tea, mate and	19477.85	32574.62	13096.77	67.24
151110	Animal or vegetable fats	1371.17	2846.43	1475.27	107.59
151190	Animal or vegetable fats	1380.77	2940.00	1559.23	112.92
151620	Animal or vegetable fats	17372.14	34221.92	16849.78	96.99
230650	Food industry residues &	1440.66	3107.93	1667.27	115.73
392620	Plastics and articles thereof	144.56	1996.29	1851.73	1280.92
392690	Plastics and articles thereof	5772.91	10164.09	4391.19	76.07
400121	Rubber and articles thereof	2635.87	3955.33	1319.47	50.06
401110	Rubber and articles thereof	3549.13	4996.11	1446.99	40.77
420221	Leather articles; saddlery	43.54	1843.74	1800.20	4134.49
441111	Wood and articles of wood;	1283.42	6173.81	4890.38	381.04
441119	Wood and articles of wood;	1738.55	5255.14	3516.58	202.27
470790	Pulp of wood or of other	6430.61	8471.96	2041.35	31.74
481910	Paper & paperboard &	442.70	4710.59	4267.89	964.06
481930	Paper & paperboard &	406.29	1950.70	1544.41	380.13
520942	Cotton, including yarn and	462.27	1834.69	1372.43	296.89
600621	Knitted or crocheted fabrics	96.12	2067.13	1971.01	2050.61
600622	Knitted or crocheted fabrics	61.28	1326.36	1265.08	2064.29
620462	Apparel articles and	58.43	3133.36	3074.94	5263.05
680221	Articles of stone, plaster,	11645.70	30913.60	19267.90	165.45
690710	Ceramic products	298.16	1539.09	1240.93	416.20
690790	Ceramic products	850.24	3275.20	2424.97	285.21
690810	Ceramic products	296.24	7957.63	7661.39	2586.17
690890	Ceramic products	266.59	6864.18	6597.59	2474.82
691110	Ceramic products	525.88	4743.11	4217.24	801.94
710239	Natural or cultured pearls,	1592.52	2995.56	1403.04	88.10
720421	Iron and steel	889.26	2292.14	1402.88	157.76
720449	Iron and steel	14179.35	22874.70	8695.36	61.32
740120	Copper and articles thereof	36.11	1322.50	1286.39	3562.72
740312	Copper and articles thereof	30726.86	37412.44	6685.59	21.76
740313	Copper and articles thereof	1436.13	6604.33	5168.21	359.87
740319	Copper and articles thereof	58923.71	90653.54	31729.83	53.85
740322	Copper and articles thereof	1794.68	4012.88	2218.20	123.60
740721	Copper and articles thereof	374.21	1865.31	1491.10	398.47
741300	Copper and articles thereof	12039.50	132852.04	120812.55	1003.47
760110	Aluminum and articles	2594.16	4071.75	1477.59	56.96
760120	Aluminum and articles	7857.45	9950.34	2092.89	26.64
760511	Aluminum and articles	7155.34	17595.72	10440.38	145.91
790600	Zinc and articles thereof	837.30	6539.73	5702.43	681.05
800700	Tin and articles thereof	1484.78	3108.72	1623.94	109.37
842620	Nuclear reactors, boilers	18141.65	48851.70	30710.05	169.28
853931	Electric machinery	3234.14	4743.91	1509.77	46.68
854411	Electric machinery	5001.57	7354.34	2352.78	47.04
854419	Electric machinery	12336.31	16906.53	4570.22	37.05
854460	Electric machinery	998.44	2837.37	1838.93	184.18
Total Import Rise for Top 50 products (US$ '000) = 364680.18, which is 87.87 percent of Total Import Rise from Sri Lanka to India.					

Table 2: ISFTA – Top 50 products with the Highest Increase in Exports from India to Sri Lanka (no sensitive list)

HS Code		Export Before ($ '000)	Export After (% '000)	Change In Export ($ '000)	% change from base
30613	Fish, crustaceans	1,104.71	1,592.67	487.958	44.17
71340	Edible	22,479.54	25,616.14	3,136.60	13.95
90240	Coffee, tea, mate	4,231.02	6,005.94	1,774.92	41.95
90420	Coffee, tea, mate	15,961.58	19,555.74	3,594.16	22.52
100590	Cereals	24,735.94	25,958.15	1,222.21	4.94
140490	Vegetable	5,187.76	6,284.17	1,096.40	21.13
151110	Animal or	6,294.16	8,797.82	2,503.66	39.78
151550	Animal or	2,539.47	3,187.35	647.874	25.51
190190	Preparations of	3,336.10	4,210.70	874.6	26.22
190410	Preparations of	443.227	996.386	553.159	124.80
210690	Miscellaneous	2,165.76	2,694.56	528.801	24.42
230400	Food industry	27,398.90	28,587.67	1,188.77	4.34
240220	Tobacco and	703.565	3,991.39	3,287.83	467.31
240310	Tobacco and	212.872	685.818	472.946	222.17
252329	Salt; sulfur; earth	25,993.96	30,051.09	4,057.13	15.61
350691	Albuminoidal	641.379	1,473.29	831.906	129.71
400121	Rubber and	1,505.25	1,979.45	474.209	31.50
401120	Rubber and	2,058.80	2,933.79	874.986	42.50
401390	Rubber and	1,162.75	1,602.69	439.935	37.84
480255	Paper &	6,373.78	7,371.68	997.898	15.66
480256	Paper &	2,278.12	3,095.27	817.151	35.87
480257	Paper &	17,203.12	19,766.29	2,563.18	14.90
481019	Paper &	5,455.98	6,193.84	737.866	13.52
481099	Paper &	1,606.54	2,031.37	424.831	26.44
481920	Paper &	1,199.11	1,834.52	635.41	52.99
560749	Wadding, felt	938.31	1,403.70	465.389	49.60
680293	Articles of stone,	216.756	2,260.00	2,043.24	942.65
690890	Ceramic	3,021.14	4,696.51	1,675.37	55.45
691090	Ceramic	1,293.39	1,750.82	457.432	35.37
721049	Iron and steel	8,794.34	10,365.89	1,571.54	17.87
730890	Articles of iron or	1,307.07	1,679.81	372.74	28.52
740819	Copper and	2,626.84	3,293.81	666.967	25.39
760110	Aluminum and	24,675.81	26,679.34	2,003.53	8.12
830910	Miscellaneous	823.329	1,311.52	488.189	59.29
841451	Nuclear reactors,	2,306.05	2,711.71	405.652	17.59
841821	Nuclear reactors,	4,258.99	4,732.72	473.73	11.12
853922	Electric	2,326.23	2,893.09	566.862	24.37
854449	Electric	3,573.64	4,739.17	1,165.54	32.61
870210	Vehicles, (not	33,637.26	42,420.58	8,783.32	26.11
870321	Vehicles, (not	62,492.06	67,956.00	5,463.94	8.74
870322	Vehicles, (not	4,828.23	6,894.63	2,066.41	42.80
870421	Vehicles, (not	11,225.03	14,713.73	3,488.70	31.08
870422	Vehicles, (not	33,567.30	34,532.59	965.291	2.88
870600	Vehicles, (not	5,686.72	6,161.36	474.639	8.35
870895	Vehicles, (not	3,799.33	4,486.58	687.255	18.09
870899	Vehicles, (not	3,799.33	4,467.53	668.201	17.59
871120	Vehicles, (not	79,563.22	83,719.51	4,156.29	5.22
871200	Vehicles, (not	679.893	1,177.72	497.828	73.22
871499	Vehicles, (not	1,428.83	1,823.75	394.924	27.64
960899	Miscellaneous	1,349.61	1,717.88	368.274	27.29
Total Export Rise for Top 50 products (US$ '000) = 74595.65, which is 67.47 percent of Total Export Rise from India to Sri Lanka					

