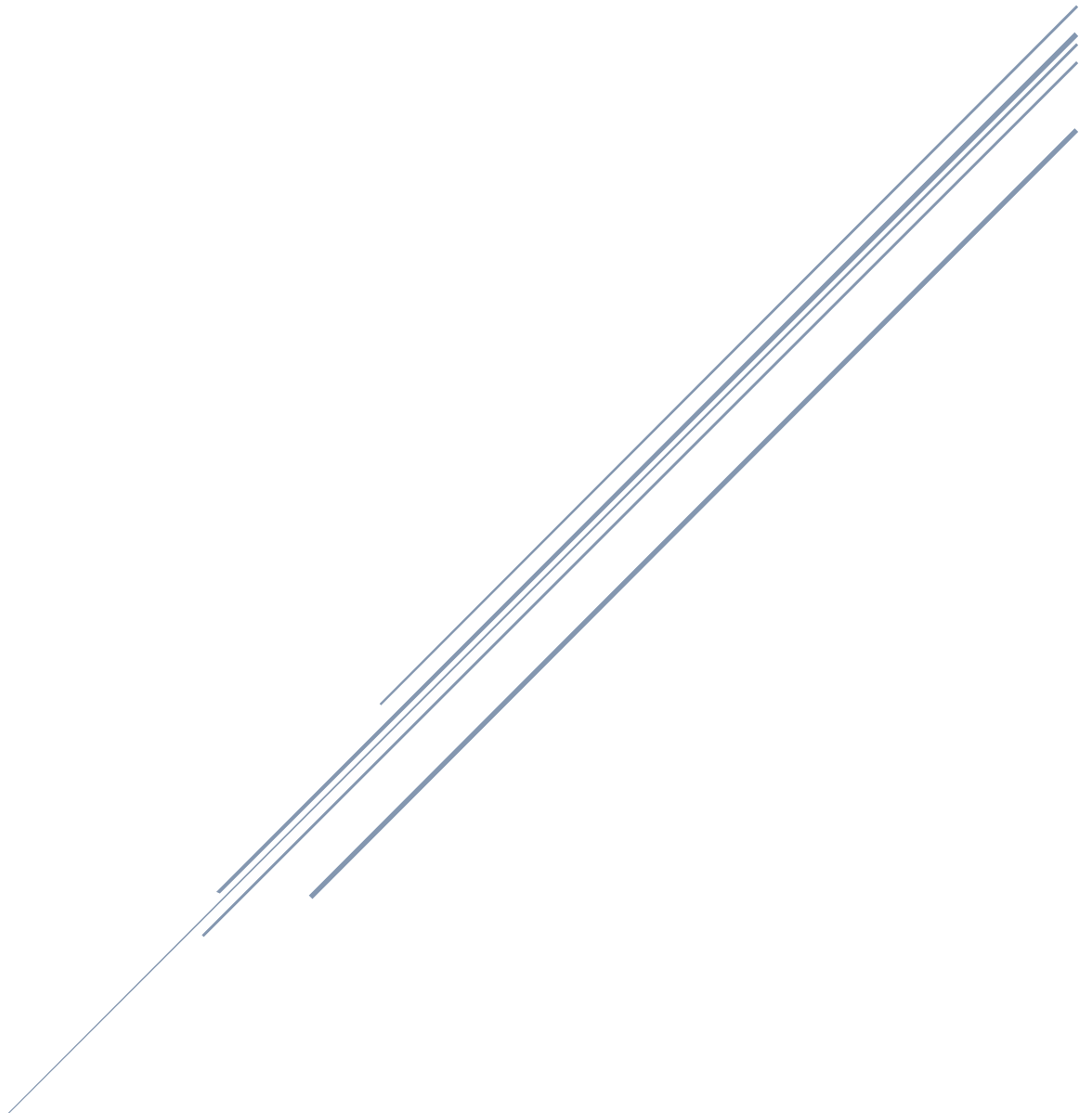


The economic impact of the bilateral liberalization of goods in the proposed FTAs

Computable General Equilibrium Approach



Contents

1	Title	3
2	Terms of Reference.....	4
3	Abstract	5
4	Economic Models for Assessing the Impact of FTAs.....	7
4.1	Why are economic models needed?	7
4.2	Models used for trade policy analysis	7
4.3	Partial Equilibrium Model.....	8
4.4	General Equilibrium Model	8
4.5	General Equilibrium or Partial Equilibrium analysis?.....	8
4.6	Why is Partial Equilibrium Analysis Not Enough?	9
4.7	Why Applied (Computable) General Equilibrium (CGE) Models?	9
4.8	Basics of Computable General Equilibrium (CGE) Model	9
4.9	Global Trade Analysis Project (GTAP)	11
4.10	Welfare Changes in GTAP.....	11
5	The Research Question	13
6	The model Experiment.....	15
6.1	Regions in the model.....	15
6.2	Sectors in the model	15
6.3	Modelling Scenarios.....	17
7	ETCA	18
7.1	Results of ETCA	18
7.2	Explanation of impact of ETCA to Sri Lanka.....	24
8	FTA with China	26
8.1	Results of the FTA with China.....	26
8.2	Explanation of economic impact of an FTA with China	32

9	FTA with Thailand.....	33
9.1	Results of the FTA with Thailand.....	33
9.2	Explanation of economic impact of an FTA with Thailand.....	38
10	Singapore FTA.....	40
10.1	Results of the FTA with Singapore.....	40
10.2	Explanation of economic impact of an FTA with Singapore	44
11	All proposed FTAs are in operation	45
11.1	Results of the four FTAs	45
11.2	Explanation of economic impact of four FTAs	49
12	Future study areas	51
13	References.....	52

1 Title

The economic impact of the bilateral liberalization of goods in the proposed FTAs: Economic and Technology Co-operation Agreement (ETCA), Singapore-Sri Lanka FTA, China-Sri Lanka FTA and Thailand-Sri Lanka FTA

2 Terms of Reference

This report is prepared by Association of Information Technology Professionals to present the results of a study to assess the economic impact of the proposed FTAs for Sri Lanka namely, Economic and Technology Co-operation Agreement (ETCA), Singapore-Sri Lanka FTA, China-Sri Lanka FTA and Thailand-Sri Lanka FTA. Further, the economic impact when all these four free trade agreements are in operation is assessed. The scope of the assessment is limited to the liberalization of goods sector proposed by these preferential trade agreements.

The Association of Information Technology Professionals presents this report to the secretary of Ministry of Development Strategies and International Trade to bring his attention to the outcome of the study.

3 Abstract

Officials of Sri Lanka are engaged in four proposed FTAs namely, Economic and Technology Co-operation Agreement (ETCA), Singapore-Sri Lanka FTA, China-Sri Lanka FTA, and Thailand-Sri Lanka FTA. It is utmost important to assess the economic impact of any proposed preferential trade agreement before start negotiations. Computable General Equilibrium Modeling which considers the economy as a whole is considered to be the most comprehensive technique of assessing the economic impact of a proposed preferential trade agreement.

In this paper, the scenario where all goods are bilaterally liberalized and another scenario where some of the products which are considered to be sensitive for Sri Lanka has been protected while other goods are bilaterally liberalized has been considered for each four proposed agreements. The case where all four agreements are in parallel operation has been simulated for the above two scenarios as well. All simulations are done by aggregating the entire world into 10 economies comprising Sri Lanka, India, China, Thailand, Singapore, rest of Asia, the rest of ASEAN countries, North America, European Union and the rest of the world. All products are aggregated to 18 sectors. The assessment is limited to the impact of liberalization of goods sector. The results are summarized in terms of trade performance, industry output, market prices, and gross domestic production.

The results show that the proposed four agreements when they are operating together, increase Sri Lanka's export by 5.1% (629 million USD) and 4.1% (504 million USD) in the two scenarios; full liberalized and protected scenarios consequently. Imports increased by 4.1% (1004 million USD) and 3.0% (742 million USD). Total trade of Sri Lanka increases while trade deficit further

deteriorated due to the proposed agreements. Sri Lanka's economic welfare and gross domestic production is negatively affected while economic welfare and gross domestic production of four partner countries are improved for the same policy applied as to Sri Lanka.

4 Economic Models for Assessing the Impact of FTAs

This section should answer the following questions.

- Why are economic models needed?
- What kinds of models are commonly used for trade policy analysis?
- Basics of CGE Modelling
- What is involved in a policy simulation?

4.1 Why are economic models needed?

The use of economic models should help improve policymaking. How?

1. They provide a theoretically consistent framework for analysing trade policy questions
2. Models can provide a handle on complicated questions
3. Models can help give greater intellectual support for a chosen trade policy
4. The use of models can provide a common “language” for policy discourse or debate
5. But models should complement rather than substitute for policy making

4.2 Models used for trade policy analysis

- Simulation models:
 - they help answer “What if” types of questions (+ projections)
 - These models can be categorised to two main categories.
 - Partial Equilibrium Models
 - General Equilibrium models
- Econometric Models:
 - gravity models: reduced form: can be used to establish whether certain economic variables have an effect on a variable of interest (Does GSP increase trade?)
 - Macro-econometric models: tools for projections of aggregates but no info on the industrial structure of the economy + may lack micro-foundations

4.3 Partial Equilibrium Model

Partial Equilibrium model considers a model with a single product or an industry in a region where the demand and supply is balanced. Then the model applies a policy shock exogenously to the model such as tariff exclusion, subsidy or labor migration to find out the new equilibrium. Based on the new equilibrium point revealed by the partial equilibrium model, the impact to the industry in question is assessed. Partial Equilibrium models do not consider the impacts to the other industries, production factors, government income, or wedges as the model is confined to the industry in question and assumes that prices and income in the rest of the economy is fixed.

4.4 General Equilibrium Model

Unlike partial equilibrium model, general equilibrium approach assesses the impact of an economic shock to multiple products or industries and within relevant multiple regions. General equilibrium approach considers economic linkages between substitute and complement goods, factor endowment such as capital, labour and land, input materials of the production, income of the households, government income and savings considering the economy as a whole.

4.5 General Equilibrium or Partial Equilibrium analysis?

The Decision whether a researcher or a policy maker should use partial equilibrium analysis or general equilibrium analysis depend on the following factors of the policy change.

- Nature of policy change
 - Does it cut across many markets or sectors?
- Potential impact of change
 - Are there economy-wide impacts?
- Constraints imposed by availability of data and resources (financial and skills)
 - PE data and models: free
 - CGE data: single country (SAM)
 - could be free, multiple country (GTAP: from \$ 700 to \$ 4600)
 - CGE models: free (GTAP) but may need software for mathematical programming to run (LINKAGE, MIRAGE)

4.6 Why is Partial Equilibrium Analysis Not Enough?

- Everything depends on everything else
- Other things are not equal
 - Example: A given policy measure may change both the supply and the demand sides with the outcome on both the equilibrium price and quantity not easily predictable a priori

4.7 Why Applied (Computable) General Equilibrium (CGE) Models?

- Analytical indeterminacy of effects
- Need to know magnitude as well as direction
- Analytical intractability-substitution of numerical simulation for analysis
- Sensitivity analysis

4.8 Basics of Computable General Equilibrium (CGE) Model

Due to the variety of goods and number of countries involved in a PTA, researchers found that theoretical models of analyzing PTAs has many limitations. To overcome these limitations, and to obtain more relevant advice for policy makers, the researchers have turned to Computable General Equilibrium Models.

