CWS/WP/200/11

Trade Creation and Trade Diversion in the India-Sri Lanka Free Trade Agreement-A Sector Specific Analysis

Working Paper
January 2013

Sonam Choudhry, Murali Kallummal and Poornima Varma

Centre for WTO Studies,
Indian Institute of Foreign Trade

Table of Contents

INTRODUCTION 1
LITERATURE REVIEW 3
DATA SOURCES AND METHODOLOGY 5
3.1: Finger-Kreinin (FK) index 5
3.2: Trade Creation and Trade Diversion-Comparison of export and import prices 6
SMART-Partial Equilibrium Analysis and Theoretical Model 11
Theoretical Model 11
Trade Creation 12
Trade Diversion 13
RESULTS OF SMART ANALYSIS 15
5.1 a): Textiles and Clothing Sector 15
5.1 b): Articles of Base Metals and Machinery Equipment 18
CONCLUSIONS 24

List of Tables

Table 1: Trade Creation & Trade Diversion in Textiles from India's Perspective 15
Table 2: List of Top 10 Countries lost their Markets in Sri Lanka in Textiles Sector 16
Table 3: Trade Creation & Trade Diversion in Base Metals and Machinery Equipment from Sri Lanka's Perspective 18
Table 4: Top 10 Countries that Lost their Market in India due to the Agreement 19
Table 5: Trade creation & Trade diversion from India's perspective 21
Table 6: Top 10 countries that lost their market in Sri-Lanka due to the Agreement 21

List of Figures

Figure 1: Finger-Kreinin Index 6
Figure 2: Trends in the of unit value imports of India from Sri-Lanka and the rest of the world for top 100 trade diverting products 7
Figure 3: India's Imports from Sri-Lanka with respect to India's imports from World 8
Figure 4: Unit value of top trade creating commodities/products 9
Figure 5: India's imports from Sri Lanka of top 100 trade creating products 10
Figure 6: India's Export to Sri Lanka in Textiles 16
Figure 7: Average Unit Price in Textiles SectorData Source: WITS, Figure by Author 17
Figure 8: Share of India's Imports from Sri Lanka in Chapters 84 and 85 to Total Indian Imports from Sri Lanka 19
Figure 9: Average unit Prices of Chapters 84 and 85 20
Figure 10: India's exports to Sri Lanka in Chapters 84 and 85 22
Figure 11: Average unit prices chapter 84 and 85 (Global, India) 22

Figure 12: India's export to Sri Lanka - Chapter-87 23
Figure 13: Average Unit Prices - Chapter-87 23

List of Annex Figures

Annex Table 2: Schedule of Tariff Concession under ISFTA 27
Annex Table 3: Summary Table for India's Trade Complementarity Index (%) with 27

List of Annex Tables

Annex Figure 1: India's Average Applied MFN and Preferential Tariff 28
Annex Figure 2: Sri Lanka's Average Applied MFN and Preferential Tariff 28
Annex Figure 3: Sri Lanka Trade Flows with India (1996-2010) 28
Annex Figure 4: India's export in Textiles and Clothing Sector 29
Annex Figure 5: Sri Lanka's Export in the Textile and Clothing Sector 29

TRADE CREATION AND TRADE DIVERSION IN THE INDIA- SRI LANKA FREE TRADE AGREEMENT-A SECTOR SPECIFIC ANALYSIS

Sonam Choudhry[*], Murali Kallummal[†], Poornima Varma[‡]

ABSTRACT

The present study attempts to analyze the trade creation and trade diversion effects of the India Sri-Lanka FTA (ISFTA) at the sectoral level. The major sectors identified for the study are textiles, base metal and machinery equipments. The sector specific analysis is a departure from the existing studies that analyses the trade creation and trade diversion effects of the ISFTA. The methods that have been relied upon in identifying the sectors are the indices such as Revealed Comparative Advantage (RCA), Vertical Intra Industry Trade (VIIT) Finger-Kreinin (FK) and the unit values of exports and imports (taken as a proxy for export and import prices) and the trends in trade flows. After identifying the sectors that requires a close empirical scrutiny we use a partial equilibrium modeling approach (SMART model) to simulate the likely trade creation and trade diversion effects under the proposed tariff reduction scenarios. Overall, the results suggest that ISFTA will cause significant trade creation between the member countries than trade diversion among the non-member countries. The results from VIIT, FK and unit value analysis have also indicated that the ISFTA has paved the way for considerable product diversification as well as the quality up-gradation. Thus the analysis reflects that the industries like metal products, electronic equipment, chemical, machinery and equipment seems to be benefited from the Agreement.

KEYWORDS: *Free trade agreement, tariffs, trade creation, trade diversion.*

[*] M. Sc. Economic , TERI University Vasant Kunj Institutional Area, Presently M.Phil. Economics student at CESP Jawaharlal Nehru University, sonam.choudhry@gmail.com,

[†]Associate Professor, Centre for WTO Studies (CWS), Indian Institute of Foreign Trade (IIFT), Deemed University, under the Department of Commerce, Ministry of Commerce and Industry, New Delhi. The usual caveat applies.muralikallummal@gmail.com, muralik@iift.ac.in

[‡]Assistant Professor, TERI University, Vasant Kunj Institutional Area, New Delhi, poornimavarma@gmail.com

We wish to express our sincere gratitude to faculty members of TERI University for their valuable comments and suggestions during the presentations of earlier versions of this paper. We also express our profound gratitude to the Head and Professor of Centre for WTO Studies, IIFT, Mr. Abhijit Das who has been a source of constant encouragement and support at all stages in the preparation of this paper

SECTION I

INTRODUCTION

Over the past few decades an important addition to international trade arrangements between countries has been a significant expansion of Regional Trade Agreements (RTAs) across the global economy. As of 15 January 2012, there were around 319 RTAs in the global economy. Some of these agreements are simply free-trade agreements in which tariff and non-tariff barriers are reduced to boost the trade between the countries. The most sophisticated RTAs go beyond traditional trade policy mechanisms, to include regional rules on flows of investments, coordination of competition policies, agreements on environmental policies and the free movement of labor. In general the major objective of RTAs is to reduce trade barriers between the member countries-which imply discrimination against trade with non-member countries.

India's first Free Trade Agreement (FTA), the India-Sri Lanka FTA (ISFTA) was signed in December 1998, and came in to force in 2000. India and Sri Lanka account for the largest bilateral trade flow in the South Asian Association for Regional Cooperation (SAARC) region. As a part of the agreement both countries agreed with the need to protect or safeguard their sensitive domestic industries and these industries came under the negative list category. The product categories in the positive list attained full concessions whereas products in the residual list were treated as products that would receive phased tariff reductions. Also the Rules of Origin (ROO) were used to specify the criteria for a product to qualify for concessions from the importing member country. Figure A.1 and A.2 in annex shows the comparison of India's (Sri Lanka's) average applied MFN tariff with its preferential tariff for Sri Lanka (India). Table A1. provides more details about the commitment of the FTA partners.

The ISFTA has provided a further impetus to the trade between the countries. A sustained and increasing growth of trade was observed over the years between the two countries, although due the economic global crisis the bilateral trade declined to US $2.023 billion in 2009. In 2007 the trade turnover was about US $3266 million whereas it was about US$ 3265 million in 2008. This is almost five times higher as compared to the trade turnover in 2000 (US$658 million

The composition of trade has also changed with Sri Lanka exporting more of manufacturing commodities as compared to earlier exports of agricultural commodities.

The main objective of the present paper is to analyze the trade creation and trade diversion effects of the ISFTA on the sectors identified for the purpose of the study. The major sectors identified for the analysis are textiles, base metal and machinery equipments. This paper is organized as follows: Section 2 presents literature review. Section 3 discusses the data and methodology used for analysis of ISFTA. Section 4 gives a brief outline of the theoretical model. Section 5 deals with the trade creation and trade diversion effects of ISFTA using partial equilibrium approach of SMART. Concluding observations are discussed in section 6.

SECTION II

LITERATURE REVIEW

Previous studies have analysed various free trade agreements and its trade creation and diversion effect. However, the studies for India and Sri-Lanka FTA are very limited. The empirical framework estimating these effects is particularly important. This is because of the fact that as per the theoretical literature on the RTA, a particular agreement may be beneficial or harmful depending upon the countries involved and the extent of trade created relative to the trade which is diverted (Panagariya, 2000). As Burfisher et al (2001) noted, the impact of regional trade agreements are essentially an empirical issue that must be settled by data analysis.

As far as the studies on ISFTA are concerned, the analysis undertaken by Mukherji et al. (2002) showed a modest increase in trade for India's imports from Sri Lanka and considerable increase in Sri Lankan imports from India. In addition to this the study noted that there was an increase in the number of new products in Sri-Lankan export basket which points out the possibility for export diversification. Another analysis by Weerakoon and Thennakoon (2006) showed that in absolute terms, Sri Lanka's export earnings increased from US$ 58 million in 2000 to US$ 566 million by 2005. However there was a fall in export earnings in 2006 due to some trade dispute.1 The analysis also showed a considerable increase in the trade in investment and services between the two countries.

ISFTA has been more constructive and progressive as compared to the regional SAFTA agreement which was seen to be more restrictive in terms of the negative lists being maintained (Weerakoon and Thennakoon, 2006). For Sri Lanka in particular, SAFTA offers much less favourable access to the Indian market, both in terms of the depth of liberalization and the period of implementation. Most recent study in the context of ISFTA was carried out by Joshi (2009) which was based on a method developed by Romalis (2005). It was seen that a 1 per cent reduction in ISFTA's preferential tariffs will cause a 1.12 per cent reduction in imports by the

[1] Sri Lanka's export earnings increased prior to 2006 mainly due to the exports of two items - copper and vanaspati. The export of these products increased not necessarily due to Sri Lanka having a comparative advantage in the production but due to tariff arbitration by Indian manufacturers who invested in the production of these products in Sri Lanka. Sri Lanka's share of exports to India in vanaspati rose from one per cent in 2002 to 25.6 percent of total exports by 2005. The main reason for this phenomenon was that the Indian investors established their processing plants in Sri Lanka to make use of the preferential tariff treatment.