3.2.2. Simulation 1.2: India- Sri Lanka BFTA: With Negative list restriction

Under this simulation, the liberalization scenario is considered after excluding the commodities that have been kept in the negative list. That is, these are the commodities on which liberalization commitment is not made.

The summary of the results is presented in Table 3. Before getting into the results, it is important to mention that the results seem to suggest small differences in the indicators of interest between the two scenarios (i.e. with and without the negative list). More precisely, with the negative list restriction trade creation, diversion, revenue and welfare effects in India do not differ much with the scenario where there is no sensitive list. The only major exception is that with the consideration of the sensitive list India's export rise to Sri Lanka gets restricted quite significantly (see Table 3).

One possible reason for reduced export rise from India under this scenario is likely to be very restrictive nature of Sri Lanka's negative list. It is also of interest to know why trade creation (and diversion as well) effects in India remain more or less unchanged between the two scenarios. This can be attributable to restrictive negative list of maintained by India. It is most likely that products that were highly restricted (either by high tariffs and/or by non-tariff measures) before the FTA had been kept in the negative list. If the previous restrictive regime had resulted in very limited trade in these goods, simulations of liberalized scenarios could generate low trade response. For example, if the initial trade barriers were prohibitive in nature, trade expansion could not be simulated.

Table 3: Summary of the Impacts of Simulation 1.2

		US$ Mln	% of effect under simulation 1.1 (i.e. without the negative list restriction)
1	Total Trade Creation Effects in India	341.69	96.75
2	Total Trade Diversion Effects for India	-57.74	93.39
3	Total Trade effect (1+2)	283.95	97.46
4	Revenue Loss for India	-125.53	93.39
5	Increase in import from Sri Lanka to India	399.43	96.25
6	Increase in exports from India to Sri Lanka	28.05	25.37
7	Welfare Effects for India	63.76	95.56

As done in the case of the previous simulation the main 50 products in terms of trade creation effects in India are presented in Annex Table 5. These products account for 93.57 percent of total trade creation effects. Similar products but with highest trade diversion effects are listed in Annex Table 6. Together they account for 43.43 percent of total trade diversion effects. Annex Table 6 also provides information on the sources of trade diversion by partner countries.

These results are also comparable to the ones presented in the case of the simulation without the negative list restrictions.

The results on products triggering adverse revenue effects are placed in Annex Table 7. Of the $125 million lost revenue incurred under this scenario, 86.28 per cent is caused by 50 products. Finally Annex Tables 8-9 list the top 50 export products from Sri Lanka to India and vice versa under this scenario. These products account for about 90 per cent of the import rise from Sri Lanka and 71 per cent export rise from Sri Lanka.

IV. SOUTH ASIAN FREE TRADE AREA (SAFTA)

4.1. Overview of SAFTA

SAFTA has come into force from 1 July 2006, with the aim of reducing tariffs for intraregional trade among the 7 SAARC members. The Agreement on SAFTA has seven core elements: (i) trade liberalization programme; (ii) rules of origin, (iii) institutional arrangements, (iv) revenue compensation mechanism, (v) technical assistance for LDCs, (vi) safeguard measures and (vii) consultations and dispute settlement procedures.

As per Article 7 of the Agreement, tariffs on all products except the products under sensitive lists would be reduced to 0-5% within time frames agreed for LDCs and Non- LDCs. The Agreement stipulates that SAFTA Committee of Experts would review non-tariff barriers in its regular meeting with a view to eliminating them or making them non-restrictive.

The Agreement provides different timeframe for tariff reduction by LDCs and non-LDCs. Non-LDCs are required to reduce their tariffs for the products of LDCs within a shorter period of time. Their tariffs applied on 1 January 2006 should be reduced to 0-5% among themselves within seven years (with one extra year for Sri Lanka). Non-LDCs are required to reduce tariffs on the products other than products under Sensitive Lists for LDCs to 0-5% within 31 December 2008. LDCs are required to reduce tariffs on the products other than the products under sensitive lists to 0-05% within 31 December 2015 as per following schedule:

The Agreement provides scope for maintaining of sensitive lists, which are not subject to tariff reduction programme. Although the Agreement maintains that sensitive list shall be different for LDCs and non-LDCs, only three countries namely Bangladesh, India and Nepal maintain different sensitive lists for LDCs and Non-LDCs. Besides, the LDCs maintain longer sensitive lists than the Non-LDCs. India has 865 products for non-LDCs and 744 products for LDCs in her sensitive list, whereas Sri Lanka maintains 1079 products for both LDCs and non-LDCs in her sensitive list.

4.2 Simulation Design and Results

Two simulations that have been carried out are as follows:

- **Simulation 2.1: Full Implementation of SAFTA: No negative list restriction**

- **Simulation 2.2: Full Implementation of SAFTA: With negative list restriction**

The main results concerning the key variables of interest are summarized in Table 4. The table also compares the results involving both the SAFTA liberalization scenarios. It is found that under both cases of with and without negative restrictions there are positive trade creation effects for India. When full SAFTA liberalization takes place, trade creation effects for India is estimated at $143 million. However, the limited liberalization (i.e. after excluding the commodities in the sensitive list) results in reduced trade creation of about $79 million. That is, trade creation with the negative list is 55 per cent of that of without any sensitive list restriction.

Trade diversion effects under the full liberalization scenarios is estimated to be about $87 million while the corresponding figure for the scenario with the negative list is about $55 million. That is, the presence of sensitive list somewhat helps reduce the trade diversion effects. In other words, SAFTA member countries are not always the most efficient suppliers of the commodities kept in India's restriction list. Net trade effect of SAFTA for India is positive and it is much more profound under the first scenario of 'no negative list restriction'.