Computable General Equilibrium (CGE) model comprises of a set of mathematical equations and functions which are created based on neoclassical economic assumptions of the motivation of the agents in the economy. CGE model comprises of a set of real-world data of a benchmark year.

Typical CGE model has three agents; consumers, producers and governments. Consumers are considered as household in the CGE model. Household consumes goods and services to maximize their utility. At the same time, households are the owners of factors of production, therefore they supply factor endowments such as land and labour for the production. The income received by supplying endowments are utilized by households to buy goods and services and pay taxes to the government.

In a CGE model, the motivation of the producers is to maximize their profit. One product is produced by only one producer in a CGE model. The production functions such as Leontif production function, Cobb-Douglas production

function, Constant Elasticity of Substitution can be used as the production function. The producers buy factors of production, such as, land and labour from the households. Producers buy the raw materials from the other producers or producers import goods from the other economies in the model.

The government in a CGE model, does not involve in the production process but intervene to the system by collecting taxes and granting subsidies and quotas. In a typical CGE model, a government does not have a specific objective. Often, the policy changes by government are the primary interest of a CGE analysis. Therefore, policy changes such as changes in the taxes and subsidies are considered as exogenous variables to the CGE model.

CGE model depicts microeconomic behaviors of the agents in the economy and describes the macroeconomic behaviors of the economy by equations and integrate all of them together to consider the economy as a whole. CGE model considers all economic activities including supply and demand for products and services, factor markets, savings and investments, trade and taxation and regulations.

Apart from the system of microeconomic and macroeconomic equations, computable general equilibrium is associated with a database. Usually, the database comprises of Social Accounting Matrix and elasticity parameters. Social Accounting Matrix (SAM) includes circular flow of income and expenditure in a nation during a particular period. SAM describes the income and expenditure of households, government revenue, expenditure, savings and investments, international trade data. These data are considered to for the benchmark year.

At the beginning, the system is in an equilibrium so that demand and supply for all the section of the considered economy is balanced according to the data in the database. The model should be calibrated to find out the initial equilibrium values. Social Accounting Matrix, behavioral equations of the economy concerned, and the elasticity parameters are the input to for the calibration. Calibration procedure calculates the prices and quantities and other parameter values in the initial equilibrium before the policy shock is introduced to the system. Those values are used as the benchmark values to compare with the final values after the policy shock.

A policy shock is introduced exogenously to the system. Considering the change introduced to the system, a new equilibrium is found solving the interactive system of equations using a computer program. The difference caused by the new equilibrium settled in the various sections of the economy is reported.

4.9 Global Trade Analysis Project (GTAP)

As the global economy is becoming more integrated, the demand for quantitative analysis on impact of those integrated measures and policies have been increasing. Global Trade Analysis Project (GTAP) model is constructed in 1992 with the primary objective of reducing the cost of quantitative analysis on international economic issues in an economywide framework. (Hertel, 1997)

GTAP is a computable general equilibrium model. GTAP consists of a global data base, standard modeling framework and a software for manipulating the data and implementing the standard model. The global data base of GTAP consists of data related to economic linkages among regions and data related to intersectoral linkages within each region. Data on economic linkages among regions are included in the GTAP database by data related to bilateral trade, transport and protection. Data on intersectoral linkages within each region is included in the GTAP database by country specific input-output data. GEMPACK software is used to implement the GTAP model in a computer.

4.10 Welfare Changes in GTAP

The GTAP model features a representative regional household whose behavior is governed by an aggregate utility function specified over per capita private household consumption, per capita government spending and per capita savings. The percentage change in aggregate per capita utility for a region is the welfare change variable computed by the standard GTAP model during simulations. The model also computes a money metric equivalent of this utility change and any change in population. This convenient measure summarizes the regional welfare changes resulting from a policy shock in dollar values (\$US million) and is frequently reported in studies employing the GTAP model. (Huff and Hertel, 2000).

The total welfare change in a GTAP model is decomposes into several sectors. In our experiment, three welfare decompositions are important.

1. Allocation effect:

Allocation welfare effect attributed to trade creation effect and trade diversion effect.

2. Terms of trade effects:

Terms of trade effect redistribute countries purchasing power among the regions. The changes in both export prices and import prices affect the terms of trade effect. Terms of trade effect arises from changes in relative prices (export prices relative to import prices) as producers and consumers adjust their purchasing and sales patterns in response to a policy change.

3. Investment-savings terms of trade:

Changes in the purchasing power of a region's savings in the capital investment goods.

5 The Research Question

The present Sri Lankan government is working on several bilateral free trade agreements, which are much broader in their scope than the existing trade agreements of Sri Lanka. Sri Lanka and Singapore inked Singapore-Sri Lanka Free Trade Agreement (SSLFTA) on 23rd April 2018 in Colombo. This agreement covers a wide scope including tariff elimination of goods, liberalization of services including movement of natural persons, investments, intellectual properties, government procurements and e-commerce. Sri Lanka will eliminate tariffs for Singapore exports on 80% of all tariff lines in up to 15 years. On the other hand, Singapore has already eliminated 99% of its tariff lines unilaterally for all the countries.

Singapore government has expressed several benefits that Singapore government would enjoy by this free trade agreement. Among those specified benefits Singapore exports will enjoy potential tariff savings of about \$10 million each year. Ministry of trade and Industry of Singapore has expressed that more exports from Singapore to qualify for lower tariffs negotiated by the agreement since SSLFTA which contains one of the most liberal Rules of Origin article in the agreement. SSLFTA contains the first treaty commitment on Government Procurement of Sri Lanka, allowing Singapore companies to bid for projects by several large central entities and state-owned enterprises of Sri Lanka.

Since Singapore was already tariff free for 99% of tariff lines, there is hardly anything new for Sri Lankan exports to Singapore. Though Sri Lanka does not get any tariff benefit via SSLFTA, the Sri Lankan government is keener on attracting foreign direct investments due to the secure circumstances made by SSLFTA for Singapore registered companies. The present government of Sri Lanka expects to give a message to the world on its openness in trade to attract foreign direct investments by signing an FTA with one of the most liberalized economies in the world.

At the same time Sri Lankan government is conducting negotiations of free trade agreements with India (ETCA), China and Thailand. The government has also expressed that they are processing FTAs with Malaysia and Indonesia as well. In Sri Lanka, there is a big debate on the impact of those trade agreements and the

process followed by the Ministry of Development Strategies and International Trade to design, negotiate and implement Singapore FTA and other FTAs in negotiations.

This study answers the following questions;

- 1. What is the economic impact of the trade liberalization of goods sector by Singapore FTA?**
- 2. What is the economic impact of the trade liberalization of goods sector by proposed FTA with Thailand?**
- 3. What is the economic impact of the trade liberalization of goods sector by proposed FTA with India (ETCA)?**
- 4. What is the economic impact of the trade liberalization of the goods sector by the proposed FTA with China?**
- 5. What is the economic impact of the trade liberalization of the goods sectors proposed by those four free trade agreements when they are implemented parallelly?**

6 The model Experiment

The GTAP 9 Database (the latest available version of GTAP database) is used for this study. The study Aggregated the world into 10 regions including Sri Lanka, India, China, Thailand and Singapore. The products are aggregated to 18 sectors.

6.1 Regions in the model

Code	Description	Comprising
SriLanka	Sri Lanka	Sri Lanka.
India	India	India.
RestSAsia	South Asia exc. India, China and Sri Lanka	Bangladesh; Nepal; Pakistan; Rest of South Asia.
Singapore	Singapore	Singapore.
Thailand	Thailand	Thailand.
RestASEAN	ASEAN exc. Singapore	Cambodia; Indonesia; Lao People's Democratic Republ; Malaysia; Philippines; Viet Nam; Rest of Southeast Asia.
China	China	China.
NAmerica	North America	Canada; United States of America; Mexico; Rest of North America.
EU_28	European Union 28	Austria; Belgium; Cyprus; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Latvia; Lithuania; Luxembourg; Malta; Netherlands; Poland; Portugal; Slovakia; Slovenia; Spain; Sweden; United Kingdom; Bulgaria; Croatia; Romania.
RestofWorld	Rest of World	

6.2 Sectors in the model

No.	Code	Description	old sectors
1	PaddyRice	Paddy rice	Paddy rice.
2	ProceRice	Processed rice	Processed rice.
3	VegFrtNut	Vegetables, Fruits and Nuts	Vegetables, fruit, nuts.
4	Cropsnec	Crops nec	Crops nec.
5	GrainsCrops	Grains and Crops	Wheat; Cereal grains nec; Oil seeds; Sugar cane, sugar beet; Plant-based fibers.

6	MeatLstk	Livestock and Meat Products	Cattle, sheep, goats, horses; Animal products nec; Raw milk; Wool, silk-worm cocoons; Meat: cattle, sheep, goats, horse; Meat products nec.
7	Fishing	Fishing	Fishing.
8	Extraction	Mining and Extraction	Forestry; Coal; Oil; Gas; Minerals nec.
9	ProcFood	Processed Food	Vegetable oils and fats; Dairy products; Sugar; Food products nec; Beverages and tobacco products.
10	Textiles	Textiles	Textiles.
11	Clothing	Wearing apparel	Wearing apparel.
12	LightMnfc	Light Manufacturing	Leather products; Wood products; Paper products, publishing; Metal products; Motor vehicles and parts; Transport equipment nec; Manufactures nec.
13	Petroleum	Petroleum and Coal Products	Petroleum, coal products.
14	ChemRubPlstc	Chemical, Rubber Plastic prods	Chemical,rubber,plastic prods.
15	HeavyMnfc	Heavy Manufacturing	Mineral products nec; Ferrous metals; Metals nec; Electronic equipment; Machinery and equipment nec.
16	Util_Cons	Utilities and Construction	Electricity; Gas manufacture, distribution; Water; Construction.
17	TransComm	Transport and Communication	Trade; Transport nec; Sea transport; Air transport; Communication.

18	OthServices	Other Services	Financial services nec; Insurance; Business services nec; Recreation and other services; PubAdmin/Defence/Health/Education; Dwellings.
----	-------------	----------------	--

6.3 Modelling Scenarios

This study considers four proposed FTAs with India, China, Thailand and Singapore individually. Also, the study considers the scenario where all four FTAs are in operation together. All five scenarios are experimented with two possible policy scenarios;

1. Tariffs are waived for all products for both countries in the bilateral agreement.
2. The policy scenario where out of 18 aggregated sectors, 12 sectors are liberalised, and the following 6 sectors are not liberalised by both parties in the bilateral FTA;
 - a. Paddy rice (1)
 - b. Processed rice (2)
 - c. Vegetables, Fruits and Nuts (3)
 - d. Livestock and Meat Products (6)
 - e. Fishing (7)
 - f. Petroleum and coal products (13)

This explains that the study is done for five FTA scenarios and each FTA scenario is considered for two policy scenarios making 10 scenarios altogether. The following diagram explains the scenarios considered.