ISFTA countries from the rest of the countries analysed. When author substituted US, EU15, Indonesia, Australia, Switzerland and Malaysia respectively as ‘country 2’ (forming six more panels) it was seen that there is a trade creation. Thus a slight trade creation effect was observed in the non-ISFTA members.

There is hardly any study that focuses on specific sectors. The impact of any regional agreements between countries is expected to have region specific, sector specific as well as product specific implications. This is more apt in the case of country like India due to its diverse characteristics. The major objective of the present study is to analyse the sector specific impact of ISFTA.

SECTION III

DATA SOURCES AND METHODOLOGY

The present study utilises the 6 digit (nomenclature HS 1996) trade and tariff data collected from the WITS database for a period of 1996 to 2010, i.e., 10 years after and 5 years before the signing of ISFTA. The other data sources has been used for this study are Global Trade Atlas (GTA) of Global Trade Information (GTI) services, Ministry of Commerce, Customs union of Sri-Lanka, United Nations Development Programme (UNDP), International Monetary Fund (IMF), Asia-Pacific Research and Training Network on Trade (ARTnet) and World Bank.

In order to identify the sectors that demand further empirical scrutiny, calculation of the unit values of exports and imports between the two countries as well as the countries with the rest of the world, Vertical Intra-Industry Trade (VIIT) analysis, Import Dependency Index, Export Propensity Index, Revealed Comparative Advantage (RCA) index and Finger-Kreinin (FK) index etc has been carried out in this study. The trade creation and diversion effects of the major sectors have been analysed using the partial equilibrium analysis tool, SMART developed by UNCTAD.

3.1: Finger-Kreinin (FK) index

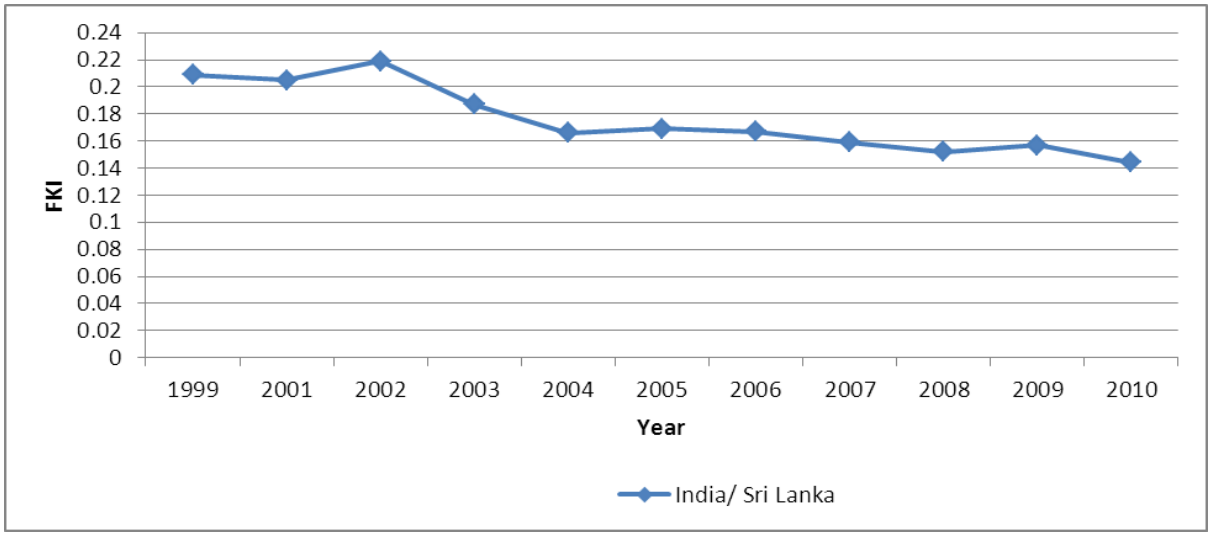
FK index can be used to measure the similarity between India and Sri-Lanka's trade with respect to the rest of the nations. If the countries have similar trade and production structures, bilateral trade liberalization is likely to result in 'trade creation', whereas if the structure of trade is dissimilar, bilateral trade liberalization would result in 'trade diversion'. The formula for the FK index is as follows:

$$FK^{k}_{i\,j} = \sum_{I} min\left[\left(\frac{x^{k}_{i1\,j}}{X_{i1\,j}}\right), \left(\frac{x^{k}_{i2\,j}}{X_{i2\,j}}\right)\right]$$

In the above equation, i_1 and i_2 represents country 1 and 2 respectively. j refers to the destination country, x^k refers to the trade flow in product k, X refers to the total trade flow. So x^k_{i1j}/X_{i1j} is the share of product k in country 1's total exports to the destination country (j). x^k_{i2j}/X_{i2j} is the share of product k in country 2's total exports. If this index is 1 then it shows that the share of exports out of total exports going to destinations is identical across India and Sri Lanka whereas if this

index is zero then the exports are completely divergent. Figure 1 shows the Finger-Kreinin Index for India and Sri-Lanka 's exports to the World is declining over a period of time i.e., from 1999 to 2010.

Figure 1: Finger-Kreinin Index



Data Source: Trade Sift and WITS

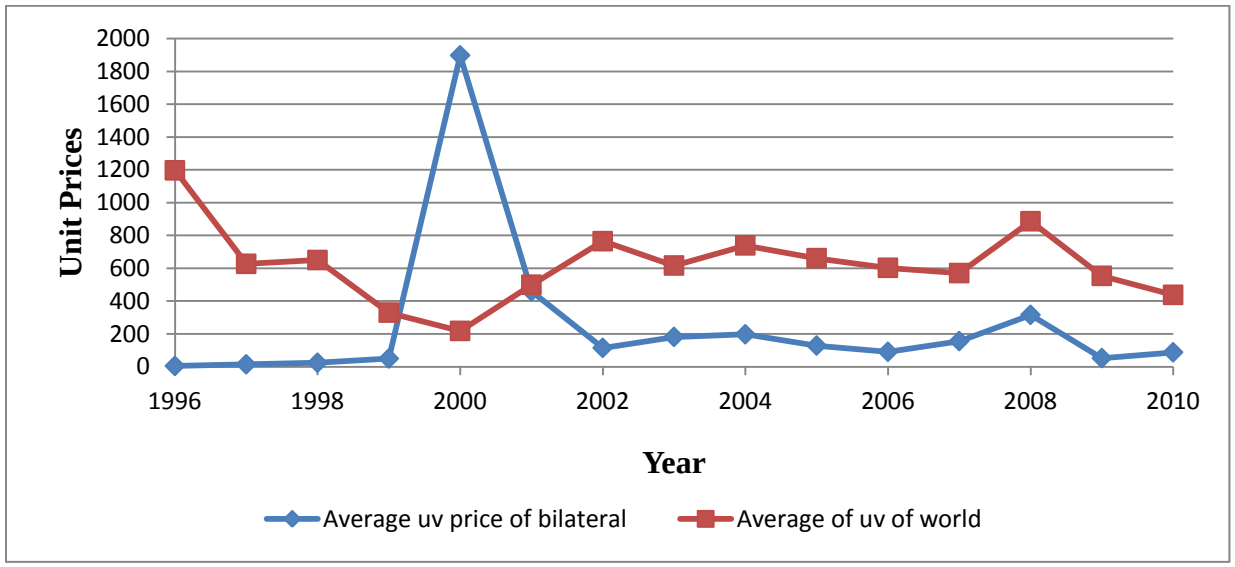
This indicates that the exports of the countries are getting diversified especially after the signing of the FTA. *The* results are in line with the results obtained for the analysis of Vertical and Horizontal Intra Industry Trade (VIIT & HIIT) (Choudhry, 2012). The results showed that the structure of trade between India and Sri-Lanka after the FTA was moving closer to VIIT-indicating trade diversification.

3.2: Trade Creation and Trade Diversion-Comparison of export and import prices

The next step is to identify the sectors in which we would like to make a detailed empirical scrutiny. The unit values of exports and imports are taken as a proxy for export and import prices. Trade diversion occurs when RTA diverts trade away from a more efficient supplier outside the RTA towards a less efficient supplier within the RTA. In this case the unit value of imports from say Sri Lanka for a particular product will be higher than the unit value of imports from rest of the world if there is a trade diversion. The period of analysis is divided between pre and post FTA by taking the year 2000 as the benchmark.

The analysis is undertaken at the HS- 6 digit level to identify the top 100 products in which we expect a possibility for trade diversion by analyzing the unit prices as well as trade flows. Accordingly, the majors chapters are soap, organic surface-active agents, lubricating preparations, artificial waxes, prepared waxes (chapter 34), miscellaneous chemical products (chapter 38), rubber and articles (chapter 40), cotton (chapter 52), man-made filaments (chapter 54), special woven fabrics; tufted textile fabrics; lace; embroidery (chapter 58), knitted or crocheted fabrics (chapter 60), articles of apparel and clothing accessories, knitted (chapter 61), tools implements, cutlery, spoons and forks, of base metal (chapter 82), miscellaneous articles of base metal (chapter 83), nuclear reactors, boilers, machinery and mechanical appliances; parts (chapter 84), electrical machinery and equipment, sound recorders, television image (chapter 85), vehicles other than railway or tramway rolling stock, and parts (chapter 87), aircraft, spacecraft, and parts (chapter 88) and optical, photographic cinematographic measuring, checking precision, medical or surgical instruments (chapter 90).