Table 4: Trade and welfare effects of SAFTA for India with and without the negative list

		No negative list restriction ($ million)	With negative list restriction ($ million)	With restriction effects as % of no negative restriction results
1	Total Trade Creation Effects	**143.64**	**78.96**	**0.55**
2	Total Trade Diversion Effects	**-86.59**	**-55.42**	**0.64**
3	Total Trade effect (1+2)	**57.04**	**23.54**	**0.41**
4	Revenue Loss	**-139.48**	**-68.34**	**0.49**
5	Increase in import from SAFTA Member countries to India	**221.69**	**97.54**	**0.44**
6	Increase in exports from India to SAFTA Member Countries	**1,015.30**	**375.66**	**0.37**
7	Welfare Effects	**20.69**	**12.00**	**0.58**

Table 4 also provides information on the revenues forgone due to preferences granted by India to other SAFTA members. In the absence of any sensitive list limitation revenue loss could be up to $139 million. However, because of the negative list included in SAFTA arrangement, the estimated revenue loss falls to $68 million.

The full liberalization scenario gives rise to additional imports from other SAFTA member countries by 221 million, but the existence of sensitive list would imply the figure to be just about $97 million. This shows that India's sensitive list is likely to be quite stringent for other SAFTA member countries.

India is the most important supplier within the SAFTA region and the regional integration arrangement provides an important opportunity for expansion of India's exports further. Under full SAFTA liberalization, there is likely to be more than $1 billion worth of additional exports from India. But, given the restrictions imposed by partner countries under the shield of the negative lists, India's export expansion is limited to only $376 million. Therefore, it seems that the sensitive lists of other SAFTA member countries are also quite stringent for India.

India registers overall positive welfare gains under both the scenarios. Under the first scenario of full liberalization, welfare gains are estimated to be $20.69 million, which is reduced to about $12 million given the presence of the sensitive list, restricting the scope of liberalization.

Annex Tables 10 and 11 provides the list of major products that lead to trade creation effects in India under SAFTA simulations 1 and 2, respectively. The listed 50 products in Annex Table 10 account for about 71 per cent of all trade creation effects under simulation 1. When the restrictions related to products apply, the identified 50 commodities in Annex Table 11 become the source of about 78 per cent of all trade creation. Under full liberalization animal and vegetable fats (HS 151620) from Nepal, edible fruits and vegetables (HS 080410) from Pakistan, organic chemicals (HS 2911736) from Pakistan, plastic articles (HS 392690) from Bangladesh and beverages (HS 220290) from Nepal turn out to be the five most important products triggering trade creation. A close investigation into Annex Tables 11 and 12 would reveal that the relative importance of the products in terms of trade creation is moderately changed as the liberalization is being restricted due to the India's sensitive list.

The level of tariffs in India associated with trade creation is depicted in Figures 5 and 6, which represent simulation 1 and 2, respectively. In the absence of any negative list the highest level of trade creation ($38 million) is generated due to the removal of tariff rates in the range of 15-20 per cent. This is also the tariff bracket that covers the largest proportion of the commodities listed in Annex Table 10. The next highest levels of trade creation are generated due to removal of tariff brackets of 20-25 per cent and above 25 per cent. In contrast, when the negative list of India is considered, the highest level of trade creation is generated due to the liberalization of tariff rates of 10-15 per cent, followed by less than 10 per cent. This implies that the negative list maintained by India significantly alters the effects of tariff structures on trade creation.

Figure 5: Distribution of 50 products with the highest trade creation effects for India without the sensitive list

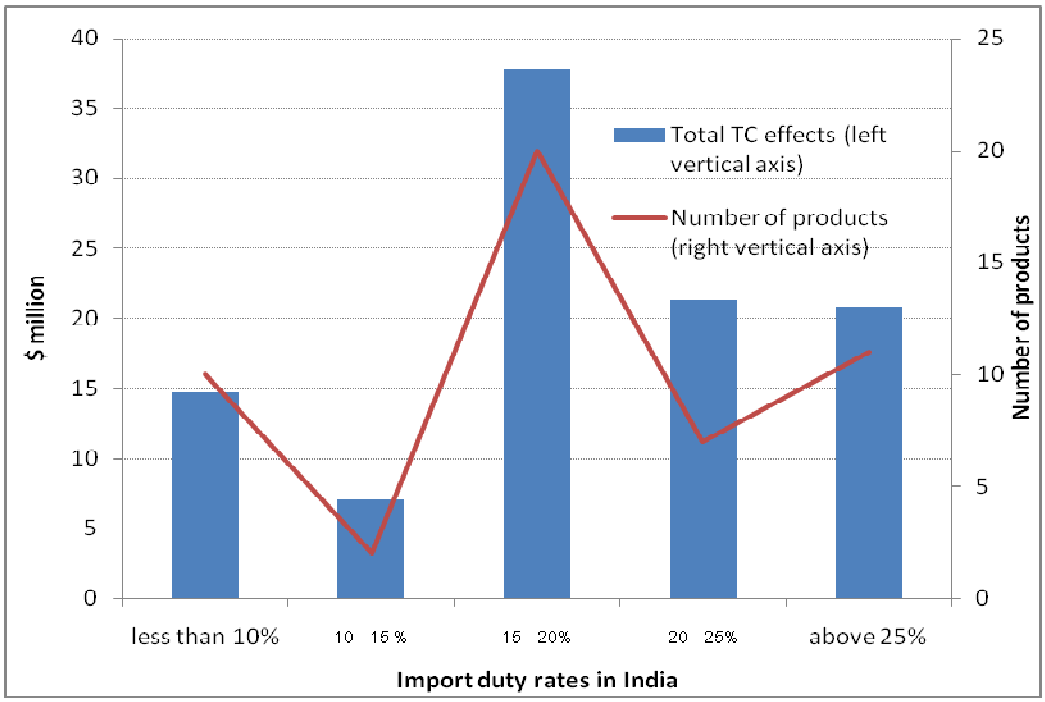


Figure 6: Distribution of 50 products with the highest trade creation effects for India with the sensitive list restriction