Bilateral Agreement	Fully liberalised	12 of 18 sectors liberalised
ETCA	✓	✓
China	✓	✓
Thailand	✓	✓
Singapore	✓	✓
All agreements	✓	✓

7 ETCA

7.1 Results of ETCA

7.1.1 Exports

Table 1: Exports to India from Sri Lanka (USD millions)

Sector	Pre	Full Liberalization			Protected scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	0.0	0.0	0.0	3.7	0.0	0.0	-4.1
Processed rice	0.0	0.0	0.0	1.8	0.0	0.0	-1.6
Vegetables, Fruits and Nuts	10.4	10.7	0.3	3.3	10.2	-0.1	-1.4
Crops nec	70.2	303.9	233.7	332.7	297.7	227.4	323.8
Grains and Crops	1.7	1.9	0.2	10.6	1.9	0.2	8.8
Livestock and Meat Products	2.3	2.3	0.1	2.7	2.2	0.0	-0.5
Fishing	1.5	1.5	0.0	0.6	1.5	0.0	0.6
Mining and Extraction	82.5	81.0	-1.5	-1.8	81.8	-0.6	-0.8
Processed Food	63.1	65.7	2.6	4.1	65.6	2.4	3.9
Textiles	41.4	61.8	20.5	49.5	61.9	20.6	49.8
Wearing apparel	21.1	21.1	0.0	0.0	21.1	0.0	0.2
Light Manufacturing	183.1	196.2	13.1	7.1	195.4	12.3	6.7
Petroleum and Coal Products	32.0	32.1	0.1	0.3	32.0	0.0	0.0
Chemical, Rubber Plastic prods	76.0	112.7	36.7	48.3	111.5	35.5	46.7
Heavy Manufacturing	145.1	150.3	5.2	3.6	148.4	3.3	2.3
Utilities and Construction	0.4	0.4	0.0	1.8	0.4	0.0	0.1
Transport and Communication	20.1	20.3	0.2	1.1	20.0	0.0	-0.1
Other Services	16.7	16.7	0.0	0.0	16.7	0.0	0.1
Total	767.6	1078.6	311.2	40.5	1068.3	301.0	39.2

If 100% of bilateral trade liberalization is done with India, Sri Lanka's export to India will be increased by 41% while it will be increased by 39% in the Protected scenario. Exports to the other regions in the model also increased marginally.

Table 2: Total exports from Sri Lanka (USD millions)

Sector	Pre	Full Liberalization			Protected scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	2.0	2.0	0.0	1.8	1.7	-0.1	1.8
Processed rice	7.0	7.0	0.1	1.4	7.3	-0.1	1.4
Vegetables, Fruits and Nuts	184.0	188.0	4.8	2.6	188.4	-2.7	2.6
Crops nec	1047.0	1260.0	212.7	20.3	1259.8	185.2	20.3
Grains and Crops	6.0	6.0	0.3	4.5	6.0	0.1	4.5
Livestock and Meat Products	9.0	9.0	0.2	2.3	9.5	-0.1	2.3
Fishing	67.0	68.0	0.3	0.5	67.6	0.3	0.5
Mining and Extraction	211.0	207.0	-3.9	-1.9	206.6	-1.6	-1.9
Processed Food	1276.0	1305.0	29.8	2.3	1305.3	27.6	2.3
Textiles	904.0	920.0	15.9	1.8	920.2	18.0	1.8
Wearing apparel	3433.0	3427.0	-6.2	-0.2	3426.9	0.6	-0.2
Light Manufacturing	1013.0	1078.0	65.6	6.5	1078.2	61.1	6.5
Petroleum and Coal Products	99.0	99.0	0.3	0.3	99.4	0.0	0.3
Chemical, Rubber Plastic prods	1385.0	1444.0	58.9	4.3	1443.8	43.5	4.3
Heavy Manufacturing	583.0	604.0	20.7	3.5	604.0	12.9	3.5
Utilities and Construction	44.0	45.0	0.7	1.6	45.0	0.0	1.6
Transport and Communication	1352.0	1365.0	12.4	0.9	1364.7	-2.5	0.9
Other Services	623.0	622.0	-0.6	-0.1	622.2	0.3	-0.1
Total	12245.0	12656.0	412.1	3.4	12656.6	342.5	2.8

The total exports of Sri Lanka are increased by 3.4% from Full Liberalization scenario while it is increased by 2.8% in the Protected scenario. The biggest gainer is Crops. Crops include Black fermented tea and partly fermented, Pepper, cardamom, and cinnamon. Crops industry's import tariffs have been waived in both scenarios considered. However, it is known that India is keen to protect these industries.

7.1.2 Imports

In the Full Liberalization scenario of ETCA, the total annual imports to Sri Lanka increases by 545 million USD, which is an increase of 2.2%. In the protected scenario Sri Lanka's total imports increased by 375 million USDs (1.5%).

Table 3: Total imports to Sri Lanka (USD millions)

Sector	Pre	Full Liberalization			Protected scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	0.5	0.9	0.3	64	0.54	0.01	1.88
Processed rice	27.7	37.5	9.8	35.3	27.87	0.19	0.69
Vegetables, Fruits and Nuts	512.6	605.2	92.6	18.1	515.21	2.57	0.5
Crops nec	302	437.4	135.4	44.8	442.15	140.11	46.39
Grains and Crops	639.4	640	0.6	0.1	640.02	0.65	0.1
Livestock and Meat Products	41.3	52.7	11.4	27.5	41.31	-0.01	-0.03
Fishing	9.2	9.2	0	0.4	9.16	-0.04	-0.47
Mining and Extraction	2120	2002.2	-117.7	-5.6	2122.63	2.68	0.13
Processed Food	1831.1	1911.7	80.6	4.4	1914.31	83.2	4.54
Textiles	2257.9	2256.8	-1.1	-0.1	2260.12	2.24	0.1
Wearing apparel	250.6	250.5	-0.1	-0.1	250.29	-0.34	-0.13
Light Manufacturing	3966.5	4082	115.5	2.9	4068.81	102.3	2.58
Petroleum and Coal Products	3678.1	3840.5	162.4	4.4	3676.05	-2.03	-0.06
Chemical, Rubber Plastic prods	2408.8	2436.3	27.5	1.1	2434.65	25.85	1.07
Heavy Manufacturing	4451.2	4492.7	41.5	0.9	4475.73	24.51	0.55
Utilities and Construction	16.9	16.9	0	0	16.97	0.06	0.38
Transport and Communication	1045.2	1036.2	-9	-0.9	1041.84	-3.35	-0.32
Other Services	855.5	851.1	-4.4	-0.5	852.02	-3.48	-0.41
Total	24414.5	24959.8	545.3	2.2	24789.7	375.1	1.5

7.1.3 Trade balance

Sri Lanka's imports increases more than exports. Therefore, Sri Lanka's trade deficit will continue to increase by ETCA. Sri Lanka's annual trade deficit will be increased by 186 million USDs in the full liberalization scenario and it will be increased by 95 million USDs in the protected scenario.

Table 4: Change to annual trade balance in USD millions

Country	Full Lib.	Protected scenario
Sri Lanka	-186.0	-94.7
India	-143.0	-141.5
Rest of South Asia	8.0	5.6
Singapore	-2.0	-1.8
Thailand	5.0	5.3
Rest of ASEAN	8.0	6.1
China	27.0	23.9
North America	98.0	64.0
EU_28	72.0	53.4
Rest of the World	112.0	79.7

7.1.4 Industry output

Industry output of Sri Lanka decreases for 11 sectors out of 18 aggregated sectors due to ETCA in both scenarios. petroleum and coal products, vegetables, fruits and nuts, and livestock and meat products are the most negatively affected sectors. Industry output of the crops and textile are increased by ETCA. In the crops sector, higher increment of export (212.7 million USD) compared to increment of import (135.4 million USD) is the reason to increase the industry output. In the Textile sector, increment of export value (by 15.9 million USD) increases the demand for production. It is worth mentioning that India is reluctant to liberalize its crops and textile markets though the model is tested for liberalized scenario of those markets.

The reduced market price due to increased demand for tariff removed imports is the reason for the production output to be dropped in many sectors. Unlike Sri Lanka, Industries in India are affected negligibly due to ETCA.

Table 5: Industry Output percentage change by both Countries

Sector	Full Liberlization		Protected scenario	
	Sri Lanka	India	Sri Lanka	India
Paddy rice	-0.61	0	-0.26	-0.01
Processed rice	-0.65	0	-0.26	-0.01
Vegetables, Fruits and Nuts	-2.04	0.09	-0.36	0
Crops nec	1.82	-0.03	1.05	-0.01
Grains and Crops	-0.62	0	-1.22	0.03
Livestock and Meat Products	-0.96	0.01	-0.25	0
Fishing	-0.23	0.02	-0.15	0.01
Mining and Extraction	-0.11	-0.05	-0.06	-0.05
Processed Food	-0.69	0.08	-0.68	0.1
Textiles	0.96	-0.16	1.16	-0.13
Wearing apparel	-0.22	-0.25	-0.06	-0.2
Light Manufacturing	-0.05	0.1	-0.26	0.12
Petroleum and Coal Products	-6.01	0.17	0.08	-0.01
Chemical, Rubber Plastic prods	1.08	-0.05	0.68	-0.02
Heavy Manufacturing	1.35	-0.06	0.62	-0.04
Utilities and Construction	0.85	0.02	0.44	0.02
Transport and Communication	0.04	0	-0.11	0
Other Services	-0.31	-0.02	-0.17	-0.02

Petroleum and coal products industry is badly affected if the

7.1.5 Market Prices

Market prices of the products in Sri Lanka will be marginally dropped by a fully liberalized ETCA. This happens as more imports from India reaches the country with no tariffs. In the protected scenario, the prices of the protected sectors such as paddy rice, vegetables, fruits and nuts are slightly increased. This can be attributed to reduced supply due to reduced production and increased unskilled labour price by 0.22% in the protected scenario.¹

Table 6: Percentage change in prices

Sector	Full Liberalization		Protected scenario	
	Sri Lanka	India	Sri Lanka	India
Paddy rice	-0.3	0.13	0.45	0.08
Processed rice	-0.3	0.1	0.35	0.07
Vegetables, Fruits and Nuts	-0.76	0.16	0.44	0.08
Crops	0.37	0.11	0.75	0.08
Grains and Crops	-0.35	0.11	0.06	0.08
Livestock and Meat Products	-0.33	0.11	0.1	0.07
Fishing	-0.25	0.11	-0.24	0.09
Mining and Extraction	0.18	0.02	0.07	0.01
Processed Food	-0.55	0.09	-0.5	0.06
Textiles	0.08	0.07	0.04	0.05
Wearing apparel	0.03	0.07	0	0.05
Light Manufacturing	-0.94	0.06	-0.88	0.04
Petroleum and Coal Products	-0.07	0.01	-0.01	0.01
Chemical, Rubber Plastic prods	-0.28	0.04	-0.1	0.03
Heavy Manufacturing	-0.45	0.05	-0.28	0.04
Utilities and Construction	-0.35	0.06	0.01	0.05
Transport and Communication	-0.24	0.07	0.05	0.06
Other Services	0.02	0.08	-0.01	0.06

7.1.6 Welfare

The experiment yields a welfare reduction for Sri Lanka while India's welfare gains by ETCA. Sri Lanka records a negative resource allocation effect implying that trade diversion is greater than trade creation. Digging more into the results of the experiment shows that the negative welfare effect of aggregated sectors of processed food and light manufacturing are high. This implies that tariff release

¹ In the protected scenario for ETCA, unskilled labour is increased by 0.22%, which is not tabulated in this report.

with India on these sectors, makes Sri Lanka to import more from India due to preferential tariff relief over lower priced imports.