Figure 2: Trends in the of unit value imports of India from Sri-Lanka and the rest of the world for top 100 trade diverting products



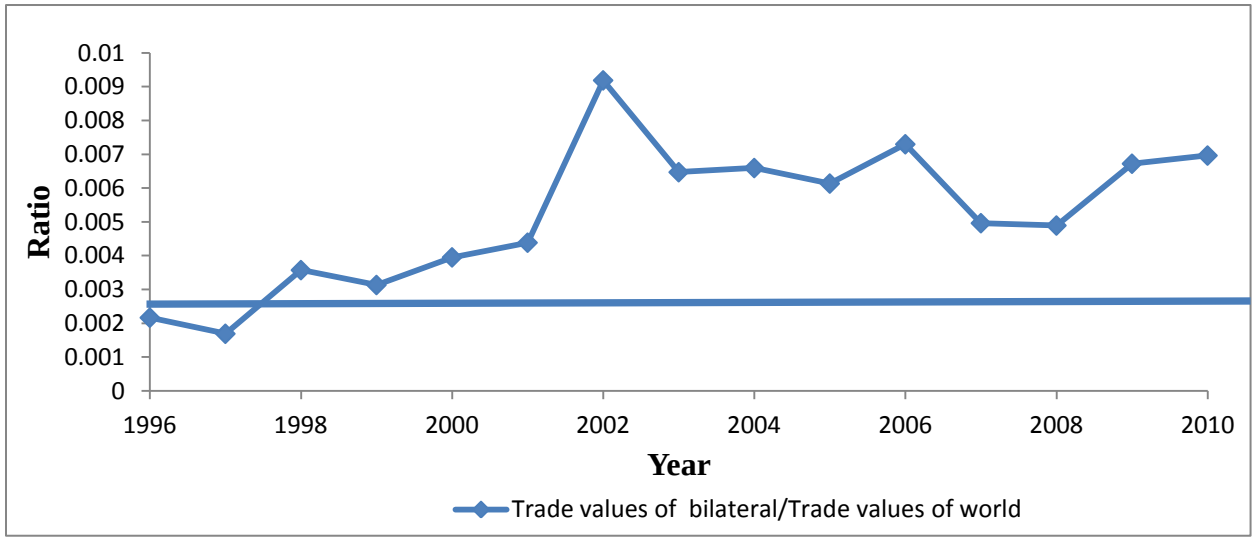
Data Source: WITS, Figure by Author

Figure 2 shows the average unit value of India's imports from world as well as average unit value of India's imports from Sri-Lanka in the case of above identified products. The average unit values of bilateral trade declined sharply after 2001 and the gap between the two increased

over the period of time. The decline in unit value of imports from Sri-Lanka to India can be attributed to the concessions extended by India towards Sri-Lanka after the formation of FTA.

The next figure (figure 3) shows the ratio of India's imports from Sri-Lanka with respect to India's imports from the world which have increased quite considerably over the period of time. This analysis indicates that not only the unit values of imports from Sri-Lanka has declined after the signing of the agreement but the actual amount of imports from Sri-Lanka to India has also increased over a period of time. This shows that there is a possibility of some amount of trade diversion that happened in favor of Sri-Lanka.

Figure 3: India's Imports from Sri-Lanka with respect to India's imports from World



Data Source: WITS, Figure by Author

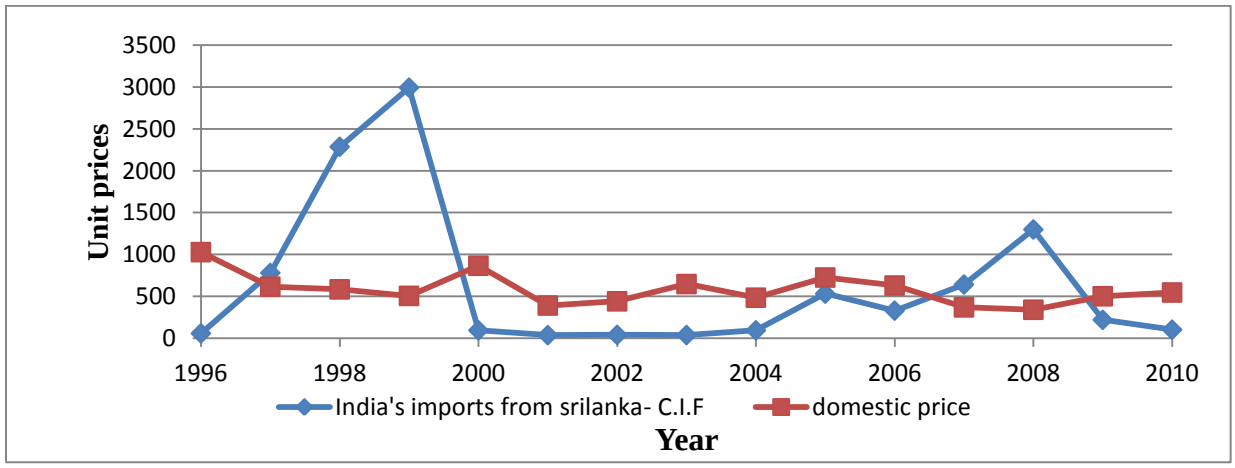
Similar analysis has been carried out for identifying top 100 trade creating products. Trade creation happens when there is an additional trade that occurs between members of a regional trading arrangement that replaces what would have been sourced in the importing country itself were it not for the free trade agreement.

The comparison of import prices of products from Sri-Lanka to India with respect to the export prices of products from India to world is undertaken for the purpose of identifying top 100 trade creating products. India's export prices to world are considered as a proxy for domestic prices. Import prices are c.i.f prices whereas the export prices are f.o.b prices. Therefore the conversion factor of 0.13 has been used for the purpose of analysis. The assumption which has been made in

this analysis is that if the domestic prices are greater than import prices then we can say that the imports from Sri-Lanka replaced the high cost domestic production in India. The analysis showed that the products such as textiles, base metals and machinery equipment are most likely to contribute towards trade creation.

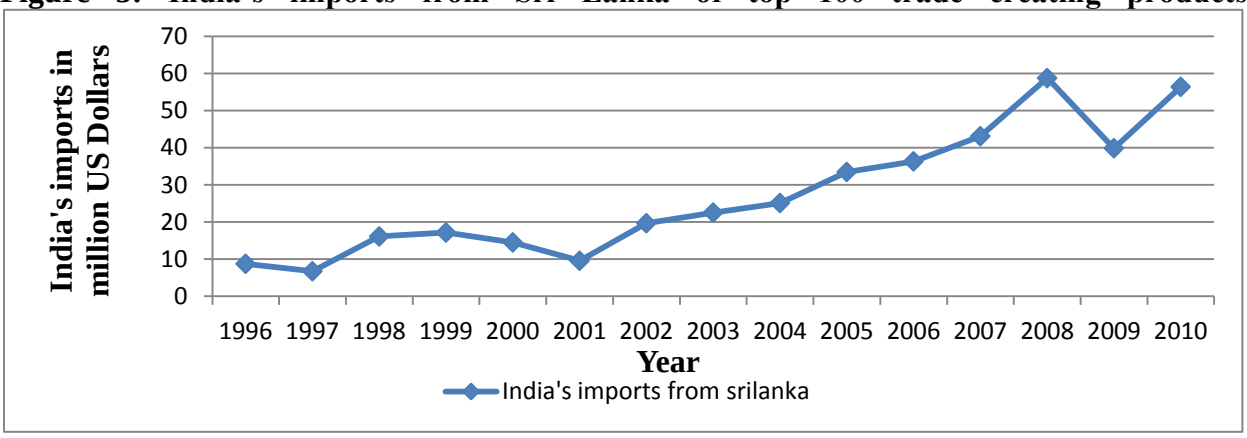
Figure 4 shows the average unit value of India's exports to world and the average unit value of India's imports from Sri-Lanka. The analysis showed that the domestic prices were higher than the import prices in almost all the years except 1997 to 1999 as well as 2007 and 2008. The higher domestic prices for the commodities analyzed shows that there is a possibility of increased imports from Sri-Lanka in the coming years as well. This also indicates trade creation as there is a possibility for high cost domestic production to get replaced with low cost imports from Sri-Lanka. Figure 5 shows an upward trend in imports of these top 100 products from Sri-Lanka to India.

Figure 4: Unit value of top trade creating commodities/products



Data Source Comtrade (W.I.T.S), Figure by Author

Figure 5: India's imports from Sri Lanka of top 100 trade creating products



Source Comtrade (W.I.T.S), Figure by Author

SECTION IV

SMART-Partial Equilibrium Analysis and Theoretical Model

The study utilizes SMART model[1] to do a partial equilibrium analysis to simulate the impact of tariff reduction scenarios. One of the advantage of using SMART is that the model has the ability to analyze the effects of trade policy reforms in the presence of imperfect substitutes and is more adequate than the homogenous good model when examining tariff preferences, as it avoids corner solutions. The model can be used to analyze the tariff effect of a single market on disaggregated product lines. The elasticity values (i.e., 1.5) in the current version of the SMART model are primarily based on the calculations by Stern et al (1976), which are quiet old and out-dated. Following Veeramani's approach (2010), we have used the import demand elasticities calculated by the World Bank (Kee, Nicita, and Olarreaga, 2008) instead of the elasticity value available from the SMART.

Theoretical Model

In this section, we will briefly discuss the theoretical framework of the model (Laird and Yeats (1986)[2]. Below are simplified import demand and export supply functions and equilibrium is attained when imports is equal to exports. Country j's (India) import demand function (M) for the ith commodity produced in the kth partner stated (Sri-Lanka) can be written as;

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

The kth partner's (Sri Lanka) export supply function for ith commodity can be expressed as

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

The partial equilibrium can be written as,

[1] This static partial equilibrium model was developed by UNCTAD and World Bank in the 1980's, which is used to analyze the impact of General Agreement on Trade and Tariff (GATTs) rounds. The main theory behind this tool was brought from Laird and Yeats (1986). This model can be easily accessed through the World Bank's World Integrated Trade Solution (WITS). The WITS provides various databases on trade flows, tariff and trade policy instruments. WITS have various analytical tools which support simulation analysis.

[2]Laird, S. and Yeats, J. A., 1990. Two Sources of Bias in Standard Partial Equilibrium Trade Models. International Economics Department, The World Bank.
Jammes .O and Olarreaga M (2005). Explaining SMART and GSIM Work in Progress, World Bank ;
Othieno L and Shinyekwa S (April 2011) . Trade, revenue and welfare effects of the east African community customs union principle of asymmetry on Uganda: An application of WITS-SMART simulation model

$M_{ijk} = X_{ijk}$……(3)

When there is a free trade agreement the domestic price of i[th] commodity in the India's market will be equal to k[th] partner's export price plus transport and insurance charges.