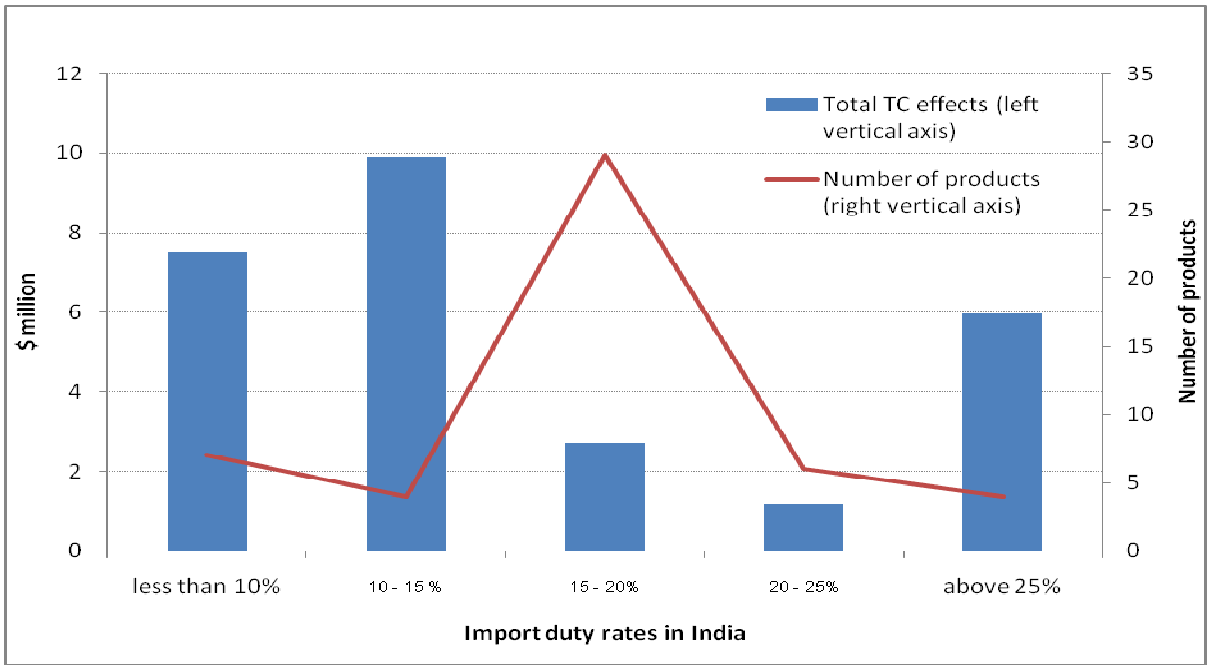
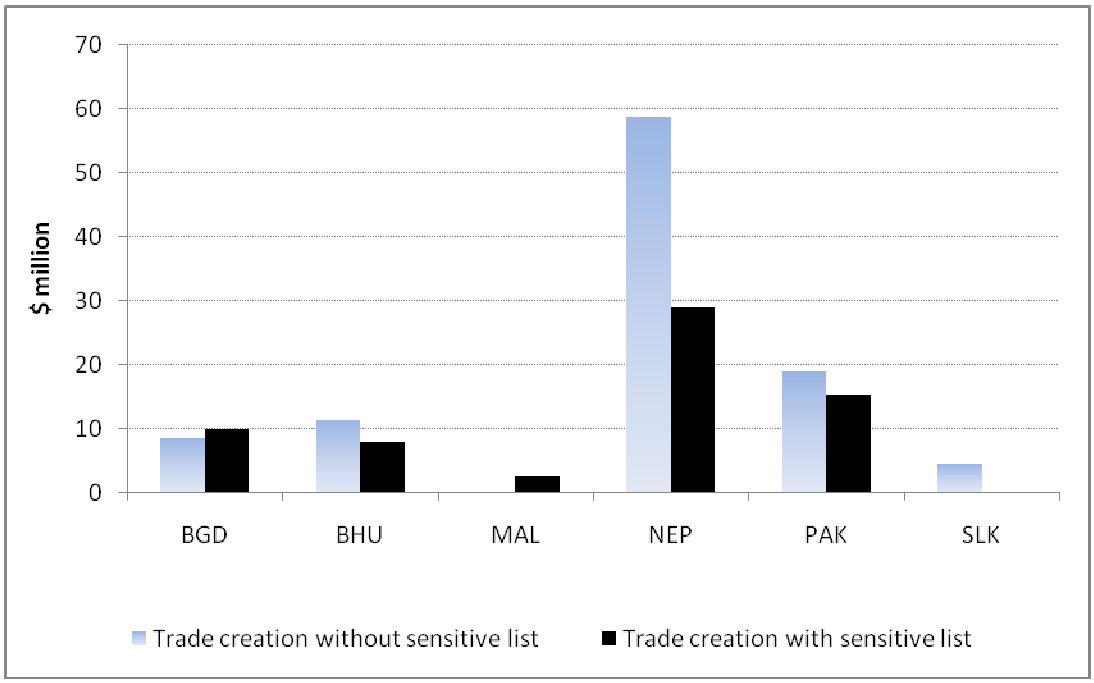


Figure 7 shows the sources of trade creation in India by SAFTA partners. It shows that both with and without the sensitive list Nepal is the principal source of trade creation, followed by Pakistan. It is quite remarkable to find that when sensitive list is imposed, trade creation due to Nepal is halved from about $60 million to close to $30 million.

Figure 7: SAFTA – sources of trade creation by partners in India



Under full SAFTA liberalization, the proportion of trade creation due to Nepal is 58 per cent, followed by Pakistan (19 per cent), Bhutan (11 per cent), Bangladesh (8 per cent), and Sri Lanka (4 per cent). Under the sensitive list restriction, Nepal's share in trade creation is reduced to 45 per cent, while those of Pakistan and Bangladesh increase moderately.

Figure 8: SAFTA – distribution of trade creation without the negative list by members in India

