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Chapter 6

The Impact of Trade Liberalisation on Poverty and Welfare in South Asia: A Special Reference to Sri Lanka

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Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.69506

Abstract

This chapter evaluates the economic impacts of SAFTA relative to alternative trade policies to determine which policies best deliver increased welfare to citizens, thereby helping to alleviate income disparities and poverty in the region. The study does so with a particular emphasis on the income inequality and poverty effects of trade liberalisation in South Asia on households in Sri Lanka. A static multi-country computable general equilibrium model for South Asia (SAMGEM) is formulated by incorporating a multiple household framework into the Global Trade Analysis Project (GTAP) model. A non-parametric extended representative household agent approach is used to estimate the income inequality and poverty effects of trade liberalisation in South Asia by using micro-household survey data. The findings revealed that amongst the different trade policy options considered, unilateral trade liberalisation ensures the highest welfare to all South Asian members followed by the customs union (with the exception of Sri Lanka) and the SAFTA. The poverty and income equality analysis for the Sri Lankan economy suggests that poverty is predominant in the rural and the estate sectors and Sri Lanka can achieve a significant progress towards poverty reduction as a result of implementing trade reforms.

Keywords: trade reforms, poverty, income distribution, households, CGE model

1. Introduction

In a world increasingly dominated by the forces of globalization and regionalization, it is important to stimulate thinking on, and explore solutions to, some of the salient issues accompanying trade reforms. In line with trends in other economies, South Asia initiated trade reforms during the last two decades with a view of integration into the world economy, hence improving their growth prospects and reducing poverty in the region. In the 1980s,

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Bangladesh proposed the idea of a 'regional forum' in South Asia, drawing attention towards the success of similar arrangements elsewhere in the world, thereby enabling the South Asian economies to get benefit from such co-operation by strengthening their competitive position, both individually and as a group [1]. Consequently, the South Asian economies commenced regional integration initiatives with the formation of the South Asian Association for Regional Co-operation (SAARC) in 1985.

The trade liberalisation in SAARC aims to establish South Asian Free Trade Agreement (SAFTA) as well as probe beneath the deeper integration levels such as customs union through the elimination of tariffs and Non Tariff Barriers (NTBs) and structural impediments to free trade.

Many studies have shed light on South Asian Preferential Trade Agreement (SAPTA) and SAFTA, but only a few quantify the possible economic impacts on member countries as given in [2–7]. Quantitative estimates of gains from the SAFTA can either be made by using gravity models or CGE models in [8]. In Ref. [9], the study quantified the impact of the SAFTA using 1997 statistical series in gravity model and found that the seven SAARC economies not only reduced trade among themselves but also with the Rest of world (ROW). Nevertheless, in [10] it was used both panel and cross sectional data for the period of 1996–2002 to estimate trade creation and trade diversion effects under the present SAFTA regime and found the evidence of trade creation among the SAARC member countries, without any trade diversion with the ROW. Among these studies, there is a disagreement about the economic outcome of the preferential trade agreements in the SAARC region on its member countries, as stated in [11]. In Ref. [6], the early studies were examined showing impact of potential benefits of the SAFTA on the member countries and classified those findings into three views: optimistic, pessimistic and moderate. The study quantified the welfare implications of the SAFTA by comparing with the effects of unilateral trade liberalisation and other policy options on member countries using the Global Trade Analysis Project (GTAP) model. They found that the potential benefits of full trade liberalisation in South Asia are marginal for most of the countries except for India, which stands to gain significantly from the agreement. Hence, their study supported the pessimistic view and indicated that South Asian countries may gain more from the unilateral and multilateral trade liberalisation than under the SAFTA.