In other words price would change with change in the *ad valorem* incidence of any tariff as shown in equation 4:

$P_{ijk} = P_{ijk}(1 + t_{ijk})$……(4)

Equation 5 expresses the export revenue earned by the kth partner as follows

$R_{ikj} = X_{ikj}.P_{ikj}$……(5)

Trade Creation

As mentioned earlier the trade creation effect can be defined as the increased demand for the i[th] commodity exported by Sri-Lanka to India as a result of the lowering of price due the reduction in tariffs. Similar results are expected in Sri-Lanka's market for Indian products as well. Therefore, using equation (1) to (5) we can write the formula for trade creation. First, it is possible to derive the total differential of domestic price with respect to tariffs and foreign price from Eq. (4) as;

$\partial P_{ijk} = P_{ijk}.\partial t_{ijk} + (1 + t_{ijk})\partial P_{ikj}$ ……(6)

The simplified expression for the elasticity of import demand with respect to the domestic price can be written as follows:

$\frac{d\,M_{ijk}}{M_{ijk}} = E_m \frac{d\,P_{ijk}}{P_{ijk}}$……(7)

After substituting Eq. (4) and (6) into Eq. (7) we will get;

$\frac{d\,M_{ijk}}{M_{ijk}} = E_m \frac{d\,t_{ijk}}{(1+t_{ijk})} + \frac{d\,P_{ijk}}{P_{ijk}}$……(8)

By rearranging we can write the elasticity of export supply with respect to the world price as follows

$\frac{d\,P_{ikj}}{P_{ikj}} = (\frac{d\,X_{ikj}}{X_{ikj}})/E_x$……(9)

From Eq. (4) it follows that

$$\frac{d\,M_{ijk}}{M_{ijk}} = \frac{d\,X_{IKJ}}{X_{ikj}} \quad \text{.....(10)}$$

Substitution of Eq. (10) into (9) and the result into (8) would produce the expression that can be employed to compute the trade creation effect. From Eq. (4) this is equivalent to Sri Lanka's growth of export of the i[th] commodity to the j[th] country. The expression for *trade creation* can be written as

$$TC_{ijk} = M_{ijk}.E_m \frac{d\,t_{ijk}}{(1+t_{ijk}).\left(1-\frac{E_m}{E_x}\right)} \quad \text{.....(11)}$$

It may be noted that if the elasticity of export supply with respect to the world price is infinite then the denominator on the right hand side of Eq. (11) becomes unity and can be ignored.
Then we can re-write the above expression as

$$TC_{ijk} = M_{ijk}.E_x \frac{(1+t^1{}_{ijk})-(1+t^0{}_{ijk})}{(1+t^0{}_{ijk})} \quad \text{.....(11.a)}$$

Trade Diversion

Trade diversion is the diversion of trade away from non-members to member countries. In other words trade diversion occurs when a preferential trade agreement replaces an efficient producer from outside the free trade area with a less efficient producer within the free trade area or preferential area.

Baldwin and Murray (1977) estimated trade diversion as follows

$$TD_{ijk} = TC_{ijk}.\frac{Mn_{ijk}}{V_{ij}} \quad \text{.....(12)}$$

This is when the elasticity of substitution between alternative suppliers is not known. For using the above formula we need to calculate the level of import penetration by non-preference-receiving countries, that is, the level of imports from non-preference receiving countries in apparent domestic consumption (defined as domestic output of the i[th] *plus* imports of i[th] *less* exports of the i[th] commodity).

Whereas, if explicit values for the elasticity of substitution between goods from different sources are available, then it is not necessary to use the approach outlined above. It is possible to define

the elasticity of substitution as the percentage change in relative shares associated with a one percent change in the relative prices of the same product from alternative sources as follows:

$$\sigma_M = \frac{d\left(\frac{\sum M_{ijk}}{\sum M_{ijK}}\right)/\left(\frac{\sum M_{ijk}}{\sum M_{ijK}}\right)}{d\left(\frac{\sum P_{ijk}}{\sum P_{ijK}}\right)/\left(\frac{\sum P_{ijk}}{\sum P_{ijK}}\right)} \quad \text{..... (13)}$$

Where k represents imports from k^{th} country and K denotes import from the rest of the World. From this expression and through substitution and rearranging we obtain trade diversion equation as follow:

$$TD_{ijk} = \frac{M_{ijk}}{\sum_k M_{ijk}} \frac{\sum_k M_{ijk} \sum_K M_{ijK} \quad \sigma_M . \frac{\left(\frac{d(P_{ijk})}{P_{ijK}}\right)}{\frac{(P_{ijk})}{P_{ijK}}}}{\sum_k M_{ijk} + \sum_K M_{ijK} \quad + \sum_k M_{ijk} \sigma_M . \frac{\left(\frac{d(P_{ijk})}{P_{ijK}}\right)}{\frac{(P_{ijk})}{P_{ijK}}}} \quad \text{.....(14)}$$

The above equation can be written as

$$TD^{ISFTA} = \frac{M^{Sri} M^{ROW} \left(\frac{1+t^1}{1+t^0} - 1\right) \sigma_m}{M^{Sri} + M^{ROW} + M^{Sri} \left(\frac{1+t^1}{1+t^0} - 1\right) \sigma_m} \quad \text{.....(15)}$$

The above equation M^{SRI} and M^{ROW} represents current imports and $t^1$and t^0 present and initial period's imports tariff on Sri Lanka imports in the destination – India with $t^1 < t^0$. σ_m Is the elasticity of substitution between Sri Lanka and the rest of the world (ROW) imports into the concerned country i.e. India. Trade diversion thus depend on the current level imports by Sri Lanka and ROW, the percentage change of tariff facing Sri Lanka imports with that of world remaining unchanged and the elasticity of substitution of imports. There is a direct relation between trade diversion and elasticity of substitution, the greater the elasticity the greater will be the trade diversion effect. After providing the theoretical underpinnings of SMART we will now turn to analyze the impact of trade creation and diversion effects for the products identified in this study i.e., chapters 50-62 (textiles) and 80-93 (metals, engineering equipment).

SECTION V

RESULTS OF SMART ANALYSIS

5.1 a): Textiles and Clothing Sector

One of the main characteristics of the South Asian countries including India and Sri Lanka is that they have comparative advantage in labor intensive sectors such as textiles. As per the agreement, Sri-Lanka has provided phased reduction in tariffs - 35 per cent in 2003, 70 per cent in 2006 and 100 per cent in 2008 concession was provided for textiles imported from India. India's exports of these products to Sri Lanka also increased from around 121 million US dollars in 1999 to around 396 million US dollars in 2009-10. The same trend can be observed in the case of India's exports to the world as well (See figure A. 4 in annex).

MFN tariff of Sri Lanka for textiles sector in most of the chapters was zero but only for few products the MFN was above zero. Trade creation and diversion will happen in those products where MFN tariff rate is above zero and preference treatment was provided to India. The trade creation and trade diversion effects for textiles calculated using the SMART from the point of view of India is given in table 1. The results show that the trade creation effect dominates the trade diversion effects. For example, for the product category in chapter 62 i.e., articles of apparel and clothing accessories, not knitted, the trade creation is around 555 thousand US Dollars and trade diversion around 248 thousand US Dollars.

Table 1: Trade Creation & Trade Diversion in Textiles from India's Perspective

Chapter	Trade Creation Effect in 1000 USD	Trade Diversion Effect in 1000 USD	Trade Total Effect in 1000 USD	Average Old Duty Rate	Average New Duty Rate
57	124.08	23.696	147.777	9.269231	0
58	145.272	175.728	321.001	9.75	0
59	0.046	0.066	0.112	9.75	0
61	123.408	108.09	231.497	9.65451	0
62	555.065	248.889	803.964	9.75	0
63	113.663	85.014	198.679	9.75	0

Source: SMART (WITS)

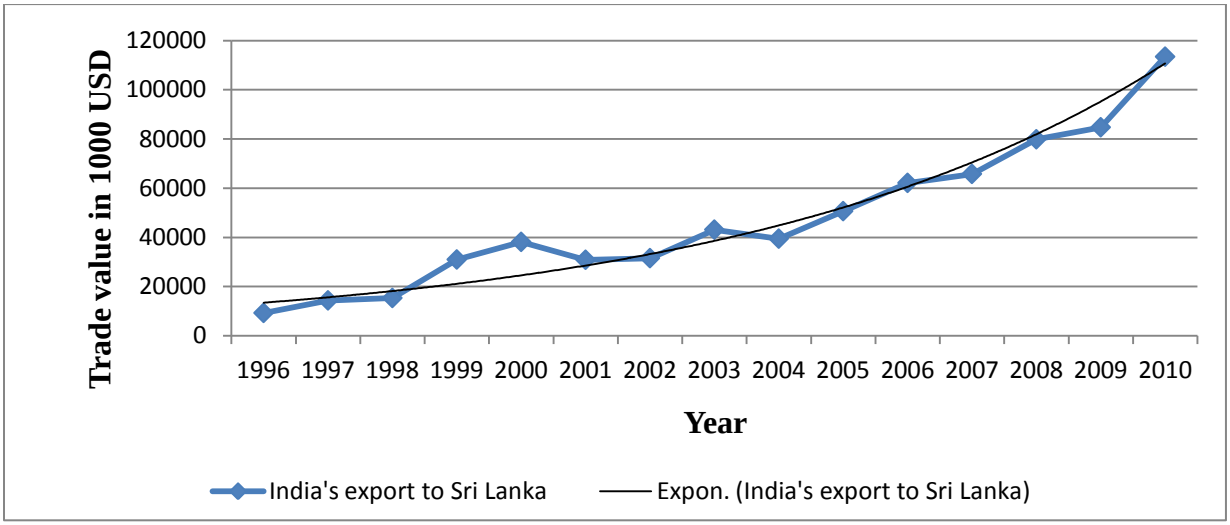
Table 2: List of Top 10 Countries lost their Markets in Sri Lanka in Textiles Sector