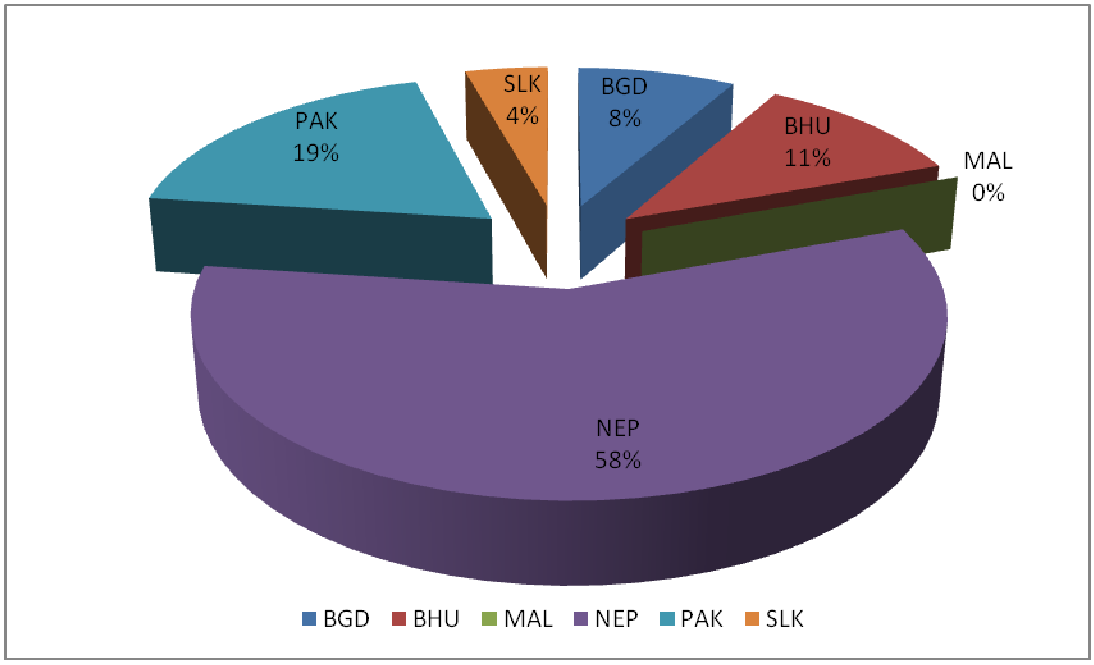
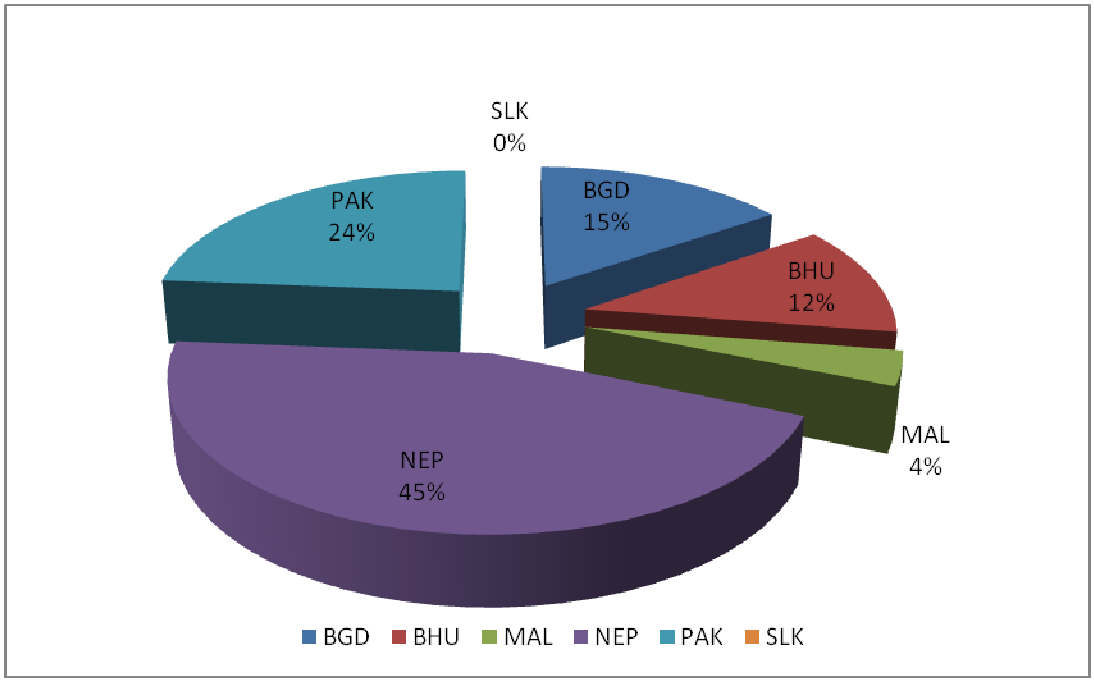


Figure 9: SAFTA – distribution of trade creation with the sensitive list restrictions

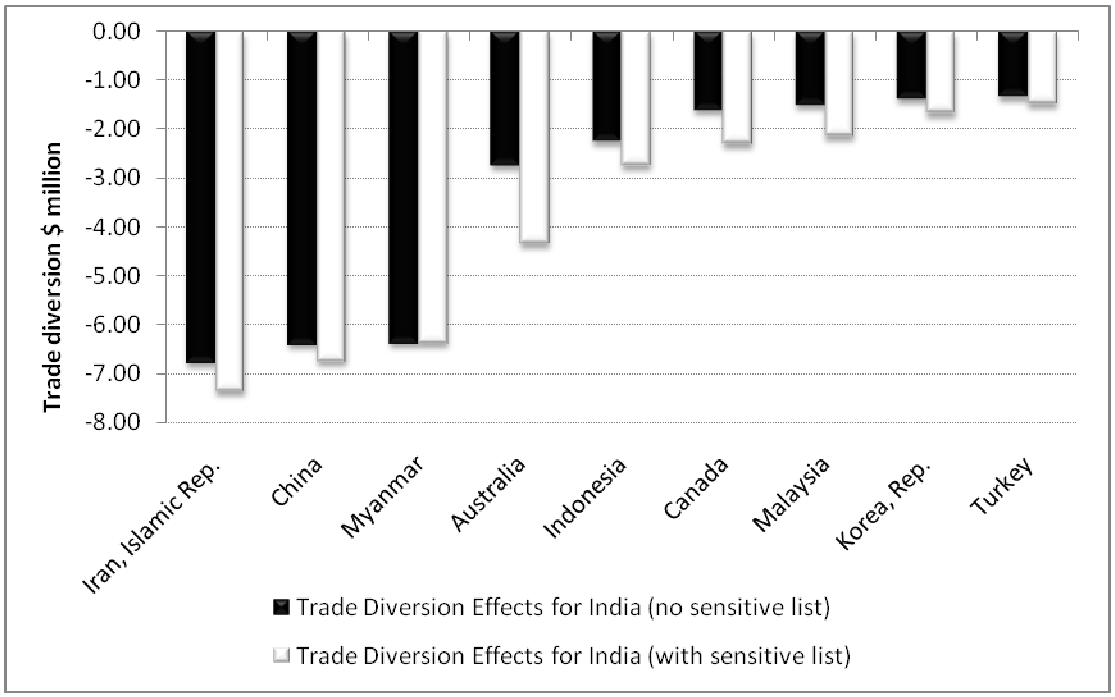


Annex Tables 12 and 13 provides the information on the sources of trade diversion inflicted upon the rest of the world suppliers. The basic mechanism of trade diversion effects is that preferences provided by India to SAFTA members undermine the competitiveness of more efficient non-SAFTA suppliers. The 50 products as listed in Annex Tables 12 and 13 account for

about 55 per cent and 60 per cent of all trade diversion effects created by SAFTA preferences. It is found that edible fruits and nuts (HS 080410) from Iran, vegetables and agricultural products (HS 071390) from Myanmar, vegetables (HS 071320) from Australia and Iran, and processed vegetables (HS 071390) from Myanmar are the five commodities with the largest trade diversion effects both under the complete SAFTA liberalization and limited liberalization with sensitive list.

As Annex Tables 12 and 13 capture sources of trade diversion by countries as well, it is possible to find out the rest of the world suppliers that are likely to be worst affected by SAFTA. Figure 10 summarises the information. It turns out that Iran, China, Myanmar, Australia, and Malaysia are amongst non-SAFTA countries from which supplies of different products are likely to be diverted. In other words, these countries produce a number of products more efficiently than SAFTA members, but preferences provided by India to its South Asian neighbours could replace the imports from them.

Figure 10: SAFTA – sources of trade diversion by India's rest of the world partners



In order to understand the tariff revenue consequences of trade liberalization under SAFTA, Annex Tables 14 and 15 identify the top 50 revenue sensitive products at the HS-6 digit level, under full liberalization (simulation 1) and restricted liberalisation (simulation 2), respectively. These products account for more than 80 per cent of the forgone revenues in each case. Based on the information, Table 5 lists the 10 most revenue-sensitive products. In the case of full SAFTA liberalization, agricultural products dominate the list, while under the restrictive liberalization along with edible vegetables, certain chemical and textile related items, beverages, and iron and steel products also exert significant revenue influence.