The negative Terms of trade effect indicates the welfare loss due to increased prices of imports relative to export prices. This causes due to increasing demand for imports over the increasing of demand for exports. Negative investment-savings terms of trade indicates decreased purchasing power of capital investment goods using savings of Sri Lanka.

Table 7: Impact on Sri Lanka's welfare by ETCA (USD millions)

Country	Full Liberalization				Protected scenario			
	Resource Allocation Effect	Terms of Trade	Investment-Savings Terms of Trade	Total	Resource Allocation Effect	Terms of Trade	Investment-Savings Terms of Trade	Total
Sri Lanka	-58	-25	-71	-154	-73	-10	-52	-134
India	184	225	79	488	102	171	63	336
Rest of South Asia	-3	-8	-2	-12	-2	-5	-1	-9
Singapore	0	-3	0	-3	0	-3	0	-3
Thailand	-2	-7	0	-9	-2	-7	0	-9
Rest of ASEAN	-4	-20	-1	-24	-4	-17	-1	-22
China	-1	-19	-2	-23	-2	-23	-2	-28
North America	-2	-27	-5	-34	-1	-21	-6	-28
EU_28	-4	-23	-3	-30	-7	-30	-3	-40
Rest of World	-35	-94	3	-126	-20	-54	1	-73

7.1.7 Gross Domestic Production

Sri Lanka's Gross Domestic Production is badly affected by ETCA. Sri Lanka's GDP will be decreased from 0.92% by full liberalization while the GDP will be decreased by 0.45% by protected liberalization scenario. This may be mainly attributed to reduced private consumption expenditure. In the fully liberalized scenario, private consumption expenditure drops by 0.97%. The income of the regional household is also reduced by 0.95%.² The drops in income and expenditure can be attributed to the reduced output of the production.

² These figures are obtained from the simulations.

Table 8: Percentage change to GDP by ETCA (USD millions)

Country	Full Lib.	Protected scenario
Sri Lanka	-0.92	-0.45
India	0.10	0.07
Rest of South Asia	-0.01	-0.01
Singapore	0.00	0.00
Thailand	-0.01	-0.01
Rest of ASEAN	-0.01	-0.01
China	0.00	0.00
North America	0.00	0.00
EU_28	0.00	0.00
Rest of the World	0.00	0.00

7.2 Explanation of impact of ETCA to Sri Lanka

Though the bilateral goods liberation of ETCA improves the Sri Lankan exports and imports, the trade deficit will be increased for Sri Lanka. Industry output will be deteriorated except for few aggregated sectors such as textiles and crops. However, it is doubtful whether India will agree to liberalize these sectors on their part. Existing non-tariff barriers that have been imposed by India in these sectors is another issue.

Market prices of the products in Sri Lanka will slightly be dropped by a fully liberalized ETCA. This happens as more imports from India reaches the country with no tariffs. In the protected scenario, the prices of the protected sectors such as rice, vegetables and fruits, and nuts are slightly increased.

The experiment yields a -154 million USD welfare reduction for Sri Lanka while India's welfare gains by 488 USD million in the fully liberalized scenario. Sri Lanka records a negative resource allocation effect implying that trade diversion is greater than trade creation. The negative Terms of trade effect of 25 million USD indicates the welfare loss due to increased prices of imports relative to export prices. This causes due to increasing demand for imports over the increasing of demand for exports. Negative investment-savings terms of trade indicate decreased purchasing power of capital investment goods using savings of Sri Lanka.

In the protected scenario, Sri Lanka records a -134 million USD loss in welfare while India records a 336 million USD welfare gain. Sri Lanka's GDP will be

decreased from 0.92% by full liberalization while the trade the GDP will be decreased by 0.45% by protected liberalization scenario. The reduction of welfare and the GDP for Sri Lanka by this simulation suggests that a preferential trade agreement with India is disadvantageous to Sri Lanka

8 FTA with China

8.1 Results of the FTA with China

8.1.1 Exports

Table 9 : Sri Lankan exports to China (USD millions)

Sector	Pre	Full Liberalization			Protected scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	0.0	0.0	0.0	2.4	0.0	0.0	0.0
Processed rice	0.1	0.1	0.0	0.9	0.1	0.0	-0.1
Vegetables, Fruits and Nuts	0.2	0.3	0.1	26.5	0.2	0.0	-0.1
Crops nec	8.2	14.1	5.9	71.9	14.0	5.8	70.4
Grains and Crops	0.0	0.0	0.0	0.9	0.0	0.0	0.1
Livestock and Meat Products	0.1	0.1	0.0	0.3	0.1	0.0	-0.8
Fishing	3.9	4.6	0.8	19.8	3.9	0.0	-0.1
Mining and Extraction	11.8	11.9	0.1	1.2	11.9	0.1	0.9
Processed Food	4.2	5.9	1.7	39.9	5.9	1.7	39.5
Textiles	42.5	80.8	38.3	90.0	80.6	38.1	89.6
Wearing apparel	8.9	22.1	13.2	148.0	22.1	13.1	147.5
Light Manufacturing	11.1	24.2	13.2	119.0	24.2	13.1	118.6
Petroleum and Coal Products	1.9	2.3	0.4	20.8	1.9	0.0	0.2
Chemical, Rubber Plastic prods	25.9	54.3	28.5	110.0	54.2	28.3	109.5
Heavy Manufacturing	13.1	19.3	6.2	47.2	19.3	6.2	46.9
Utilities and Construction	1.6	1.6	0.0	-0.5	1.6	0.0	-0.7
Transport and Communication	14.7	14.6	-0.1	-0.8	14.6	-0.1	-0.9
Other Services	18.3	18.2	-0.1	-0.8	18.1	-0.2	-1.0
Total	166.5	274.4	108.0	0.6	272.5	106.1	163.5

Table 10: Sri Lanka's total exports (USD millions)

Sector	Pre	Full Liberalization			67% Liberalization		
		Post	Change	change %	Post	Change	change %
Paddy rice	1.7	1.7	0.0	1.2	1.7	0.0	0.0
Processed rice	7.2	7.2	0.0	0.7	7.2	0.0	-0.1
Vegetables, Fruits and Nuts	183.6	186.1	2.5	1.4	183.5	-0.1	-0.1
Crops nec	1047.1	1065.6	18.5	1.8	1056.6	9.5	0.9
Grains and Crops	5.7	5.8	0.0	0.7	5.7	0.0	0.0
Livestock and Meat Products	9.3	9.3	0.0	0.2	9.2	-0.1	-0.9
Fishing	67.2	67.9	0.7	1.0	67.1	-0.1	-0.1
Mining and Extraction	210.6	206.2	-4.3	-2.1	205.7	-4.8	-2.3
Processed Food	1275.5	1276.5	1.0	0.1	1272.8	-2.7	-0.2
Textiles	904.3	933.4	29.1	3.2	931.1	26.8	3.0
Wearing apparel	3433.1	3428.5	-4.6	-0.1	3421.7	-11.4	-0.3
Light Manufacturing	1012.6	1078.6	66.1	6.5	1076.9	64.3	6.3
Petroleum and Coal Products	99.1	99.7	0.5	0.5	99.3	0.1	0.1
Chemical, Rubber Plastic prods	1384.9	1425.3	40.4	2.9	1421.9	36.9	2.7
Heavy Manufacturing	583.3	618.3	35.0	6.0	617.0	33.7	5.8
Utilities and Construction	44.3	44.1	-0.2	-0.5	44.0	-0.3	-0.7
Transport and Communication	1352.3	1342.0	-10.3	-0.8	1339.5	-12.8	-0.9
Other Services	622.8	617.8	-5.0	-0.8	616.4	-6.3	-1.0
Total	12244.4	12413.8	169.4	1.4	12377.1	132.7	1.1

8.1.2 Imports

Table 11: Impact on imports to Sri Lanka by China FTA (USD millions)

Sector	Pre	Full Liberalization			Protected scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	0.53	0.52	-0.01	-1.09	0.53	0	0.01
Processed rice	27.68	27.7	0.02	0.07	27.69	0.01	0.05
Vegetables, Fruits and Nuts	512.64	540.96	28.32	5.52	512.64	-0.01	0
Crops nec	302.04	321.33	19.3	6.39	322.45	20.41	6.76
Grains and Crops	639.37	638.35	-1.01	-0.16	638.06	-1.31	-0.2
Livestock and Meat Products	41.32	41.92	0.6	1.45	41.4	0.07	0.18
Fishing	9.2	9.22	0.02	0.18	9.2	0	0.01
Mining and Extraction	2119.95	2125.09	5.15	0.24	2126.94	6.99	0.33
Processed Food	1831.11	1840.17	9.06	0.49	1841.8	10.69	0.58
Textiles	2257.88	2244.68	-13.2	-0.58	2242.21	-15.67	-0.69
Wearing apparel	250.63	309.76	59.13	23.59	310.01	59.38	23.69
Light Manufacturing	3966.51	4037.01	70.5	1.78	4037.32	70.81	1.79
Petroleum and Coal Products	3678.09	3682.99	4.9	0.13	3680.69	2.6	0.07
Chemical, Rubber Plastic prods	2408.8	2438.54	29.74	1.23	2438.69	29.89	1.24
Heavy Manufacturing	4451.22	4527.89	76.67	1.72	4527.61	76.39	1.72
Utilities and Construction	16.91	17.04	0.13	0.77	17.06	0.15	0.87
Transport and Communication	1045.19	1046.15	0.96	0.09	1047.51	2.32	0.22
Other Services	855.5	856.14	0.64	0.08	857.31	1.81	0.21
Total	24414.6	24705.5	290.9	1.2	24679.1	264.5	1.1

8.1.3 Trade Deficit

Table 12: Impact on Trade balance by China FTA (USD millions)

Country	Full Lib.	Protected scenario
Sri Lanka	-147.5	-149.7
India	36.7	38.1
Rest of South Asia	5.0	4.8
Singapore	-3.2	-3.2
Thailand	4.5	4.7
Rest of ASEAN	11.6	12.7
China	-18.8	-38.7
North America	40.0	45.1
EU_28	27.1	33.4
Rest of the World	44.6	52.9

Table 13: Impact on sector wise trade balance by China FTA (USD millions)

Sector	Full Liberalization		Protected scenario	
	Sri Lanka	China	Sri Lanka	China
Paddy rice	0.04	-0.34	0	-0.24
Processed rice	0	-0.1	-0.02	-0.26
Vegetables, Fruits and Nuts	-26.64	43.81	-0.09	-2.81
Crops nec	-4.88	21.39	-13.19	22.29
Grains and Crops	0.93	-8.38	1.15	-6.18
Livestock and Meat Products	-0.75	-7.43	-0.12	-7.14
Fishing	0.71	-0.75	-0.05	-0.29
Mining and Extraction	-8.55	-27.74	-10.86	-21.6
Processed Food	-11.14	5.69	-15.15	9.22
Textiles	43.63	-70.68	44.12	-65.47
Wearing apparel	-55.89	26.04	-61.95	30.73
Light Manufacturing	-33.42	152.95	-35.18	159.34
Petroleum and Coal Products	-4.69	9.5	-2.21	-4.94
Chemical, Rubber Plastic prods	8.57	-16.87	5.51	-12.71
Heavy Manufacturing	-42.21	-88.51	-43.05	-82.02
Utilities and Construction	-0.3	-4.02	-0.39	-3.96
Transport and Communication	-8.58	-28.43	-11.78	-28.01
Other Services	-4.32	-24.79	-6.47	-24.54