Arguments in favour of free trade suggest that trade liberalisation accelerates economic growth, which leads to reductions in poverty and income inequality in developing countries [13–16]. However, as stated in [17, 18], others are of the opinion that trade liberalisation produces welfare losses, thereby increasing poverty and income inequality in developing countries. **Figure 1** illustrates that South Asia remains home to the second highest number of people living below the poverty line, although the region has experienced a substantial reduction in both the incidence of poverty and the absolute number of poor. Poverty in the South Asian region has fallen from 32.1 in 2008 to about 18.8% in 2012.

Poverty Headcount data of the South Asian countries are depicted in **Figure 2**. According to this figure, it is clear that Sri Lanka has the lowest poverty headcount ratio amongst all South Asian economies. The poverty headcount ratio in Sri Lanka is recorded at 1.9% in 2012, calculated at $1.9/day. On the other hand, Bangladesh and India suffer from relatively high poverty headcount ratios in the region.

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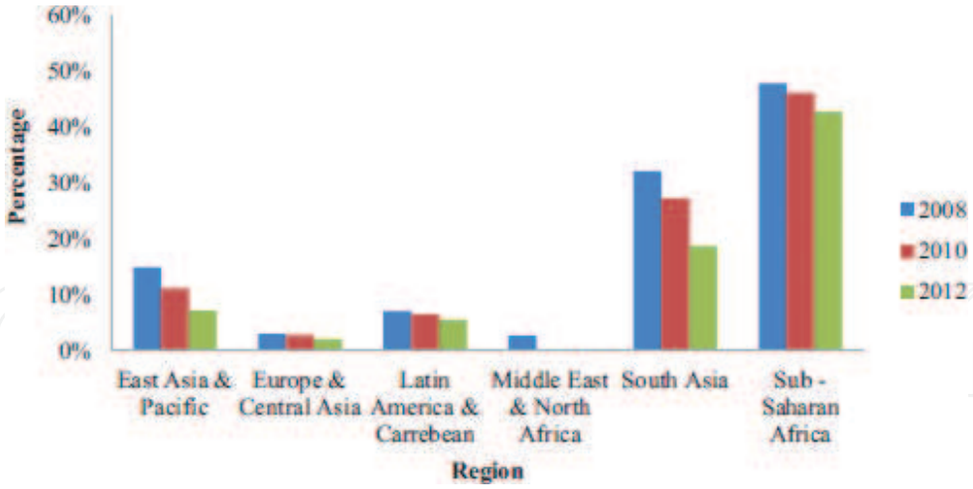


Figure 1. Working poor living on less than US$1/day by region: 2008–2012. Source: World Bank [12], World Development Indicators Database, 2014.

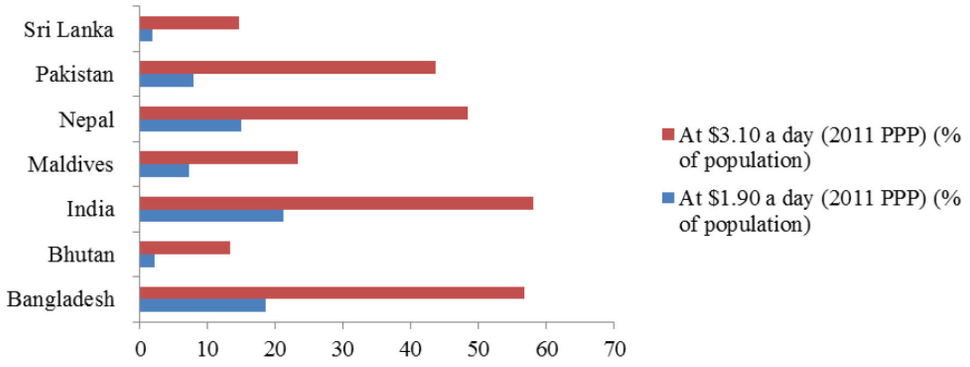


Figure 2. Poverty headcount ratio for South Asia: 2012. Source: World Bank, World Development Indicators Database, 2014.