Table 5: Revenue Effects of SAFTA for India

Full SAFTA Liberalisation			**SAFTA with Negative List**		
HS Code	Description	Revenue effects ($ mill)	HS Code	Description	Revenue effects ($ mill)
71320	Edible vegetables and certain roots and tubers	-14.9	80410	Edible fruit, nuts, peel of citrus fruit, melons	-7.57
151620	Animal or vegetable fats	-8.5	220290	Beverages, spirits and vinegar	-5.51
80410	Edible fruit, nuts, peel of citrus fruit, melons	-7.6	291736	Organic chemicals	-3.75
90830	Coffee, tea, mate and spices	-7.1	530310	Other vegetable textile fibers; paper yarn and woven fabrics of paper yarn	-3.17
220290	Beverages, spirits and vinegar	-5.5	550921	Manmade staple fibres, including yarns & woven fabrics	-2.57
71339	Edible vegetables & certain roots & Tubers	-5.3	720719	Iron and steel	-2.43
291736	Organic chemicals	-3.8	720229	Iron and steel	-2.39
90230	Coffee, tea, mate and spices	-3.3	630510	Other textile articles; needlecraft sets; worn clothing and worn textile articles; rags	-2.22
530310	Other vegetable textile fibers; paper yarn and woven fabrics of paper yarn	-3.2	210690	Miscellaneous edible preparations	-2.20
230990	Food industry residues & waste; prepared animal feed	-3.0	281410	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or of isotopes	-2.10

Annex Tables 16 and 17 provide lists of commodities, under simulation 1 and 2, respectively, that register highest increase in imports into India from other SAFTA countries. The rise of imports under each of the listed 50 HS 6-digit category in each table is also estimated. It is found that agricultural products such as vegetables and fruits, edible vegetable oils, beverages, plastics, wood and wood products, apparels, iron and steel, and copper are the major broad

commodities in which India's imports rise from SAFTA. Annex Tables 16-17 also indicate the source of supply of each of the commodities listed.

India's export rise to different SAFTA countries is captured in Annex Tables 18 and 19. In general, the major export items from India are much more diverse than the imported products. In products such as beverages, apparels, and plastics, there are both imports and exports, suggesting the existence of intra-industry trade. However, the major broad commodities in which India register significant export rise include, sugar and salt, chemicals, mineral fuels, rubber, cotton, articles of iron, electric machinery and products, and heavy engineering products.

V. INDIA-SINGAPORE COMPREHENSIVE ECONOMIC COOPERATION AGREEMENT (CECA)

5.1. Overview of CECA

The Comprehensive Economic Cooperation Agreement (CECA) between Singapore and India came into effect on August 1 2005. The India-Singapore CECA has four key components: a free trade agreement (FTA) in goods; an arrangement for boosting trade in services, including financial services; a package to promote investment flows and provide mutual investment protection; and a new agreement for avoiding double taxation.

In CECA, tariff concessions are divided into three groups for the Singaporean goods which entering into India, as immediate elimination, phased elimination, and phased reduction. Immediate elimination group includes those goods which have tariffs until the CECA come into effect. For goods in the phased elimination and phased reduction groups will be phased over in five years and the rate of reduction will follow the Most Favored Nation (MFN) – margin of preference.

Singapore has entrusted to granting zero-tariff treatment on all imports from india as entry into force of the agreement, however, India granting MFN tariff structure for Singapore goods, for example, if any of the goods imposed 10 percent MFN tariff, at April 2009, it will be 5 percent depending on the 50 percent tariff reduction scheme.

Rules of Origin (ROO) confirm the authenticity of the goods of a particular country. According to the CECA, rules of origin indicates that only Singaporean or Indian goods benefiting from the tariff scheme. In India-Singapore CECA, ROO consists of 40 percent local content which actually applicable for 4 –digit level. This also includes the sole production pattern of Singapore and took them away from the general list. For each of these products specific ROO has been approved.

The following modality shall apply for the elimination / reduction of basic customs duties by India pursuant to Article 2.3:

(a) List of Products for Early Harvest Program: On the originating goods of Singapore provided in this list, the duties shall be eliminated entirely and such goods will receive duty free entry into India from Singapore from 1st August 2005

(b) List of Products for Phased Elimination in Duty: On the originating goods of Singapore provided in this List, the duties shall be removed in five stages beginning from 1st August 2005 and such goods shall receive duty free entry into India from Singapore, effective 1st April 2009. The margin of preference offered by India has been indicated in the List.

(c) List of Products for Phased Reduction in Duty: On the originating goods of Singapore provided in this List, the duties shall be reduced in five stages beginning 1st August 2005 and such goods shall receive entry into India at concessional duties. The margin of preference offered by India has been indicated in the List.

(d) List of Products excluded from any concession in Duty: No concessions in duties shall be offered on goods provided in this List. Such goods whether originating or otherwise, shall enter into India from Singapore on the applied MFN duties.

5.2. Simulation Design and Results

Four Simulations are considered and they are as follows:

- Simulation 3.1: IND-SGP Bilateral FTA: Impact of Early Harvest
- Simulation 3.2: IND-SGP Bilateral FTA: Impact of Phased Elimination in Duty
- Simulation 3.3: IND-SGP Bilateral FTA: Impact of Phased Reduction in Duty
- Simulation 3.4: IND-SGP Bilateral FTA: Additional Impacts from the Removal of Sensitive List

The first simulation is quite straightforward as it considers the duty free access provided since 1st August 2005. The second simulation deals with a set of commodities for which tariffs were designed to be eliminated in five stages. Here the simulation is run to examine what happens when tariffs on the listed commodities have been brought down to zero for Singapore by India. The third simulation (Simulation 3.3) considers India's commitment of phased duty reduction on a number of products originating in Singapore. To provide a meaningful scenario analysis, simulation 3 is designed to examine what happens if all duties are eliminated on these products. Finally, simulation 4 is carried out with a view to assessing the potential impacts of duty removal on sensitive items. Although no duty reduction commitment is intended for these products, the simulation experiment brings down the tariffs to zero on the items in the sensitive list.

Table 6 summarises the results of the four simulations associated with the key variables of interest. The liberalization under the Early Harvest programme had resulted in trade creation effects of about $75 million for India. Given the trade diversion effect of about $48 million, the net trade effect is reduced to about $27 million. Imports from Singapore increase by about $124 million. As the increased import take place due to tariff preferences, a loss of revenue – to

the tune of about $59 million – is incurred. Overall, the welfare effect of the early harvest programme is positive and is estimated to be $13.56 million.