8.1.4 Industry output

Table 14: Impact on industry output by China FTA (change %)

Sector	Full Liberalization		Protected scenario	
	Sri Lanka	China	Sri Lanka	China
Paddy rice	-0.03	0	-0.06	0
Processed rice	-0.04	0	-0.06	0
Vegetables, Fruits and Nuts	-0.6	-0.01	-0.06	0
Crops nec	0.02	-0.01	-0.23	0.34
Grains and Crops	0.15	0.01	-0.07	-0.01
Livestock and Meat Products	-0.16	0	-0.16	0
Fishing	-0.08	0	-0.1	0
Mining and Extraction	-0.17	0.01	-0.22	-0.01
Processed Food	-0.18	0	-0.24	0
Textiles	1.74	0.02	1.55	-0.02
Wearing apparel	-1.14	0.02	-1.26	0.01
Light Manufacturing	1.15	-0.02	1.1	0.01
Petroleum and Coal Products	0.14	0	0.23	0
Chemical, Rubber Plastic prods	0.51	0.01	0.44	0
Heavy Manufacturing	0.37	-0.01	0.29	0
Utilities and Construction	0.63	-0.01	0.63	0
Transport and Communication	-0.03	0	-0.03	0
Other Services	-0.13	0	-0.11	0

8.1.5 Market Prices

Table 15: Impact on market prices by China FTA (change %)

Sector	Full Liberalization		Protected scenario	
	Sri Lanka	China	Sri Lanka	China
Paddy rice	-0.23	-0.02	0	-0.02
Processed rice	-0.17	-0.02	0.03	-0.02
Vegetables, Fruits and Nuts	-0.39	-0.02	0.02	-0.02
Crops	-0.21	-0.02	-0.06	-0.02
Grains and Crops	-0.16	-0.02	-0.01	-0.01
Livestock and Meat Products	-0.04	-0.02	0.11	-0.02
Fishing	0.07	-0.02	0.08	-0.02
Mining and Extraction	0.21	0	0.24	0
Processed Food	0.01	-0.02	0.08	-0.01
Textiles	0.15	-0.01	0.19	-0.01
Wearing apparel	0.08	-0.01	0.1	-0.01
Light Manufacturing	-0.81	-0.01	-0.78	-0.01
Petroleum and Coal Products	-0.04	0	-0.04	0
Chemical, Rubber Plastic prods	-0.14	-0.01	-0.1	-0.01
Heavy Manufacturing	-0.64	-0.01	-0.62	-0.01
Utilities and Construction	0.1	-0.01	0.15	-0.01
Transport and Communication	0.2	-0.02	0.25	-0.01
Other Services	0.21	-0.02	0.27	-0.02

8.1.6 Welfare

Table 16: Impact on Sri Lanka's welfare by China FTA (USD millions)

Country	Full Liberalization				Protected scenario			
	Resource Allocation Effect	Terms of Trade	Investment-Savings Terms of Trade	Total	Resource Allocation Effect	Terms of Trade	Investment-Savings Terms of Trade	Total
Sri Lanka	-25	-8	-46	-79	-23	-1	-42	-66
India	-32	-43	-14	-88	-30	-41	-13	-85
Rest of South Asia	-2	-2	-2	-5	-1	-2	-2	-5
Singapore	0	-7	2	-5	0	-7	2	-5
Thailand	-1	-5	1	-6	-1	-5	1	-6
Rest of ASEAN	-2	-14	2	-13	-2	-13	2	-13
China	45	170	4	219	47	161	4	212
North America	-7	-18	6	-18	-7	-18	5	-20
EU_28	-5	-15	10	-10	-6	-17	9	-15
Rest of World	-17	-59	36	-40	-18	-57	34	-40

8.1.7 Gross Domestic Production

Table 17: Impact on GDP by China FTA (change %)

Country	Full Lib.	Protected scenario
Sri Lanka	-0.27	-0.15
India	-0.02	-0.02
Rest of South Asia	-0.01	-0.01
Singapore	0.00	0.00
Thailand	0.00	0.00
Rest of ASEAN	0.00	0.00
China	0.01	0.01
North America	0.00	0.00
EU_28	0.00	0.00
Rest of the World	0.00	0.00

8.2 Explanation of economic impact of an FTA with China

Though Sri Lanka's exports slightly improved, only the textiles sector and chemical, rubber, and plastic sector record a net increase in export. Industry output of the wearing apparel decreases due to increased imports from China. Industry output of the wearing apparel industry in China increases slightly. Since Sri Lankan textiles are input to the wearing apparel in China, textile exports from Sri Lanka is increased. Imports of textiles to Sri Lanka decreases due to reduced output of wearing apparel. Sri Lanka's Trade deficit further increases by an FTA with China, by nearly 150 million USD in both Full liberalized and protected scenarios.

Sri Lanka records -79 million USD and -66 million USD welfare loss in full liberalization and protected scenarios respectively. China records 219 million USD and 212 million USD gains in welfare in the two scenarios. Sri Lankan GDP decreases by -0.27% and -0.15% in the two scenarios consequently. GDP of China is increased by 0.01% due to a preferential agreement with Sri Lanka.

9 FTA with Thailand

9.1 Results of the FTA with Thailand

9.1.1 Exports

Table 18: Impact on Sri Lanka's exports to Thailand (USD millions)

Sector	Pre	Full Liberalization			Protected Scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	0.0	0.0	0.0	2.9	0.0	0.0	0.2
Processed rice	0.0	0.0	0.0	1.7	0.0	0.0	0.1
Vegetables, Fruits and Nuts	0.2	0.3	0.1	62.7	0.2	0.0	0.1
Crops nec	0.3	1.6	1.3	420.1	1.6	1.3	3.4
Grains and Crops	0.0	0.0	0.0	1.2	0.0	0.0	0.0
Livestock and Meat Products	0.0	0.0	0.0	7.3	0.0	0.0	0.1
Fishing	0.1	0.1	0.0	15.7	0.1	0.0	0.1
Mining and Extraction	32.5	32.6	0.1	0.3	32.2	-0.2	7.5
Processed Food	14.7	19.7	5.0	33.9	19.5	4.8	0.0
Textiles	4.5	7.9	3.4	74.9	7.8	3.3	6.8
Wearing apparel	2.8	13.3	10.6	383.0	13.2	10.4	162.1
Light Manufacturing	30.7	39.5	8.7	28.4	39.3	8.5	143.7
Petroleum and Coal Products	0.2	0.3	0.1	21.1	0.2	0.0	0.0
Chemical, Rubber Plastic prods	3.1	4.9	1.8	57.1	4.9	1.8	54.5
Heavy Manufacturing	8.6	11.0	2.4	27.5	10.9	2.3	106.8
Utilities and Construction	0.3	0.3	0.0	0.3	0.3	0.0	0.2
Transport and Communication	17.4	17.4	0.0	0.2	17.3	-0.1	0.0
Other Services	4.1	4.1	0.0	0.2	4.1	0.0	0.0
Total	119.6	153.0	33.4	27.9	151.7	32.2	26.9

Table 19: Impact on Sri Lanka's total exports (USD millions)

Sector	Pre	Full Liberalization			Protected Scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	1.7	1.7	0.0	2.4	1.7	0.0	0.0
Processed rice	7.2	7.3	0.1	1.4	7.2	0.0	-0.1
Vegetables, Fruits and Nuts	183.6	185.1	1.5	0.8	183.3	-0.3	-0.2
Crops nec	1047.1	1057.8	10.7	1.0	1045.8	-1.3	-0.1
Grains and Crops	5.7	5.8	0.1	0.9	5.7	0.0	0.0
Livestock and Meat Products	9.3	9.8	0.6	6.7	9.2	-0.1	-0.5
Fishing	67.2	67.3	0.1	0.2	67.2	-0.1	-0.1
Mining and Extraction	210.6	210.7	0.2	0.1	208.8	-1.8	-0.9
Processed Food	1275.5	1288.1	12.6	1.0	1276.2	0.7	0.1
Textiles	904.3	911.2	6.9	0.8	903.0	-1.3	-0.1
Wearing apparel	3433.1	3457.8	24.8	0.7	3433.1	0.1	0.0
Light Manufacturing	1012.6	1037.6	25.0	2.5	1032.8	20.2	2.0
Petroleum and Coal Products	99.1	99.2	0.1	0.1	99.1	0.0	0.0
Chemical, Rubber Plastic prods	1384.9	1397.8	12.9	0.9	1388.9	4.0	0.3
Heavy Manufacturing	583.3	592.9	9.7	1.7	589.6	6.3	1.1
Utilities and Construction	44.3	44.4	0.1	0.2	44.2	-0.2	-0.3
Transport and Communication	1352.3	1353.9	1.6	0.1	1347.3	-5.0	-0.4
Other Services	622.8	623.6	0.9	0.1	620.2	-2.6	-0.4
Total	12244.4	12352.0	107.7	0.9	12263.3	18.9	0.2

9.1.2 Imports

Table 20: Impact on total imports of Sri Lanka by the Thailand FTA (USD millions)

Sector	Pre	Full Liberalization			Protected Scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	0.53	0.52	-0.01	-1.22	0.53	0	0.2
Processed rice	27.68	27.91	0.23	0.84	27.71	0.03	0.12
Vegetables, Fruits and Nuts	512.64	512.29	-0.35	-0.07	513.02	0.38	0.07
Crops nec	302.04	300.21	-1.82	-0.6	302.37	0.34	0.11
Grains and Crops	639.37	637.86	-1.5	-0.24	639.24	-0.12	-0.02
Livestock and Meat Products	41.32	106.85	65.53	158.57	41.4	0.07	0.18
Fishing	9.2	9.22	0.02	0.25	9.2	0.01	0.06
Mining and Extraction	2119.95	2121.03	1.08	0.05	2121.65	1.71	0.08
Processed Food	1831.11	1850.16	19.05	1.04	1832.76	1.65	0.09
Textiles	2257.88	2266.98	9.1	0.4	2257.65	-0.23	-0.01
Wearing apparel	250.63	252.13	1.5	0.6	252.72	2.09	0.83
Light Manufacturing	3966.51	3990.14	23.63	0.6	3992.79	26.28	0.66
Petroleum and Coal Products	3678.09	3679.33	1.25	0.03	3679.12	1.03	0.03
Chemical, Rubber Plastic prods	2408.8	2419.4	10.59	0.44	2418.59	9.79	0.41
Heavy Manufacturing	4451.22	4466.45	15.23	0.34	4467.92	16.7	0.38
Utilities and Construction	16.91	16.91	0	0.02	16.96	0.05	0.3
Transport and Communication	1045.19	1043.73	-1.46	-0.14	1046.54	1.36	0.13
Other Services	855.5	854.27	-1.23	-0.14	856.63	1.13	0.13
Total	24414.6	24555.4	140.8	0.6	24476.8	62.3	0.3