Country	Trade Diversion Effect in 1000 USD
China	-131.315
Hong Kong, China	-79.16
Indonesia	-58.089
Japan	-10.067
Korea, Rep.	-18.2
Singapore	-18.595
Taiwan, China	-49.684
Thailand	-122.076
United Arab Emirates	-39.6
United Kingdom	-21.54
United States	-32.654

Source: SMART (WITS)

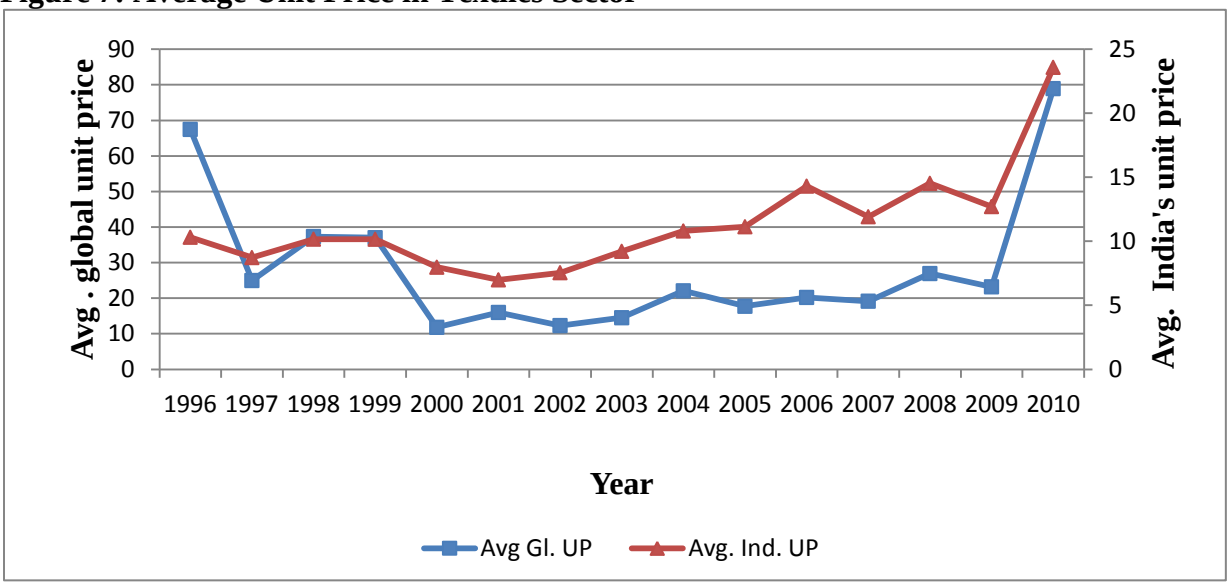
The trade diversion effect of the agreement was in the form of losing the market for ROW in Sri-Lanka as India expanded her market in Sri-Lanka by exporting greater share of textiles. Table 2 provides the details of the loss of trade that happened to the other trade partners of Sri-Lanka as a result of the implementation of FTA. The trade diverted for the above countries in favor of India can be understood from figure 6. The figure shows that there was a substantial increase in the exports of textiles from India to Sri-Lanka over the period of time.

Figure 6: India's Export to Sri Lanka in Textiles



Data Source: WITS, Figure by Author

Figure 7: Average Unit Price in Textiles Sector



Data Source: WITS, Figure by Author

A further analysis of the trends in unit values of textiles exported from India to Sri-Lanka showed an upward trend in the unit values of India's exports. On the other hand the quality of world's export in textiles sector to Sri Lanka has decreased over time (see figure 7). The higher unit values for India's exports can be due to the better quality of textiles and therefore high prices for the products exported from India to Sri-Lanka.

Textiles sector also plays a vital role in Sri Lanka's exports to India and the sector comes under the top 100 RCA sectors for Sri Lanka. In India and Sri Lanka free trade agreement, India has granted a preferential margin of 25 per cent with no quantitative restrictions for textile sector. Whereas, India has provided garment industry a preferential market access of 50 per cent for 8 million pieces per year out of which at least 2 million pieces are required to have Indian fabric content. But the sector is not covered largely by India's tariff liberalization scheme as a long list of products from this sector have made their way into India's sensitive list and high specific tariffs have also been introduced in addition to *ad valorem* tariffs to protect producers in this sector.

The benefit that Sri Lanka prevailed from the concession that India has given, is visible in the increase in India's exports from Sri Lanka. Since 2002 the total export value has increased dramatically in case of Sri Lanka's exports to bilateral country since 2002 (see figure A.5 in

annex). The value of Sri Lanka's export to India in textiles and clothing sector accelerated from 3842.933 ('000 US$) in 1999 to 34572.64 ('000 US$) in 2010.

5.1 b): Articles of Base Metals and Machinery Equipment

Electrical machinery, equipment, parts, ships, boats and floating structures contribute to about 23 percent of the total exports to India from Sri Lanka. Metals and engineering equipments constitute a major role in the import basket of Sri Lanka. India had granted most of its immediate zero duty concessions for machinery and mechanical goods and a tariff reduction to zero in 2003. Whereas Sri Lanka reduced the tariff over the years on base metals, machinery equipment by giving 35% concession in 2003 followed by 70% in 2006 and 100 % concession in 2008. The simulation results for base metals and machinery equipment are shown in Table 3. The results reveals that trade creation dominate over trade diversion in the case of most of the products.

The major product categories in the above mentioned chapters are nuclear reactor, boiler, machinery and mechanical appliance (84), electrical machinery equipment (85), and arms and ammunition (93). Table 4 provides the list of top 10 countries whose market share in India is declined due to the concessions offered by India to Sri-Lanka. The agreement resulted in greater imports from Sri-Lanka to India and lesser imports from the ROW.

Table 3: Trade Creation & Trade Diversion in Base Metals and Machinery Equipment from Sri Lanka's Perspective

HS Code	Trade Creation Effect in 1000 USD	Trade Diversion Effect in 1000 USD	Trade Total Effect in 1000 USD	Old Duty Rate	New Duty Rate
80	33.019	35.382	68.401	28.33	0
82	4.232	2.376	6.608	35	0
83	7.183	0.81	7.993	17.5	0
84	622.244	381.345	1003.589	21.64	0
85	32.981	42.074	75.054	20	0
87	20.251	15.585	35.836	35	0
89	27.819	15.61	43.429	5	0
90	33.449	48.187	81.637	12.5	0
92	0.5	0.151	0.652	35	0
93	258.375	2.256	260.63	35	0

Source: SMART-WITS

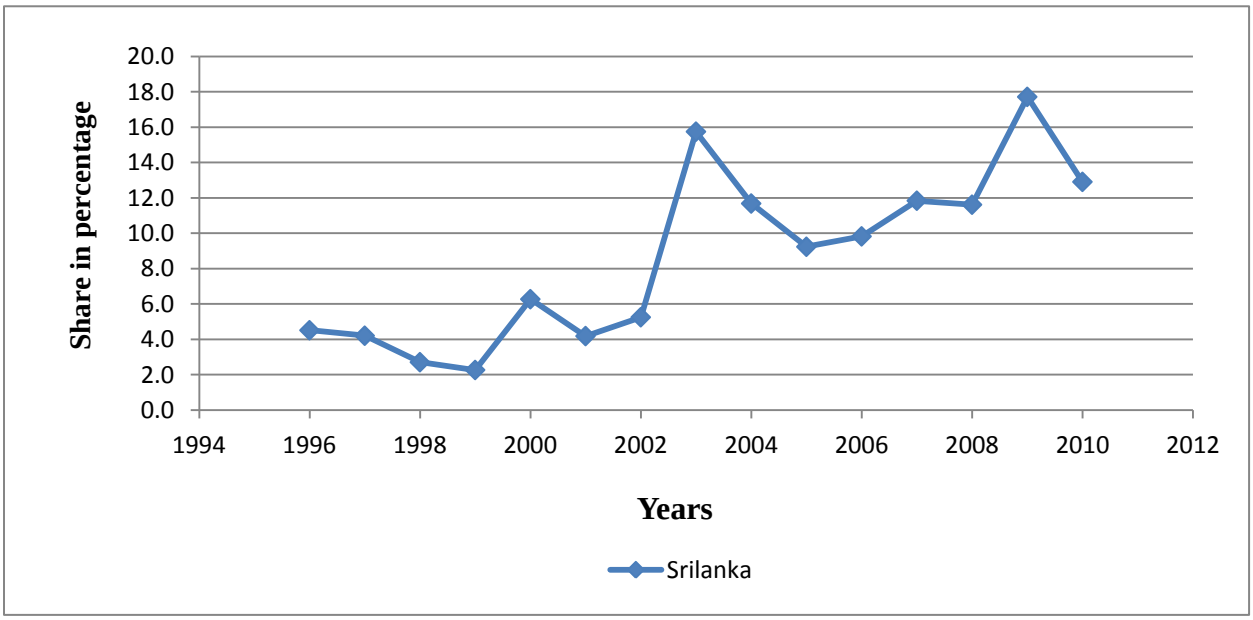
Table 4: Top 10 Countries that Lost their Market in India due to the Agreement

HS Code	Trade Diversion Effect in 1000 USD
United States	-61.205
Germany	-50.377
Italy	-45.51
China	-39.903
Singapore	-39.024
Malaysia	-38.89
Thailand	-27.55
Switzerland	-26.696
Japan	-26.226
Taiwan, China	-24.814

Source: SMART (WITS)