From **Figures 1** and **2**, it could be noticed that, although poverty as a proportion to the population has fallen in the region during the past two decades, yet there are a significant number of people living below the poverty line. In the present context, even though South Asia is the second fastest growing region in the world, it faces major challenges in its efforts to reduce poverty, [12]. Therefore, definitive empirical answers to the question of whether trade liberalisation reduces poverty in the South Asian region have proved elusive [19].

Figure 3 indicates the income inequalities prevailing within the South Asian economies. All the South Asian countries seem to have a relatively high income inequality. In almost all of these countries, about 40% of the income is enjoyed by the 20% richest and 20% poorest enjoyed less than 10% of the total income. When considering the Sri Lankan scenario, although a low poverty headcount ratio is recorded, the country seems to be suffering from income inequality.

Although it is commonly believed that trade liberalisation results in higher GDP, little is known about its effects on poverty and inequality. Given the importance of the subject and the wide divergence of opinions, it is not surprising that numerous studies have attempted to

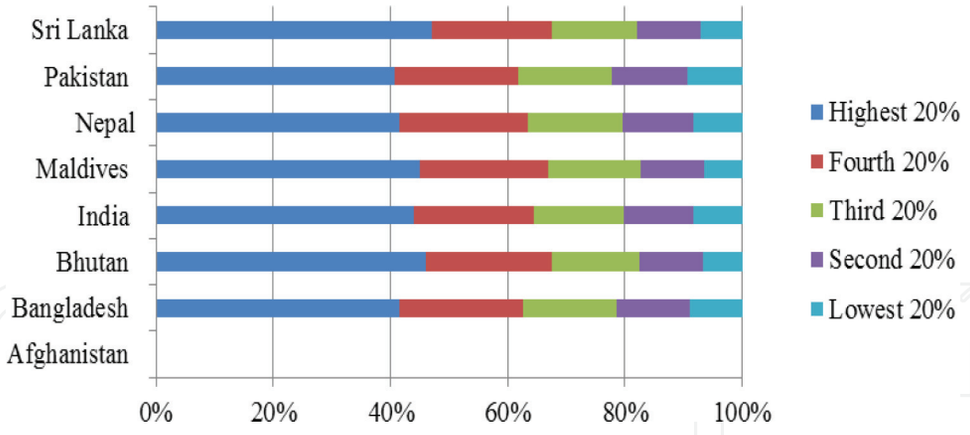


Figure 3. Income inequalities in South Asia: 2012. Source: World Bank, World Development Indicators Database, 2014.

quantify these effects, as in [20, 21]. It was noted that several single country Computable General Equilibrium (CGE) models were used for poverty and income distribution analysis in South Asian economies [17, 22–24]. However, none of these studies attempted to formulate a regional model of South Asia except in [25], where a scholar used GTAP version 6, which reflects the world economy in 2001. When we consider the previous studies undertaken to assess the welfare implications of the SAFTA, it can be seen that most omitted addressing the question of how the SAFTA may affect broader socio-economic variables in the region, particularly with regard to income distribution and poverty in a multi-country CGE framework. This is a major trade policy concerned with reference to South Asia, since it is the second largest region in the world experiencing poverty next to the Sub-Saharan Africa (**Figure 1**).

With this backdrop, this chapter examines the implications of different trade liberalisation options on the member countries such as India, Pakistan, Bangladesh and Sri Lanka using a multi-country CGE model for South Asia. For instance, it considers whether forming the South Asian customs union against the rest of the world or unilateral liberalisation of South Asia's trade will bring wider impacts on welfare and income distribution, particularly in the Sri Lankan economy. The model incorporates some modifications to the household sector to capture the inter-household income changes under different trade liberalisation scenarios. It is equally important to examine the micro-economic impacts of trade reforms on poverty and income inequality. As Sri Lanka was the region's pioneer in introducing free market policies and transitioning its integration into the global economy, Sri Lanka is an ideal selection for undertaking an in-depth micro-analysis to investigate the impact of different trade reforms on poverty and income distribution among different socio-economic groups.