9.1.3 Trade Deficit

Table 21: Impact on Trade Balance of Sri Lanka by the Thailand FTA (USD millions)

Country	Full Lib.	Protected Scenario
Sri Lanka	-23.3	-45.7
India	11.4	11.8
Rest of South Asia	1.6	1.1
Singapore	-0.5	-0.4
Thailand	-54.4	-47.8
Rest of ASEAN	8.0	6.1
China	8.1	10.4
North America	11.2	18.1
EU_28	12.1	18.0
Rest of the World	25.5	28.5

Table 22: Impact on sector specific trade balance by the Thailand FTA (USD millions)

Sector	Full Liberalization		Protected Scenario	
	Sri Lanka	Thailand	Sri Lanka	Thailand
Paddy rice	0.04	-0.78	-0.01	0.02
Processed rice	-0.2	-7.61	-0.04	-1.38
Vegetables, Fruits and Nuts	0.96	-1.58	-0.52	-0.16
Crops nec	10.43	-1.65	-1.13	-0.3
Grains and Crops	1.37	-2.3	0.1	1.57
Livestock and Meat Products	-27.55	36.92	-0.1	-3.19
Fishing	0.05	-0.35	-0.05	0
Mining and Extraction	-0.9	-1.48	-3.33	-2.57
Processed Food	-15.88	25.09	0.45	-13.04
Textiles	-2.67	-9.02	-0.38	-6.09
Wearing apparel	20.98	-10.12	-0.76	-7.65
Light Manufacturing	-8.21	76.18	-14.9	92.67
Petroleum and Coal Products	-1.19	0.04	-0.95	-2.29
Chemical, Rubber Plastic prods	0.57	-19.32	-6.14	-5.63
Heavy Manufacturing	-5.58	-70.32	-9.99	-50.89
Utilities and Construction	0.07	-3.16	-0.17	-2.41
Transport and Communication	2.61	-39.62	-5.01	-28.26
Other Services	1.87	-25.12	-3.03	-18.2

9.1.4 Industry output

Table 23: Impact on Industry output by Thailand FTA (change %)

Sector	Full Liberalization		Protected Scenario	
	Sri Lanka	Thailand	Sri Lanka	Thailand
Paddy rice	0.01	-0.07	-0.01	-0.02
Processed rice	0.01	-0.07	-0.01	-0.02
Vegetables, Fruits and Nuts	0.04	-0.01	-0.03	-0.01
Crops nec	0.25	-0.1	-0.03	-0.03
Grains and Crops	0.25	-0.01	-0.07	-0.04
Livestock and Meat Products	-3.48	0.34	-0.03	-0.02
Fishing	-0.03	0.03	-0.02	-0.01
Mining and Extraction	0.04	-0.03	-0.09	-0.02
Processed Food	-0.14	0.07	-0.03	-0.04
Textiles	0.52	-0.12	-0.16	-0.08
Wearing apparel	0.43	-0.07	-0.04	-0.05
Light Manufacturing	0.35	0.12	0.2	0.13
Petroleum and Coal Products	0.04	-0.01	0.05	-0.01
Chemical, Rubber Plastic prods	0.19	-0.06	-0.11	-0.02
Heavy Manufacturing	0.29	-0.05	0.1	-0.01
Utilities and Construction	0.14	0.04	0.17	0.04
Transport and Communication	0.02	-0.01	0	-0.01
Other Services	-0.04	-0.01	-0.03	-0.01

9.1.5 Market Prices

Table 24: Impact on Market Prices by Thailand FTA (change %)

Sector	Full Liberalization		Protected Scenario	
	Sri Lanka	Thailand	Sri Lanka	Thailand
Paddy rice	-0.25	0.05	0.04	0
Processed rice	-0.3	0.05	0.05	0.01
Vegetables, Fruits and Nuts	-0.22	0.07	0.05	0
Crops	-0.15	0.04	0.04	0
Grains and Crops	-0.2	0.06	0.03	0
Livestock and Meat Products	-0.92	0.1	0.08	0.02
Fishing	-0.09	0.1	0.05	0
Mining and Extraction	0	0.01	0.08	0.01
Processed Food	-0.15	0.04	0.08	0.02
Textiles	-0.06	0.03	0.07	0.03
Wearing apparel	-0.06	0.04	0.04	0.03
Light Manufacturing	-0.25	0.02	-0.19	0.02
Petroleum and Coal Products	0	0.01	0	0.01
Chemical, Rubber Plastic prods	-0.13	0.03	-0.03	0.02
Heavy Manufacturing	-0.16	0.02	-0.09	0.02
Utilities and Construction	-0.04	0.03	0.07	0.02
Transport and Communication	-0.03	0.05	0.1	0.03
Other Services	-0.04	0.05	0.11	0.04

9.1.6 Welfare

Table 25: Impact on economic welfare by Thailand FTA (USD millions)

Country	Full Liberalization				Protected Scenario			
	Resource Allocation Effect	Terms of Trade	Investment-Savings Terms of Trade	Total	Resource Allocation Effect	Terms of Trade	Investment-Savings Terms of Trade	Total
Sri Lanka	11	-13	-18	-20	-6	3.31	-9.08	-11.44
India	-10	-13	-4	-27	-9	-11.2	-4.02	-24.36
Rest of South Asia	-1	-1	-1	-2	0	-0.37	-0.31	-1.07
Singapore	0	-2	1	-1	0	-1.3	0.35	-1.01
Thailand	13	78	-1	90	11	50.26	-0.92	60.68
Rest of ASEAN	-1	-11	1	-11	0	-7.12	0.38	-6.86
China	-3	-11	9	-5	-1	-9.03	5.71	-4.5
North America	0	-1	1	0	-1	-2.41	-0.31	-3.53
EU_28	-1	-4	3	-2	-1	-6.3	1.39	-6.19
Rest of World	-2	-24	11	-15	-2	-15.86	6.81	-11.33

9.1.7 Gross Domestic Production

Table 26: Impact on GDPs by Thailand FTA (change %)

Country	Full Lib.	Protected Scenario
Sri Lanka	-0.20	0.01
India	-0.01	0.00
Rest of South Asia	0.00	0.00
Singapore	0.00	0.00
Thailand	0.06	0.04
Rest of ASEAN	0.00	0.00
China	0.00	0.00
North America	0.00	0.00
EU_28	0.00	0.00
Rest of the World	0.00	0.00

9.2 Explanation of economic impact of an FTA with Thailand

Sri Lanka's net trade balance improves in wearing apparel and crops sectors by a wholly FTA with Thailand. In the protected scenario, these two sectors record negative trade balance though they are liberalized. The reason is FOB price of wearing apparel from Sri Lanka increases by 0.04% in the protected scenario while FOB value of the wearing apparel is decreased by 0.06% in the fully liberalized scenario. The increased prices of wearing apparel in the protected scenario reduce exports to America and the European Union which nearly balanced out the increased sales of wearing apparel to Thailand. In the protected scenario skill labor price increases by 0.12% and unskilled labor increases by 0.14% in Sri Lanka. Cost of capital also increased by 0.13%.³

It is interesting to find out the reason for the increasing prices of factor endowments for production in the protected scenario while the factor endowment prices reduce in the fully liberalized scenario. The difference is mainly due to the 159% increase of import of livestock and meat sector in the full liberalized scenario. This drops the industry output by 3.5% replacing domestic production with imports and releasing some of the resources employed in the industry to the other industries. This causes the supply of factors to be increased for other industries reducing the factor prices. In the protected scenario, livestock and meat

³ These figures are not tabulated in this report. The figures are extracted from the simulated results

products sector is not liberalized, hence no such trade creation for the industry. Therefore, when the industry output is slightly increasing in light manufacturing and utility and construction sectors the demand for factors of production is slightly increased causing the cost of production, hence market prices to be slightly increased in many sectors in the protected scenario whereas market prices decrease in many sectors in the full liberalized scenario. It is important to note that the trade deficit widens more by the protected scenario compared to a fully liberalized scenario for an FTA with Thailand. As explained above, the difference is attributed to liberalization of livestock and meat products sector where Thailand is more efficient in production than Sri Lanka in its production.

The economic welfare of Sri Lanka is deteriorated in both scenarios for an FTA with Thailand whereas Thailand gains in both scenarios for a common tariff removal policy for the two countries. GDP of Sri Lanka drops by 0.2% and 0.01 in full liberalized and protected scenarios. Thailand GDP slightly improves in both scenarios. This concludes that in an FTA between Thailand and Sri Lanka, Thailand is the winner and Sri Lanka is looser in both scenarios considered.

10 Singapore FTA

10.1 Results of the FTA with Singapore

10.1.1 Exports

Table 27: Impact on Sri Lanka's exports to Singapore (USD million)

Sector	Pre	Full Liberalization			Protected Scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	0.0	0.0	0.0	2.0	0.0	0.0	1.0
Processed rice	0.1	0.1	0.0	1.2	0.1	0.0	0.8
Vegetables, Fruits and Nuts	0.1	0.1	0.0	0.3	0.1	0.0	-0.1
Crops nec	0.9	0.9	0.0	1.2	0.9	0.0	0.8
Grains and Crops	0.0	0.0	0.0	0.6	0.0	0.0	-0.4
Livestock and Meat Products	0.0	0.0	0.0	0.6	0.0	0.0	0.1
Fishing	3.8	3.8	0.0	0.4	3.8	0.0	0.0
Mining and Extraction	0.1	0.1	0.0	0.4	0.1	0.0	-0.2
Processed Food	9.5	9.7	0.2	2.3	9.7	0.2	0.3
Textiles	5.8	5.8	0.0	0.6	5.8	0.0	0.2
Wearing apparel	4.0	4.1	0.0	0.5	4.1	0.0	0.0
Light Manufacturing	7.9	8.0	0.1	0.6	8.0	0.1	0.0
Petroleum and Coal Products	0.2	0.2	0.0	0.2	0.2	0.0	0.0
Chemical, Rubber Plastic prods	8.5	8.6	0.1	0.8	8.6	0.1	0.0
Heavy Manufacturing	17.5	17.6	0.1	0.7	17.6	0.1	-0.1
Utilities and Construction	0.2	0.2	0.0	0.4	0.2	0.0	0.0
Transport and Communication	27.6	27.7	0.1	0.3	27.6	0.1	0.0
Other Services	8.5	8.5	0.0	0.2	8.5	0.0	-0.1
Total	94.7	95.3	0.6	0.6	95.3	0.6	0.6

Table 28: Impact on Sri Lanka's total exports by Singapore FTA (USD millions)