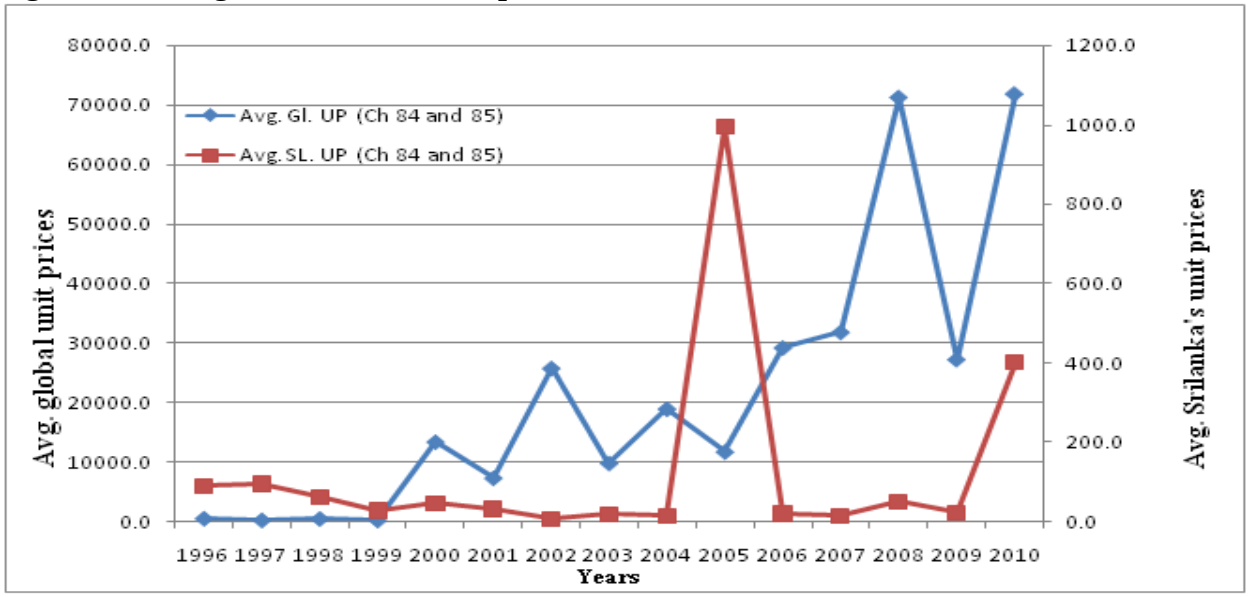
The trends in the share of exports of machinery equipment (chapter 84 & 85- major chapters) from Sri-Lanka to India in total exports shows that there was an increase in the exports of these products over a period of time (see figure 8). The share has increased from a mere 4.5 percent in 1996 to 13 percent in 2010.

Figure 8: Share of India's Imports from Sri Lanka in Chapters 84 and 85 to Total Indian Imports from Sri Lanka



Data Source – WITS, Author's calculation

Figure 9: Average unit Prices of Chapters 84 and 85



Data Source: WITS, Figure by Author

The unit value of import shows that the average unit prices of world over the year in the two chapters has been rising, and the quality of world exports to India seems to be of high quality. On the other hand, the unit prices of Sri Lanka in the recent years seem to be rising with an improvement in the overall quality of the products exported by Sri Lanka (figure 9).

Next, we will analyze the trade opportunities for India due to the tariff concessions offered by Sri-Lanka. Sri Lanka provided a phased reduction of tariffs for base metals and machinery equipment. The trade creation and trade diversion effects of these tariff reductions in Sri-Lanka have been analyzed using SMART and reported in table 5. A closer observation revealed that the products that experienced major trade effects are nuclear reactors, boilers, machinery and mechanical appliances (chapter 84), electrical machinery and equipment (chapter 85) and vehicles other than railway or tramway rolling stock (chapter 87).

Table 5: Trade creation & Trade diversion from India's perspective

Chapters	Trade creation in 1000 USD	Trade Diversion in 1000 USD	Trade Total effect in 1000 USD	Old Duty Rate	New Duty Rate
80	167.367	2.778	170.145	1.63	0
81	0.812	0.376	1.188	1.63	0
82	63.389	61.713	125.102	3.9	0
83	76.67	76.119	152.789	10.49286	0
84	1172.495	944.114	2116.609	4.378352	0
85	821.264	888.053	1709.317	7.867742	0
86	3.324	3.21	6.534	3.9	0
87	10001.94	2751.485	12753.43	6.420667	0
88	1.587	2.539	4.126	3.9	0
90	206.234	184.905	391.139	3.77844	0
91	48.839	21.856	70.695	17.21379	0
92	8.832	5.271	14.103	9.75	0
93	0.001	0.001	0.002	9.75	0

Source: SMART-WITS

Table 6: Top 10 countries that lost their market in Sri-Lanka due to the Agreement

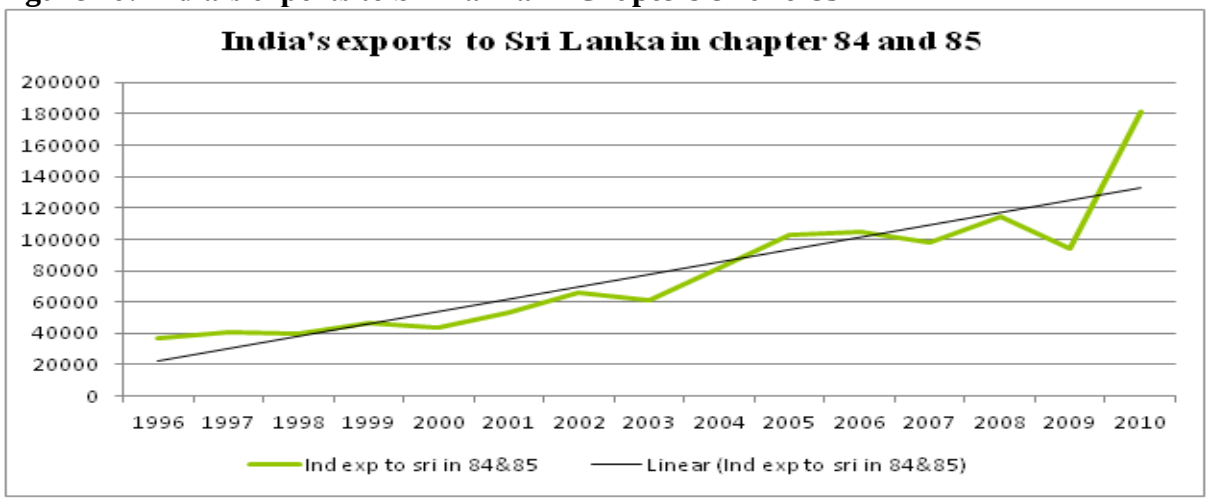
Country	**Trade Diversion Effect in 1000 USD**
Australia	-105.142
China	-1310.38
Germany	-165.565
Hong Kong, China	-121.894
Japan	-1440.01
Korea, Rep.	-83.128
Singapore	-551.139
Thailand	-187.769
United Kingdom	-179.382
United States	-89.446

Source: SMART-WITS

The agreement and the tariff reductions resulted in shifting Sri-Lanka's imports away from the ROW to Indian imports. As a result many countries lost their market in Sri-Lanka (Table 6).

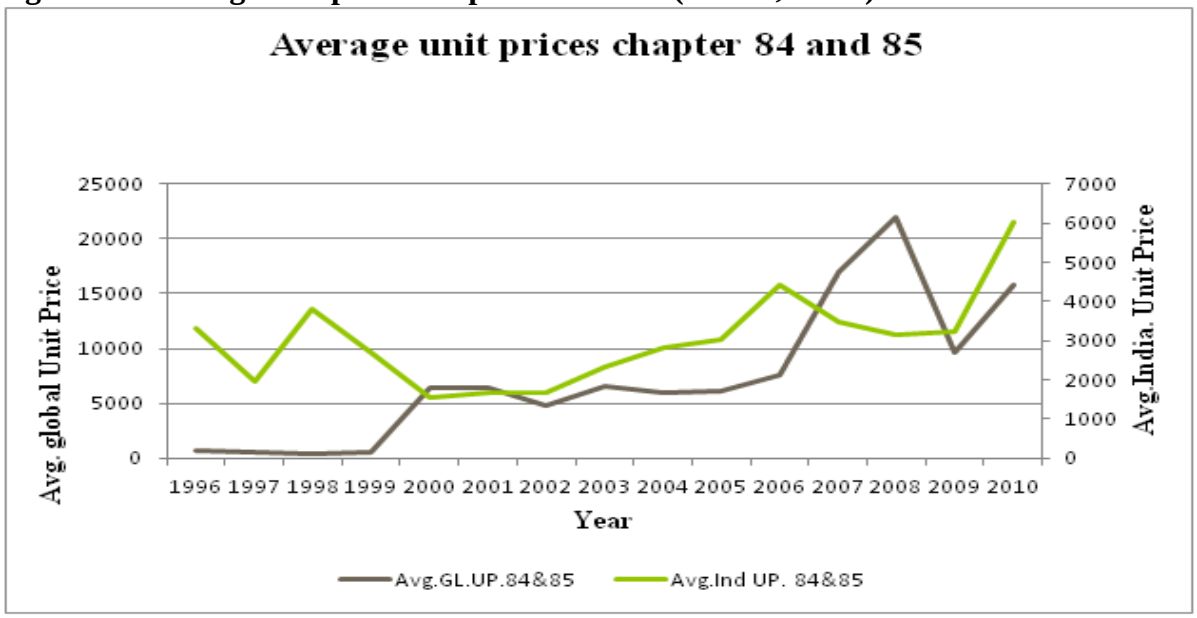
The Figure 10 also shows that the exports of these items from India to Sri-Lanka have increased over a period of time. As far as the quality differences are concerned, the average world unit prices over the years in the two chapters have been rising indicating an improvement in the quality of product that world exports to Sri Lanka. Whereas on the other hand unit prices of India in the recent years seems to be rising indicating an improvement in the quality of the product exported by India's to Sri Lanka (see Figure 11).