Table 6: Trade and welfare effects of India-Singapore FTA

	Early harvest ($ mill)	Phased elimination ($ mill)	phased reduction in duty ($ mill)	removal of sensitive list ($ mill)
Trade creation effects	74.74	177.29	113.17	251.44
Trade diversion effects	-47.59	-91.68	-45.58	-80.42
Total trade effects (1+2)	27.15	85.7	67.59	171.03
Revenue loss	-59.10	-130.27	-566.76	-101.75
Increase in import from Singapore to India	124.32	276.74	168.98	346.41
Welfare effects	13.56	29.55	20.58	48.35

When India eliminates all tariffs on the commodities kept under phased elimination (simulation 2), there is additional $177 worth of trade creation effects, or $60 million worth of net trade effects after deducting the resultant trade diversion effects. Imports from Singapore rise by $276 million. On the whole, this scenario is associated with a welfare gain of about $30 million for India.

In the case of third simulation the net welfare effect is found to be about $21 million with the net trade effect being about $68 million. However, what is most striking about this simulation is the significant loss in the tariff revenues. India stands to forgo more half a billion dollar worth of tariff revenue from the liberalization of this set of products. Singapore's exports from this scenario increases only modestly by about $169 million. This therefore suggests that commodities under the phased reduction scheme are likely to be revenue sensitive. Liberalisation of these items also exerts the maximum welfare impact.

Finally, an additional welfare gain of about $48 million will be accrued to India from the liberalization of commodities that are kept in the sensitive list. Total trade effect, i.e. trade creation less trade diversion, is the highest for this category of products. On the whole, the results suggest that commodities kept under the sensitive list could be the most protected items and thus they promise significant trade and welfare gains for India.

Annex Tables 20-23 provide detailed commodity specific information on trade creation by different scenarios. Under simulation 1 (early harvest), trade creation is almost single-handedly driven by India's bilateral liberalization of items that faced duty rates of 10-15 per cent. In fact, the 49 products initially subject to this tariff rate are shown to be generating more than 99 per cent of all trade creation in this simulation experiment. In fact, the tariff range 10-15% generate most of the trade creation effects under every scenario. Table 7 shows of the top 50 trade creating commodities 49 belongs to this particular tariff range under scenario 1, 46 under scenario 2, all of top 50 under scenario 3 and 40 under scenario 4. In terms of the size of trade

creation, 10-15% is the most important tariff bracket under the sensitive list (scenario 4), closely followed by phased reduction in duty (scenario 2).

Table 7: India-Singapore FTA – trade creation: value and number of commodities

	early harvest ($ mill)	phased elimination in duty ($ mill)	phased reduction in duty ($ mill)	sensitive list ($ mill)
less than 5%	2.54 [1]	-	-	-
5-10%	-	5.83 [1]	-	-
10-15%	72.11 [49]	149.2 [46]	85.2 [50]	159.8 [40]
15-20%	-	-	-	-
20-25%	-	-	-	27.7 [5]
above 25%	-	8.6 [3]	-	15.6 [5]

Notes: Figures in parentheses '[ ]' indicate the number of commodities involved. In each scenario only the top 50 commodities are considered. Details of the products are given in Annex Tables 20-23.

Ten most important individual trade creation items under each of the liberalization scenarios are listed in Table 8. These items are source of 92.4 per cent of trade creation in simulation 1, 62.7 per cent in simulation 2, 59% in simulation 3, and about 55 per cent in simulation 4. Organic chemicals (HS codes beginning with 29) and electric machinery, equipment and parts (HS codes with 85) appear to be the dominant sources of trade creation under the early harvest programme. In the case of phased elimination of duties, locomotives (HS 86), printed books and newspapers (HS 49), nuclear reactor, boiler and mechanical appliances (HS 84) and ships, boats and floating structures (HS 89) are most important. In simulation 3, HS 84 and HS 29 items overwhelmingly dominate the trade creation effects. Finally, when the sensitive list scenario is considered, the distribution of trade creation by broad commodity groups turn out to be quite diverse. Nevertheless, organic chemicals, iron and steel, mineral fuels, and articles of base metal appear to be important products.

Table 8: India-Singapore FTA - top 10 trade creation products

	early harvest		phased elimination in duty		phased reduction in duty		sensitive list	
	HS Code	Trade creation ($ mill)	HS code	Trade creation ($ mill)	HS code	Trade creation ($ mill)	HS code	Trade creation ($ mill)
1	290250	40.65	860900	38.99	843041	24.61	291521	43.03
2	290110	8.77	490700	19.96	841940	19.25	720421	21.10
3	291612	8.67	491199	12.60	290230	7.31	271119	16.64
4	853190	2.54	730840	8.61	293499	3.35	830241	14.22
5	880330	2.54	890110	7.88	842649	2.73	350691	12.91

6	850440	1.76	210390	6.12	843143	2.42	240220	7.35
7	852990	1.43	841451	5.76	842810	2.31	761090	7.17
8	854449	0.95	845229	4.17	290512	1.68	841581	5.63
9	853180	0.92	290243	4.12	390690	1.58	240120	4.99
10	390740	0.83	890590	2.90	842619	1.49	841583	4.55
Top 10 as % of Total		92.44%		62.69%		59.01%		54.74%

Information on trade diversion by disaggregated commodities is given in Annex Tables 24-27. Based on these tables, Tables 9 summarises the major products of trade diversion and the associated most efficient source countries which are adversely affected by the bilateral FTA deal that allows duty-free access of goods originating in Singapore. It is found that under different situations, supplying countries include both from developed such as the United States, France, Germany and developing countries such as China, Iran, Malaysia, etc.

Table 9: India-Singapore FTA: top 10 products causing trade diversions

	early harvest			phased elimination in duty			phased reduction in duty			sensitive list		
	HS Code	Source Country	Trade Diversion Effect ($ mill)	HS Code	Source Country	Trade Diversion Effect ($ mill)	HS Code	Source Country	Trade Diversion Effect ($ mill)	HS Code	Source Country	Trade Diversion Effect ($ '000)
1	290250	Saudi Arabia	-14.28	290243	Malaysia	-4.37	843143	United States	-2.75	720421	Nether-Lands	-2.28
2	290250	United States	-3.47	890110	Cyprus	-4.01	843041	United States	-1.10	390210	Saudi Arabia	-1.54
3	880330	United States	-1.90	890190	Norway	-2.68	290230	Iran, Islamic Rep.	-0.97	271119	Saudi Arabia	-1.51
4	852990	China	-1.21	890110	Panama	-2.65	293499	China	-0.96	291521	Malaysia	-1.24
5	290250	Nether-lands	-1.01	890400	Japan	-2.28	290230	Nether-Lands	-0.78	291532	United States	-0.85
6	880330	France	-0.92	890190	Panama	-2.06	290512	United States	-0.75	845710	Japan	-0.79
7	850440	China	-0.89	845229	China	-1.98	290230	Korea, Rep.	-0.71	720449	United Arab Emirates	-0.79
8	290250	Pakistan	-0.77	490700	United States	-1.87	290512	Taiwan, China	-0.60	390720	Korea, Rep.	-0.72
9	291612	Malaysia	-0.74	843149	United States	-181	293499	Germany	-0.53	720421	United States	-0.72
10	854449	China	-0.69	890110	Malta	-1.24	390530	United States	-0.51	720449	United States	-0.68
	Top 10 as % of Total		54.51%	Top 10 as % of Total		27.29%	Top 10 as % of Total		21.28%	Top 10 as % of Total		13.89%

Notes: 'Source country' is the most efficient producing country, export of which is affected by the bilateral preferences extended to Singapore, thereby causing the trade diversion. Description of the HS code can be found in Annex Table 24-27.