Sector	Pre	Full Liberalization			Protected Scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	1.7	1.7	0.0	8.0	1.7	0.0	8.6
Processed rice	7.2	7.2	0.0	4.6	7.2	0.0	5.1
Vegetables, Fruits and Nuts	183.6	184.0	0.4	2.0	184.0	0.4	2.1
Crops nec	1047.1	1050.2	3.2	3.6	1050.5	3.5	4.0
Grains and Crops	5.7	5.8	0.0	3.3	5.8	0.0	3.4
Livestock and Meat Products	9.3	9.3	0.0	3.9	9.3	0.0	4.9
Fishing	67.2	67.4	0.1	2.0	67.4	0.1	2.1
Mining and Extraction	210.6	211.0	0.4	1.4	211.3	0.8	3.6
Processed Food	1275.5	1282.2	6.7	3.1	1283.0	7.5	3.7
Textiles	904.3	907.8	3.5	3.6	908.5	4.2	4.5
Wearing apparel	3433.1	3448.0	14.9	4.2	3450.2	17.2	4.8
Light Manufacturing	1012.6	1018.2	5.6	4.7	1018.1	5.5	4.5
Petroleum and Coal Products	99.1	99.2	0.0	-2.0	99.2	0.0	0.1
Chemical, Rubber Plastic prods	1384.9	1395.3	10.3	6.0	1394.2	9.3	5.3
Heavy Manufacturing	583.3	587.1	3.8	5.9	586.4	3.1	4.8
Utilities and Construction	44.3	44.5	0.2	3.7	44.4	0.1	2.2
Transport and Communication	1352.3	1356.1	3.9	2.6	1354.9	2.6	1.8
Other Services	622.8	624.2	1.4	2.1	624.5	1.8	2.6
Total	12244.4	12298.8	54.4	0.4	12300.5	56.1	0.5

10.1.2 Imports

Table 29: Impact on imports to Sri Lanka by Singapore FTA (USD millions)

Sector	Pre	Full Liberalization			Protected Scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	0.53	0.53	0	-0.38	0.53	0	-0.41
Processed rice	27.68	27.62	-0.06	-0.21	27.61	-0.07	-0.25
Vegetables, Fruits and Nuts	512.64	511.99	-0.66	-0.13	511.96	-0.68	-0.13
Crops nec	302.04	301.19	-0.84	-0.28	301.2	-0.83	-0.28
Grains and Crops	639.37	638.24	-1.13	-0.18	638.35	-1.02	-0.16
Livestock and Meat Products	41.32	41.27	-0.06	-0.14	41.23	-0.09	-0.21
Fishing	9.2	9.19	-0.01	-0.12	9.18	-0.01	-0.16
Mining and Extraction	2119.95	2106	-13.94	-0.66	2119.8	-0.15	-0.01
Processed Food	1831.11	1856.55	25.44	1.39	1856.46	25.35	1.38
Textiles	2257.88	2263.74	5.86	0.26	2264.7	6.82	0.3
Wearing apparel	250.63	250.3	-0.33	-0.13	250.25	-0.38	-0.15
Light Manufacturing	3966.51	3971.21	4.7	0.12	3969.77	3.26	0.08
Petroleum and Coal Products	3678.09	3695.23	17.15	0.47	3677.11	-0.97	-0.03
Chemical, Rubber Plastic prods	2408.8	2415.15	6.34	0.26	2414.95	6.14	0.26
Heavy Manufacturing	4451.22	4455.43	4.21	0.09	4453.67	2.44	0.05
Utilities and Construction	16.91	16.89	-0.02	-0.14	16.89	-0.02	-0.11
Transport and Communication	1045.19	1042.9	-2.28	-0.22	1043.38	-1.81	-0.17
Other Services	855.5	853.86	-1.63	-0.19	853.83	-1.67	-0.2
Total	24414.6	24457.3	42.7	0.2	24450.9	36.3	0.1

10.1.3 Trade Deficit

Table 30: Impact on Sri Lanka's Trade Balance (USD millions)

Country	Full Lib.	Protected Scenario
Sri Lanka	-8.2	2.5
India	5.0	3.4
Rest of South Asia	1.3	1.3
Singapore	17.4	16.6
Thailand	1.4	1.3
Rest of ASEAN	4.7	4.3
China	-3.0	-4.5
North America	-8.5	-9.9
EU_28	-6.8	-8.5
Rest of the World	-3.5	-6.4

10.1.4 Industry output

Table 31: Impact on industry output of Sri Lanka by Singapore FTA (USD millions)

Sector	Full Liberalization		Protected Scenario	
	Sri Lanka	Singapore	Sri Lanka	Singapore
Paddy rice	-0.04	0.01	-0.03	0.01
Processed rice	-0.04	0.03	-0.03	0.02
Vegetables, Fruits and Nuts	-0.02	0.03	-0.01	0.01
Crops nec	0	-0.02	0.02	-0.02
Grains and Crops	-0.01	0.37	0	0.37
Livestock and Meat Products	-0.04	0	-0.02	-0.01
Fishing	-0.03	0.02	-0.02	0.01
Mining and Extraction	0.03	0.02	0.05	0.01
Processed Food	-0.24	1.9	-0.22	1.9
Textiles	0.23	2.16	0.3	2.17
Wearing apparel	0.27	0.01	0.32	0.01
Light Manufacturing	0.09	0.13	0.08	0.14
Petroleum and Coal Products	-0.7	0.15	0	0
Chemical, Rubber Plastic prods	0.16	0.02	0.13	0.02
Heavy Manufacturing	0.17	-0.05	0.11	-0.05
Utilities and Construction	0.05	0.01	0.01	0.01
Transport and Communication	0	-0.01	-0.01	-0.01
Other Services	-0.05	-0.01	-0.03	-0.01

10.1.5 Market Prices

Table 32: Impact on Market Prices of Sri Lanka (change %)

Sector	Full Liberalization		Protected Scenario	
	Sri Lanka	Singapore	Sri Lanka	Singapore
Paddy rice	-0.07	0.04	-0.08	0.03
Processed rice	-0.08	0.01	-0.09	0.01
Vegetables, Fruits and Nuts	-0.06	0.04	-0.07	0.03
Crops	-0.05	0.02	-0.06	0.02
Grains and Crops	-0.06	0.12	-0.07	0.12
Livestock and Meat Products	-0.06	0.01	-0.07	0.01
Fishing	-0.1	0.04	-0.1	0.04
Mining and Extraction	-0.02	0.03	-0.03	0.02
Processed Food	-0.13	0.01	-0.14	0.01
Textiles	-0.05	0.01	-0.07	0.01
Wearing apparel	-0.06	0.01	-0.07	0.01
Light Manufacturing	-0.09	0.01	-0.08	0.01
Petroleum and Coal Products	-0.01	0	0	0
Chemical, Rubber Plastic prods	-0.12	0.01	-0.11	0.01
Heavy Manufacturing	-0.08	0.01	-0.07	0.01
Utilities and Construction	-0.08	0.01	-0.05	0.01
Transport and Communication	-0.07	0.01	-0.05	0.01
Other Services	-0.06	0.02	-0.07	0.02

10.1.6 Welfare

Table 33: Impact on economic welfare by Singapore FTA (USD millions)

Country	Full Liberalization				Protected Scenario			
	Resource Allocation Effect	Terms of Trade	Investment-Savings Terms of Trade	Total	Resource Allocation Effect	Terms of Trade	Investment-Savings Terms of Trade	Total
Sri Lanka	-12	-10	-9	-31	-9	-10	-8	-27
India	-12	-10	-3	-25	-4	-7	-2	-12
Rest of South Asia	0	-1	-1	-1	0	-1	0	-1
Singapore	2	36	-5	32	2	34	-5	30
Thailand	0	-2	0	-2	0	-2	0	-2
Rest of ASEAN	-1	-6	1	-6	-1	-6	0	-6
China	-2	-5	7	-1	-2	-4	5	-1
North America	1	1	1	3	1	2	1	4
EU_28	0	-2	2	0	1	0	2	3
Rest of World	-2	-2	8	4	0	-7	6	-1

10.1.7 Gross Domestic Production

Table 34: Impact on GDPs by Singapore FTA (change %)

Country	Full Lib.	Protected Scenario
Sri Lanka	-0.17	-0.14
India	0.00	0.00
Rest of South Asia	0.00	0.00
Singapore	0.02	0.02
Thailand	0.00	0.00
Rest of ASEAN	0.00	0.00
China	0.00	0.00
North America	0.00	0.00
EU_28	0.00	0.00
Rest of the World	0.00	0.00

10.2 Explanation of economic impact of an FTA with Singapore

Singapore has removed tariffs for 99% of goods unilaterally. Therefore, Sri Lanka does not get anything in the goods liberalization of the Singapore-Sri Lanka FTA. Sri Lanka removes tariffs for 80% of tax lines over a 15 year period in several steps. As expected, Sri Lankan exports to Singapore does not improve by the agreement. However, total exports (to the world) increases slightly. The reason can be attributed to the increase in imports from Singapore which is used as inputs to the exports. Sri Lanka records a trade deficit in the fully liberalized scenario and a small trade surplus in the protected scenario. It should be noted that the Singapore agreement includes one of the most liberal Rules of Origin clause which has not being considered in this experiment. If the rule of origin is incorporated into the model, the imports from Singapore to Sri Lanka will be increased more.

Sri Lanka loses its economic welfare by the Agreement in both scenarios while Singapore gains. The GDP of Sri Lanka reduced by 0.17% and 0.14% in the two scenarios considered. Singapore's GDP will be slightly improved by 0.02% in both scenarios.

11 All proposed FTAs are in operation

11.1 Results of the four FTAs

11.1.1 Exports

Table 35: Impact on total exports of Sri Lanka when four FTAs are in operation (USD millions)

Sector	Pre	Full Liberalization			Protected Scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	1.7	1.8	0.1	5.4	1.6	-0.1	-4.2
Processed rice	7.2	7.4	0.2	2.8	7.1	-0.1	-1.8
Vegetables, Fruits and Nuts	183.6	190.9	7.3	4.0	180.3	-3.3	-1.8
Crops nec	1047.1	1281.1	234.0	22.3	1237.9	190.9	18.2
Grains and Crops	5.7	6.1	0.3	5.6	5.9	0.1	2.4
Livestock and Meat Products	9.3	9.9	0.7	7.1	9.1	-0.2	-2.1
Fishing	67.2	68.0	0.8	1.2	67.3	0.0	0.0
Mining and Extraction	210.6	200.5	-10.0	-4.8	202.5	-8.1	-3.8
Processed Food	1275.5	1314.1	38.6	3.0	1306.9	31.4	2.5
Textiles	904.3	949.7	45.4	5.0	948.4	44.1	4.9
Wearing apparel	3433.1	3431.4	-1.7	0.0	3428.5	-4.5	-0.1
Light Manufacturing	1012.6	1163.1	150.6	14.9	1155.9	143.3	14.2
Petroleum and Coal Products	99.1	100.0	0.9	0.9	99.3	0.2	0.2
Chemical, Rubber Plastic prods	1384.9	1495.0	110.1	7.9	1473.5	88.6	6.4
Heavy Manufacturing	583.3	646.0	62.7	10.8	635.5	52.2	9.0
Utilities and Construction	44.3	44.7	0.4	0.8	43.8	-0.5	-1.2
Transport and Communication	1352.3	1350.2	-2.1	-0.2	1331.7	-20.6	-1.5
Other Services	622.8	613.5	-9.2	-1.5	613.6	-9.2	-1.5
Total	12244.4	12873.4	629.0	5.1	12748.6	504.3	4.1

11.1.2 Imports

Table 36: Impact on imports to Sri Lanka when four FTAs are in operation (USD millions)