Figure 10: India's exports to Sri Lanka in Chapters 84 and 85



Data Source: WITS, Figure by author

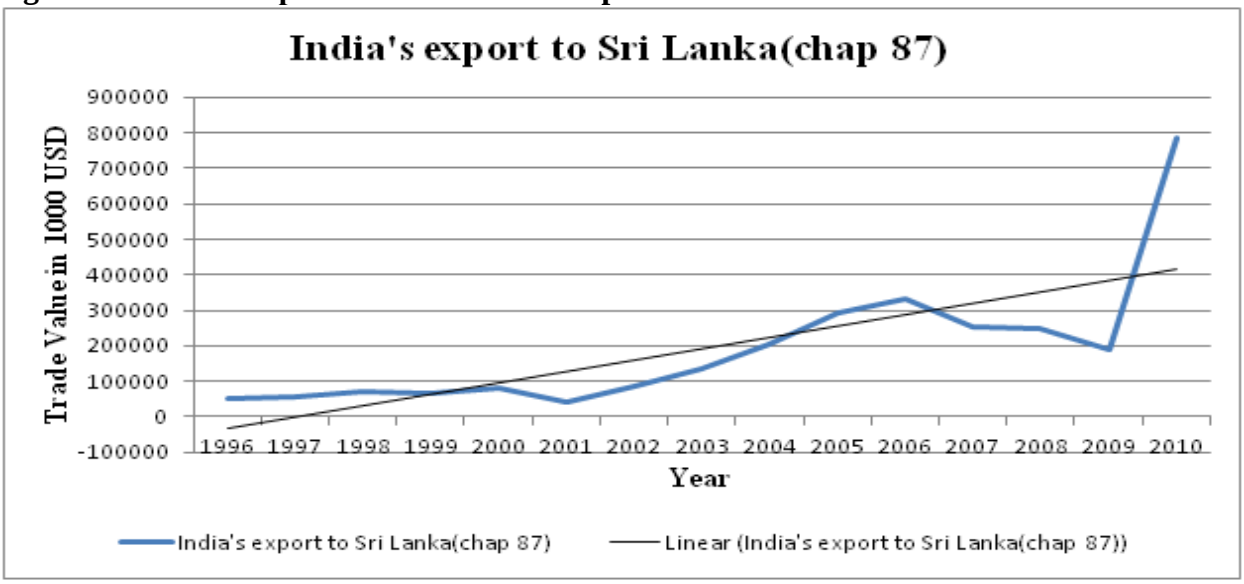
Figure 11: Average unit prices chapter 84 and 85 (Global, India)



Data Source: WITS, Figure by Author

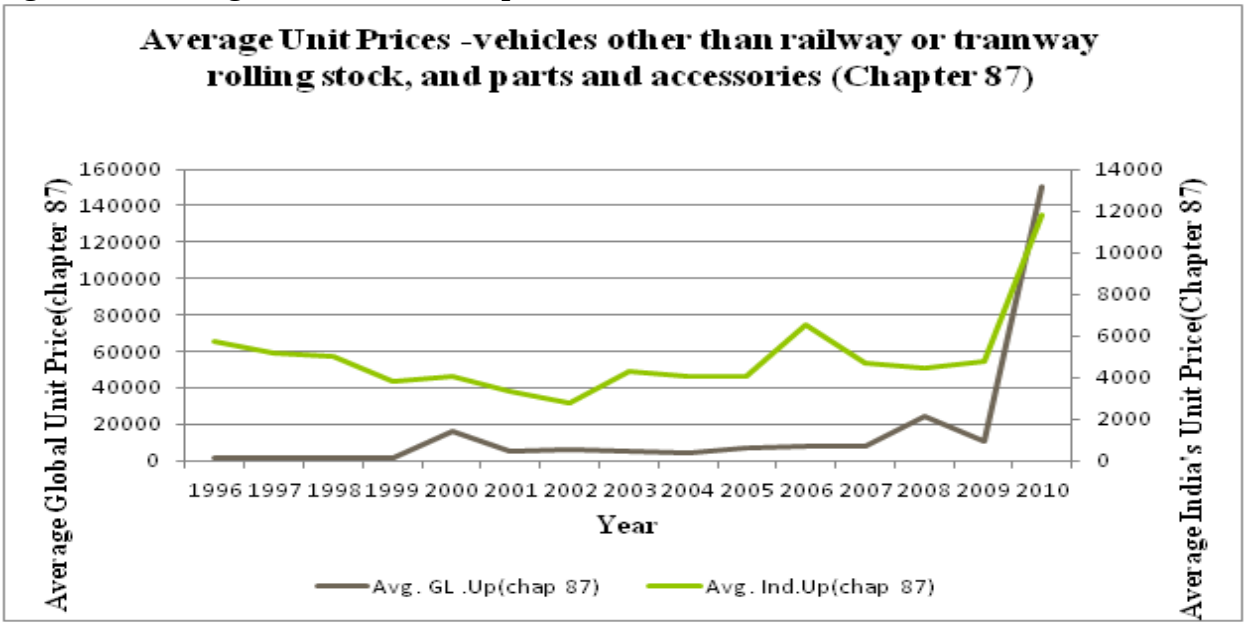
As chapter 87 i.e., vehicles other than railway or tramway rolling stock, and parts and accessories contributes to a large trade creation we looked into this chapter separately. Figure 12 shows that India's exports of these products to Sri Lanka have been remarkably improving over the years. Figure 13 shows the average unit value of India's export to Sri Lanka was also raising. This indicates that the quality of these products that has been exported from India to Sri Lanka was improving over the years.

Figure 12: India's export to Sri Lanka - Chapter-87



Data Source: WITS, Figure by Author

Figure 13: Average Unit Prices - Chapter-87



Data Source: WITS, Figure by Author

SECTION VI

CONCLUSIONS

To sum up, the India Sri Lanka free trade agreement was an important step taken by the countries to improve the economic complementarities between them. The agreement has resulted in more trade creation than the trade diversion effects. As expected, during the post agreement period there has been a remarkable improvement in the bilateral trade performance between India and Sri Lanka along with significant product diversification. This was especially true in the case of base metal and engineering products which are among the top most commodities traded between the two bilateral countries[1]. Not only there has been improvement in the trade performance but also it seems that the quality of products that have been traded has improved. Thus the analysis reflects that industries like metal products, electronic equipment, chemical, machinery and equipment necessaries seems to be benefited as a result of the enforcement of the agreement.

[1] Along with the unit value analysis carried out in the paper , an increase in vertical intra industry specialization (improvement in quality) in the major sectors over the period of time was observed.

REFERENCES

Baysan, T., Panagariya A. and Pitigal N., 2006. Preferential Trading In South Asia, World Bank (working paper).

(BRICS-TERN), (n.d.). India's Experiences On Preferential Trade Agreements (PTAs). CUTS International, Discussion Paper , IGIDR Mumbai.

Choudhry S. (2012). Trade Creation And Trade Diversion In India-Sri Lanka Free Trade Agreement (ISFTA):A Sector Specific Analysis, Major Thesis , T.E.R.I University.

Clausing, A. K., 2001. Trade Creation and Trade Diversion in the Canada - United States Free Trade Agreement. *The Canadian Journal of Economics / Revue canadienned 'Economique*, Vol. 34, No. 3, pp. 677-696.

Devadoss S., KropfJurgen, W. T., 1995. Trade Creation and Diversion Effects of the

North American Free Trade Agreement of U.S Sugar Imports from Mexico, *Journal of Agricultural and Resource Economics*, Vol. 20, No. 2, pp.215-230.

Harilal, K. N. and Joseph, K. J., 1999. India-Sri Lanka Free Trade Accord.

Economic and Political Weekly Vol. 34, No. 13, pp. 750-753.

Hirantha, W. S., 2011. From SAPTA to SAFTA: Gravity Analysis of South Asian Free Trade, India's Experiences On Preferential Trade Agreements (PTAs), Paper prepared for the launch meeting of BRICS Trade and Economics Research Network.

Yin H and Iris,Y., 2010. Trade Creation and Diversion Effects of ASEAN Free Trade Area (AFTA).

Jammes .O and Olarreaga M (2005). Explaining SMART and GSIM Work in Progress,

World Bank.

Joshi, V., 2009. An Econometric Analysis of India-Sri Lanka Free Trade Agreement.

Kee, H L, Nicita, A and M. Olarreage (2008). Import Demand elasticities and trade

distortions, Review of Economics and Statistics, 90(4), pp 666-682.

Kelagama, S. and Mukherji I. N., 2011. India- Sri Lanka Free Trade Agreement: Six Years Performance and Beyond. R.I.S (Research and Information System for developing countries).

Kelegam, S., 2003. Sri Lankan Exports to India: Impact of Free Trade Agreement. *Economic and Political Weekly*, Vol. 38, No. 30, pp. 3153-3154.

Kelegam, S., (n.d.). India-Sri Lanka Bilateral FTA: Sri Lankan Perspective on Emerging Issues.

Laird, S. and Yeats, J. A., 1990. Two Sources of Bias in Standard Partial Equilibrium Trade Models. International Economics Department, The World Bank.

Mukherji, I. N., Jayawardhana, T., Kelegama, S., 2002. Indo-Sri Lanka Free Trade Agreement :An Assessment Free Trade Agreement Of Potential And Impact.

Othieno, L. and Shinyekwa, I., 2011. Trade revenue and welfare effects of the east African community customs union principle of asymmetry on Uganda: an application of WITS- SMART simulation model. Economic Policy Research Centre.

Pant, M. and Sadhukhan, A., 2008. Does Regionalism Hinder Multilateralism: A Case Study of India, JNU(Discussion papers in Economics).

Veeramani and Saini, K.G. , 2010 . Impact of ASEAN-India FTA in the Plantation Sector.

Weerakoo, D., 2001. Indo-Sri Lanka Free Trade Agreement: How Free Is It?, *Economic and Political Weekly*, Vol. 36, No.8, pp. 627-629.