Bilateral liberalization of commodities with important revenue consequences have been identified in Annex Tables 28-31. It is found that top 50 products in terms of negative revenue

effects under scenario 1 account for 99.81 per cent of all revenues forgone. The corresponding figures for scenario 2, 3, and 4 are respectively 85.36 per cent, 71.63 per cent, and 66.42 per cent. Annex Tables 28-31 also provide the required information on individual disaggregated item's contribution to the revenues forgone. Table 10 reveals that apart from phased reduction of tariffs (scenario 3), even top 10 revenue-sensitive products have considerable share in lost revenues.

Table 10: India-Singapore FTA - products with largest revenue effects

Early harvest		Phased tariff		Phased reduction		Sensitive list	
HS Code	Value (mill $)	HS Code	Value (mill $)	HS Code	Value (mill $)	HS Code	Value (mill $)
290250	-29.86	490700	-33.01	843143	-4.84065	720421	-7.78
291612	-4.38	890110	-14.43	290230	-3.73881	291521	-5.68
852990	-3.41	890190	-6.32	843041	-3.0659	720449	-4.44
880330	-3.32	890400	-5.86	293499	-3.01788	291532	-3.79
850440	-2.13	843149	-5.36	290512	-2.04873	390210	-2.97
854449	-1.90	290243	-5.13	390530	-1.56564	390720	-2.66
390740	-1.74	491199	-5.00	853890	-1.53615	760200	-1.95
291614	-1.53	845229	-4.44	850213	-1.41473	271119	-1.78
290110	-1.48	382490	-1.95	292910	-1.10081	845710	-1.55
902790	-1.34	732690	-1.69	903300	-1.03886	291411	-1.43
Top 10 as % of total	86%		64%		4%		34%

Note: Description of the HS code can be found in Annex Table 28-31.

Table 11: India-Singapore FTA – import rise of major broad products

HS Code	% increase from base	HS Code	% increase from base	HS Code	% increase from base	HS Code	% increase from base
290110	88.12	860900	3223.29	841940	1947.85	870324	5139.95
853190	85.45	210390	1893.42	842649	324.04	851610	2802.93
410799	84.51	570320	1591.69	850220	253.58	741820	2262.51
282540	72.21	730840	928.46	850134	212.26	841581	1712.33
410449	70.54	30613	871.42	842410	191.79	350691	1269.67
851829	47.24	841810	504.56	481840	159.35	761090	1265.67
490600	46.33	841451	502.91	843041	127.71	240120	1132.39
853180	45.91	441520	350.84	842619	126.62	830241	850.01
391110	38.84	900220	318.95	842810	124.13	841583	827.01
291612	37.86	850164	316.75	841989	105.62	721230	620.86

Note: Description of HS codes can be found in Annex Tables.

Finally, it may be of interest to know the Singaporean products that manage to increase its exports to the Indian market quite rapidly. While the detailed information can be found in

Annex Tables 32-35, Table 11 provides a list of top 10 products under each of the scenarios simulated based on the percentage change in export of individual products at the HS 6-digit level. Singapore's exports of organic chemicals (HS 29), electric machinery, equipment and parts (HS 85), leather and leather products (HS 41), and inorganic chemicals (HS 28) are likely to have expanded rapidly following the implementation of the early harvest schemes. With the tariff elimination scheme, the Singaporean exports that are expected to benefit most (in terms of percentage increase) are locomotives (HS 86), miscellaneous edible preparations (HS 21), and articles of iron and steel (HS 73). Nuclear reactors, boilers, and mechanical appliances (HS 84) and electric machinery, equipment and parts (HS 85) are predicted to be important Singaporean exports under the phased reduction of tariffs and, to some extent, also under the last scenario of the abolition of sensitive list.

VI. Concluding Remarks

This paper has made an attempt to assess economic impacts of three preferential trading arrangements involving India, namely India-Sri Lanka Free Trade Agreement, South Asian Free Trade Agreement (SAFTA), and India-Sri Lanka Free Trade Arrangement. Based on the nature of various arrangements under each of these preferential trading systems, suitable quantifiable scenarios have been constructed to assess the potential implications. The key variables that have been of interest in quantitative exercise include, trade creation, trade diversion, and net trade effects; overall welfare effects; and the potential implications for tariff revenues. Quantitative assessments in the paper have been undertaken by exploiting a partial equilibrium model and an associated database that provides information on India's bilateral trade flows at a highly disaggregated level and protective structures as reflected in its tariff schedule.

The results suggest that in each case overall trade effects for India have been positive, i.e. in every case trade creation outweighs trade diversion. This paper has also investigated the sources of trade creation and at the same time has also identified the products causing trade diversion and their sources by rest of the world partners.

This paper provides the evidence of overall positive welfare effects for India in all the scenarios considered – although in some cases the resultant welfare effects turn out to be quite low.

This paper also provides estimates of tariff revenues forgone by India due to preferential treatment given to different partners. These estimates differ quite considerably and the paper has also identified the important revenue-sensitive individual commodities at a highly disaggregated level.

Under each scenario analysis, this paper has also identified individual imported commodities that expand relatively rapidly following the regional/bilateral liberalization measures. In most cases, it has also identified India's export items that stand to benefit from the reciprocal preferences received under the regional initiative.

To conclude the paper, it is important to remember a number of caveats associated with the methodology used in impact assessments. First, the assessment is made on what is known as 'ex ante' basis. Therefore, the estimated effects are predictions and no effort has been made to compare with actual 'ex post' outcomes, which in many cases are however not possible to undertake. Second, in this paper only tariff barriers have been consider as the factor determining trade flows. It is important to keep in mind that in many cases non-tariff barriers can be an important determinant of trade flows. Third, by its nature, the analysis is based on the existing trade flows. If there is very negligible trade to begin with, trade responses after regional/bilateral initiative are likely to be quite low. Fourth, it has not been possible to assess the dynamic aspects associated with new product development. That is while trade preferences may result in the development of new product and services, the model applied, and all trade models for that matter, cannot capture these dynamisms. Fifth, the empirical model used in this paper is partial in nature, and therefore the general equilibrium effects could not be captured, despite the use of highly disaggregated data used here which are usually not possible with general equilibrium framework. Finally, scenarios examined in this paper have been dealt with individually. One challenging improvement can be to consider several scenarios under a comprehensive framework.