Sector	Pre	Full Liberalization			Protected Scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	0.5	0.9	0.3	61.9	0.5	0	2.3
Processed rice	27.7	37.7	10	36.2	27.9	0.3	0.9
Vegetables, Fruits and Nuts	512.6	630.9	118.3	23.1	515.9	3.3	0.6
Crops nec	302	448.6	146.5	48.5	456	153.9	51
Grains and Crops	639.4	636.7	-2.6	-0.4	637.2	-2.2	-0.3
Livestock and Meat Products	41.3	110.9	69.6	168.3	41.5	0.2	0.4
Fishing	9.2	9.3	0.1	1.3	9.2	0	-0.3
Mining and Extraction	2119.9	1998.6	-121.3	-5.7	2131.4	11.5	0.5
Processed Food	1831.1	1966.6	135.5	7.4	1971.2	140.1	7.7
Textiles	2257.9	2248.2	-9.7	-0.4	2247.8	-10.1	-0.4
Wearing apparel	250.6	311.4	60.7	24.2	311.4	60.7	24.2
Light Manufacturing	3966.5	4171.4	204.9	5.2	4156.7	190.2	4.8
Petroleum and Coal Products	3678.1	3865.2	187.1	5.1	3681.1	3	0.1
Chemical, Rubber Plastic prods	2408.8	2482.3	73.5	3.1	2479.3	70.5	2.9
Heavy Manufacturing	4451.2	4587.6	136.4	3.1	4568.1	116.9	2.6
Utilities and Construction	16.9	17.1	0.2	1	17.2	0.3	1.5
Transport and Communication	1045.2	1039.9	-5.3	-0.5	1046.7	1.5	0.1
Other Services	855.5	854.9	-0.6	-0.1	856.1	0.6	0.1
Total	24414.4	25418.2	1003.6	4.1	25155.2	740.7	3.0

11.1.3 Trade Deficit

Table 37: Impact on trade balance when four FTAs are in operation (USD millions)

Country	Full Lib.	Protected Scenario
Sri Lanka	-370.3	-275.9
India	-83.3	-80.2
Rest of South Asia	14.3	12.1
Singapore	9.6	8.9
Thailand	-34.7	-34.7
Rest of ASEAN	28.8	26.4
China	12.5	-7.6
North America	141.7	112.4
EU_28	105.9	91.8
Rest of the World	175.2	146.8

Table 38: Impact on sector wise trade balance when four FTAs are in operation (USD millions)

Sector	Full Lib.	Protected Scenario
Paddy rice	-0.2	-0.1
Processed rice	-8.8	-0.3
Vegetables, Fruits and Nuts	-94.8	-5.1
Crops nec	98.0	59.3
Grains and Crops	1.9	1.3
Livestock and Meat Products	-30.0	-0.3
Fishing	0.7	0.0
Mining and Extraction	112.6	-8.3
Processed Food	-129.5	-139.1
Textiles	57.9	57.5
Wearing apparel	-53.5	-55.7
Light Manufacturing	-104.8	-97.9
Petroleum and Coal Products	-173.3	-2.7
Chemical, Rubber Plastic prods	29.8	14.8
Heavy Manufacturing	-74.2	-64.6
Utilities and Construction	0.1	-0.7
Transport and Communication	3.7	-16.7
Other Services	-6.2	-7.4
Total	-370.3	-275.8

11.1.4 Industry output

Table 39: Impact on industry output when four FTAs are in operation (USD millions)

Sector	Pre	Full Liberalization			Protected Scenario		
		Post	Change	change %	Post	Change	change %
Paddy rice	1834.9	1824.1	-10.8	-0.6	1829.3	-5.6	-0.3
Processed rice	1853.3	1841.6	-11.7	-0.6	1847.5	-5.8	-0.3
Vegetables, Fruits and Nuts	4054.1	3953.4	-100.7	-2.5	4036.3	-17.8	-0.4
Crops nec	4507.4	4594.7	87.3	1.9	4543.4	36	0.8
Grains and Crops	205.4	204.4	-1	-0.5	202.4	-3	-1.5
Livestock and Meat Products	1390	1334	-56.1	-4	1383.9	-6.1	-0.4
Fishing	1727.7	1722.8	-4.9	-0.3	1723.7	-4	-0.2
Mining and Extraction	1331	1325.6	-5.3	-0.4	1325.7	-5.3	-0.4
Processed Food	8481.4	8376.6	-104.8	-1.2	8373.6	-107.8	-1.3
Textiles	1474.9	1513.9	39	2.6	1512.8	38	2.6
Wearing apparel	5214.2	5152.5	-61.7	-1.2	5150.9	-63.2	-1.2
Light Manufacturing	3906.6	3966.5	59.9	1.5	3954.3	47.7	1.2
Petroleum and Coal Products	2084.1	1951.8	-132.3	-6.4	2091.7	7.6	0.4
Chemical, Rubber Plastic prods	4260.8	4330.3	69.5	1.6	4305.7	44.9	1.1
Heavy Manufacturing	2505.8	2552.4	46.5	1.9	2529.9	24	1
Utilities and Construction	10778.1	10956.1	178	1.7	10905.6	127.5	1.2
Transport and Communication	27183.9	27210.6	26.8	0.1	27154.6	-29.3	-0.1
Other Services	17528.3	17455.2	-73.1	-0.4	17478.1	-50.3	-0.3

11.1.5 Market Prices

Table 40: Impact on market prices when four FTAs are in operation (change %)

Sector	Full Lib.	Protected Scenario
Paddy rice	-0.56	0.52
Processed rice	-0.55	0.43
Vegetables, Fruits and Nuts	-1.12	0.54
Crops nec	0.16	0.76
Grains and Crops	-0.59	0.06
Livestock and Meat Products	-0.98	0.3
Fishing	-0.01	-0.03
Mining and Extraction	0.48	0.39
Processed Food	-0.58	-0.45
Textiles	0.27	0.29
Wearing apparel	0.11	0.12
Light Manufacturing	-1.82	-1.72
Petroleum and Coal Products	-0.11	-0.04
Chemical, Rubber Plastic prods	-0.51	-0.27
Heavy Manufacturing	-1.16	-0.95
Utilities and Construction	-0.19	0.25
Transport and Communication	0.04	0.4
Other Services	0.39	0.39

11.1.6 Welfare

Table 41: Impact on welfare when four FTAs are in operation (USD millions)

Country	Full Liberalization				Protected Scenario			
	Resource Allocation Effect	Terms of Trade	Investment-Savings Terms of Trade	Total	Resource Allocation Effect	Terms of Trade	Investment-Savings Terms of Trade	Total
Sri Lanka	-15	-34	-121	-170	-63	-9	-96	-169
India	124	145	53	323	53	100	40	193
Rest of South Asia	-5	-10	-4	-19	-4	-8	-3	-15
Singapore	1	19	-2	19	1	18	-2	18
Thailand	7	52	0	59	7	38	0	45
Rest of ASEAN	-6	-44	2	-48	-6	-40	2	-45
China	38	118	13	169	39	109	10	158
North America	-8	-43	1	-51	-8	-37	0	-45
EU_28	-10	-42	9	-43	-13	-50	8	-56
Rest of World	-53	-162	49	-167	-38	-121	43	-117

11.1.7 Gross Domestic Production

Table 42: Impact on GDP when four FTAs are in operation (change %)

Country	Full Lib.	Protected Scenario
Sri Lanka	-1.14	-0.54
India	0.06	0.04
Rest of South Asia	-0.02	-0.01
Singapore	0.01	0.01
Thailand	0.04	0.03
Rest of ASEAN	-0.01	-0.01
China	0.01	0.01
North America	0	0
EU_28	0	0
Rest of the World	0	0

11.2 Explanation of economic impact of four FTAs

Sri Lanka's exports improve, especially in the aggregated sectors crops, light manufacturing, chemicals, rubber and plastic products, Heavy manufacturing, textiles, and processed foods. The export growth for crops heavily depends on ETCA. However, India is very cautious to liberalize the crops sector because India needs to protect its farmers. If India does not bilaterally liberalize the crops sector or does not remove some of the existing non-tariff barriers, the Sri Lankan export growth will be hindered. Sri Lanka's imports will increase in a higher phase than its exports, increasing the trade deficit by 370 million USD in the full liberalization scenario and by 276 million USD in the protected scenario.

The net trade balance of Sri Lanka in the sectors of processed foods, light manufacturing, heavy manufacturing and wearing apparel will be decreased considerably in both scenarios.⁴ Vegetables, fruits and nuts sector livestock and meat products sector and petroleum and coal products sectors will record negative trade balances in the full liberalized scenario. The trade balance in the sectors of crops, textiles, chemical, rubber, and plastic product categories will improve in both scenarios.

As per the simulation results, industry output is considerably increased in the utilities and construction sector. Since this is a service sector, no policy shock has

⁴ Fully liberalized scenario and the protected scenario

been directly provided to the utilities and construction sector in the simulated model. The increase of the output in this sector in the simulation is mainly due to the reallocation of resources which were employed in the negatively affected industries. Apart from that, the industry output increases in crops, chemical, rubber and plastic products, light manufacturing, heavy manufacturing, and textile industries. Though the textile industries' output has increased, the wearing apparel industry is hindered. The output of the processed food is reduced by over 100 million USD per year in both scenarios. In the full liberalized scenario, vegetables, fruits, and nuts sector and petroleum and coal products sector record a decrease in industry output by more than 100 million USD each. Petroleum and coal products sector also record around 56 million USD decrease in the industrial output.

Market prices are slightly reduced in many sectors in the full liberalized scenario. In the protected scenario, food prices of paddy rice, processed rice, vegetables, fruits, and nuts are increased. The reduced the supply due to decreased production is the main reason for increasing prices in these sectors in the protected scenario. in the full liberalized scenario, although the production hinders more, prices are dropped in these sectors due to tariff-free imports. The prices of crops and textiles are increased due to increased demand for exports in both scenarios.

Sri Lanka's welfare reduced by nearly 170 million USD in both scenarios. All the other four countries India, China, Thailand and Singapore gain in terms of the economic welfare for the same policy. All the other aggregated regions on the model also record negative economic welfare. Sri Lanka is the biggest loser and India is the biggest winner. Accordingly, the gross domestic product of Sri Lanka is reduced by 1.14% in the full liberalized scenario and it is reduced by 0.54% in the protected scenario. Gross domestic product of India, China, Thailand, and Singapore improves slightly.

12 Future study areas

- Impact to the economy of Sri Lanka when the Rules of Origin Clause is incorporated to the model.
- Impact to the economy of Sri Lanka when the measures related to non-tariff barriers are incorporated to the model.
- Impact to the economy when service sector liberalization and foreign direct investments are incorporated to the model.

13 References

1. Hertel, T. W. (1998). *Global trade analysis: modeling and applications*. Cambridge university press.
2. Hertel, T., Hummels, D., Ivanic, M., & Keeney, R. (2007). How confident can we be of CGE-based assessments of Free Trade Agreements? *Economic Modelling*, 24(4), 611-635.
3. Bandara, J. S. (1991). Computable general equilibrium models for development policy analysis in LDCs. *Journal of economic surveys*, 5(1), 3-69.
4. Robinson, S., & Thierfelder, K. (2002). Trade liberalisation and regional integration: the search for large numbers. *Australian Journal of Agricultural and Resource Economics*, 46(4), 585-604.