Weerakoon, D. and Thennakoon, J., 2006. India -Sri Lanka FTA. CUTS International Lessons for SAFTA

Annex Table 1: Schedule of Tariff Concession under ISFTA

Granting Country	Tariff Cuts	Items description
Sri Lanka	0 per cent removal of tariff	for items in Annexure D of the agreement . Around 1180 items were there in negative list(annexure D)
	100 per cent removal of tariff	for items in Annexure F-1 of the agreement . Total number of items under this category 319
	50 per cent removal of tariff followed by phased out removal of tariff	for items in Annexure F-II of the agreement (the margin will be deepened to 70 per cent, 90 per cent and 100 per cent respectively at the end of first, second and third year of the entry into force of the agreement). Total number of items under this category 889.
	Residual List	for remaining items by not less than 35 per cent before the expiry of three years. 70 per cent before the expiry of sixth year and 100 per cent before the expiry of eighth year. Total number of items under this category 2724.
India	0 per cent removal of tariff	for items in Annexure D of the agreement (Negative List) . Total number of items under this category -429
	25 per cent removal of tariff	for items in Chapters 51-56, 58-60, 63. Total number of items under this category-233
	100 per cent removal of tariff	for items in Annexure E of the agreement .Total number of items under this category-1351
	50 per cent removal of tariff	Up to 15Mn. Kgs. Of Tea, 2 Mn. pieces of garments, and 6 Mn. pieces of garments using Indian fabrics. On utilization of unrestricted quota, an additional quota of 2 million pieces out of 8 Mn. pieces is permitted .
	50 per cent removal of tariff followed by phased out removal of tariff	for remaining items (margin will be increased upto 100 per cent in two stages within three years. .Total number of items under this category-2799

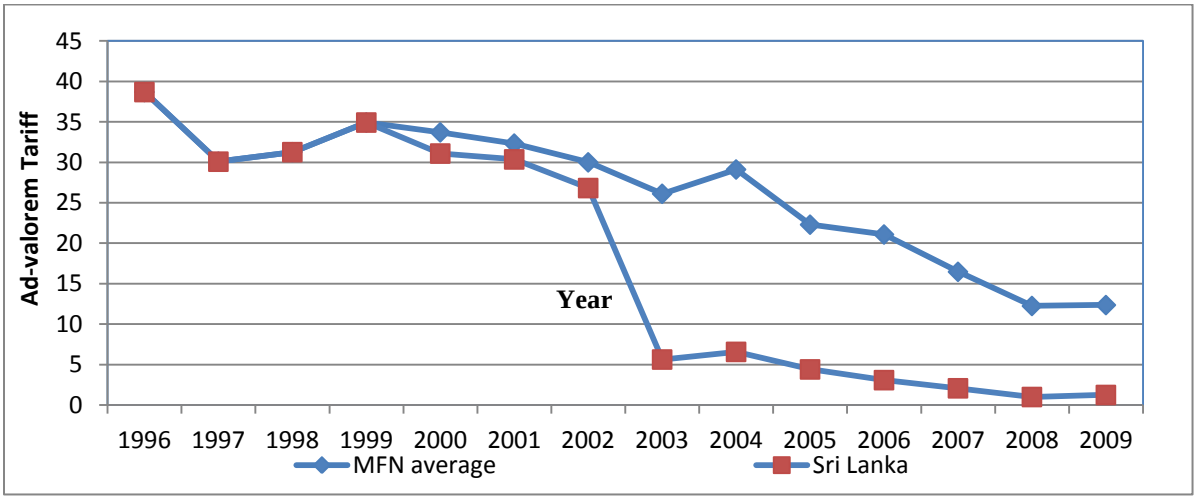
Source: Information taken from Ministry of Commerce's website.

Annex Table 2: Summary Table for India's Trade Complementarity Index (%) with Sri Lanka during 1996-2010

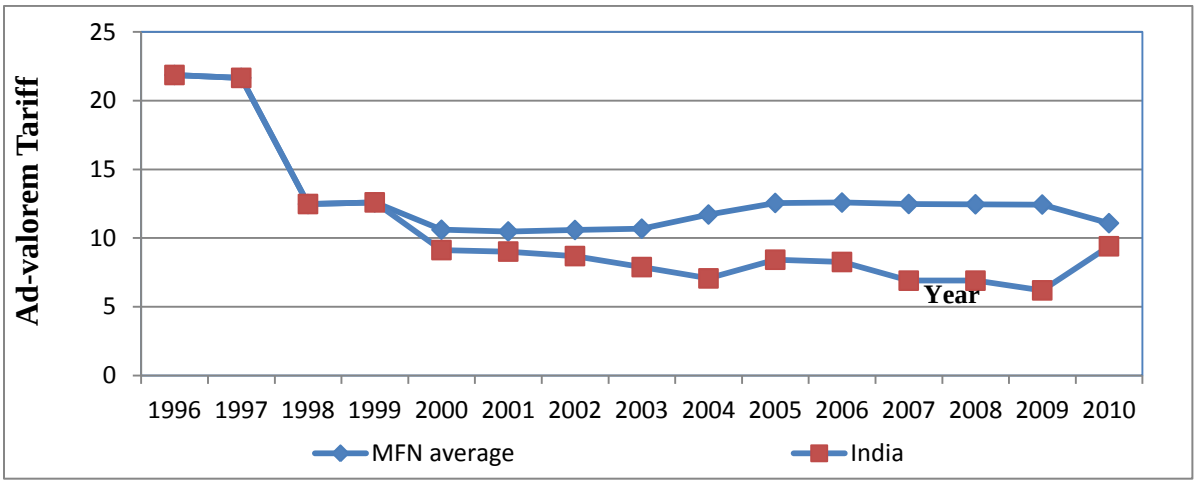
Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
TCI	50.8	49.5	47.1	46.3	48.9	54.9	54.7	56.0	58.0	57.6	57.7	60.1	64.9	59.0	60.3

Source: WITS

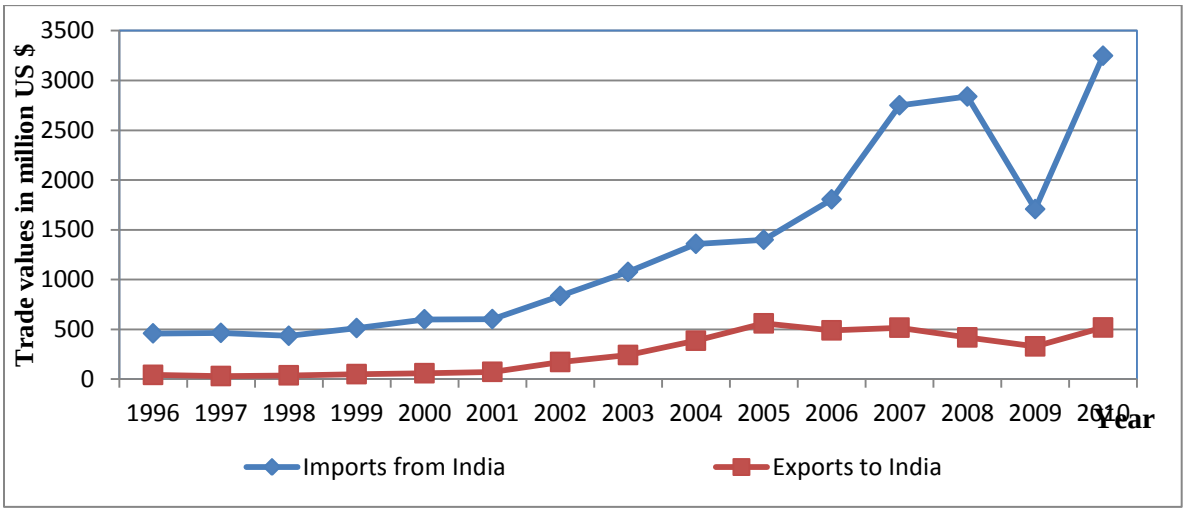
Annex Figure 1: India's Average Applied MFN and Preferential Tariff



Annex Figure 2: Sri Lanka's Average Applied MFN and Preferential Tariff

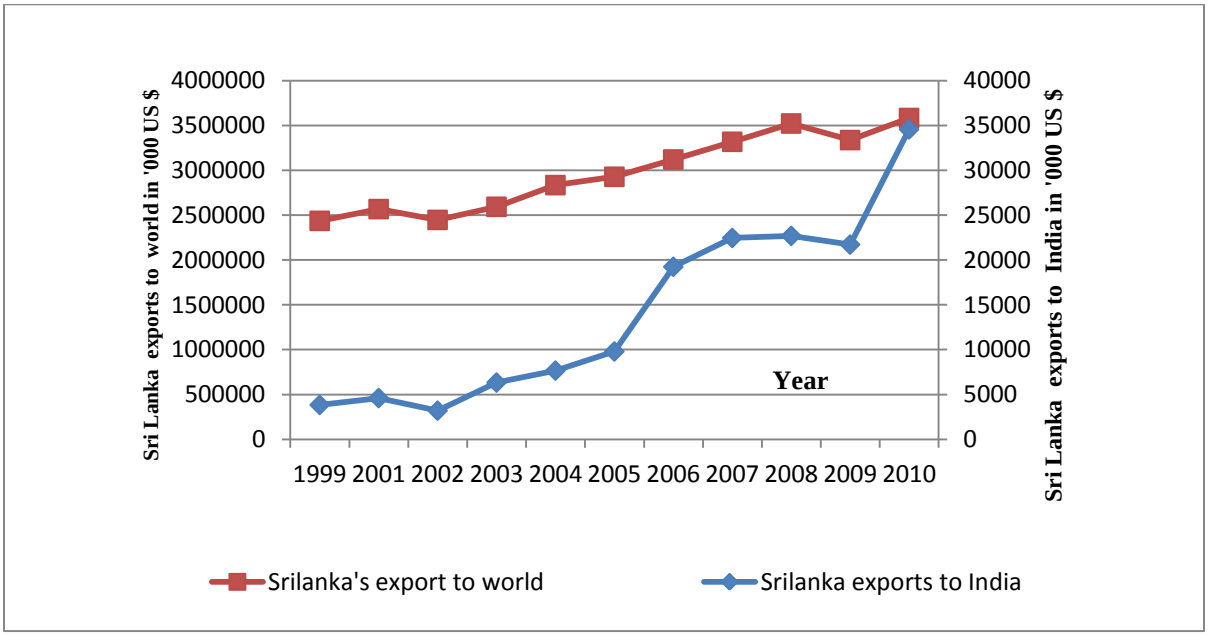


Annex Figure 3: Sri Lanka Trade Flows with India (1996-2010)



Annex Figure 4: India's export in Textiles and Clothing Sector

Annex Figure 5: Sri Lanka's Export in the Textile and Clothing Sector



Source: Authors based on COMTRADE (WITS)