2. Theoretical model and data specifications

The Global Trade Analysis Project (GTAP) model is used to provide base to the South Asia multi-country computable general equilibrium model (SAMGEM). The household sectors in South Asia are disaggregated by this model through the extended representative agent (ERA)

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approach in poverty analysis. Accordingly, the household sectors are disaggregated by income classifications in different geographical regions of India, Sri Lanka, Bangladesh and Pakistan. In addition, the model incorporates household survey data, thereby extending the framework to combine household groups, different industries and factor endowments. Since a multi-country framework provides a more complete structure in which to simulate the general impact of trade liberalization on a national economy in both the short-run and the long-run perspectives, this study gives preference to a multi-country framework over a single-country focus. These models are also more suitable for analysing the impacts of multilateral trade liberalisation, or the formation of customs union, etc., on a particular country as the model can link major trading partners with the rest of the world, [24]. Moreover, multi-country models provide a more realistic assessment in terms of the impacts of trade liberalisation.

The study uses the same data which were used in GTAP (version seven),[1] and those data are indicative of the global economy in 2004 (Narayanan and Walmsley [26]). These data are aggregated into 16 countries and regions, 30 sectors and 3 primary factors (**Table A.1**), for the purpose of constructing the SAMGEM. The household sector in India is divided into 24 household groups which include 12 rural groups and 12 urban groups; whereas in Sri Lanka, 30 household groups are considered, and they consist of 10 rural groups, 10 urban groups and 10 estate sector groups,[2] all of which are categorized according to income deciles and geographical regions [12]. When considering Pakistan, 10 household groups were identified, including 5 rural groups and 5 urban groups, grounded on income quintiles. The Bangladeshi household sector is disaggregated into 38 groups, consisting of 19 rural groups and 19 urban groups, based on monthly per capita consumer expenditure.

Sources used to gather additional data on household income and expenditure include the Central Bank of Sri Lanka (Consumer Finances and Socio-economic Survey (CFS) 2003/2004), the National Sample Survey Organization of India (Household Consumer Expenditure Survey in India, [29]), the Pakistan Bureau of Statistics (Household Income and Expenditure Survey 2004/2005) and the Bangladesh Bureau of Statistics (Household Income and Expenditure Survey 2004/2005). Data for 2003/2004 and 2004/2005 were used for consistency with the 2004 GTAP database. For each of the South Asian countries, commodity groups in the household survey data were matched and categorised under the 30 SAMGEM aggregated industries. Household income was proportionally allocated among the different factors within the model based on the proportions calculated from the household survey data of the respective South Asian economies and on the sources of income received by the households. The GTAP (version seven) database is used to obtain most of the elasticity values for the model. The income or expenditure elasticity values for different household groups were obtained from previous empirical estimates, as given in [28–31].

[1]GTAP version 7 was the latest available at the time of the construction of the SAMGEM database.

[2]The estate sector is considered to be part of the rural sector. Large plantations for growing tea, rubber and coconut were established in Sri Lanka during the British colonial period. These plantations are included in the estate sector, which comprises 5% of the total population of Sri Lanka [27].

2.1. Model

SAMGEM is based on the notion that the private households own the factors of production.[3] The structure of the regional household activities in SAMGEM is illustrated in **Figure 4**. Household income composed of labour income and capital income is allocated to savings and consumption using exogenous shares calculated from the household survey data for each country.[4] Labour income is defined as wages and salaries while capital income is profit from household investments and the income received from land and natural resources. Based on the initial supply of capital services, it is assumed that the households receive fixed proportions of sectoral capital income. Household supply of labour in each industry and the corresponding wage rates determine the labour income. It is expected that the household composition of sectoral labour income would change as labour moves between industries in response to trade liberalisation.

A linear expenditure system function is used to determine household consumption demand and hence highlights one of the key differences between the GTAP model and SAMGEM. Consumption in the GTAP model is determined using a constant difference elasticity function. On the contrary, the household consumption equations in SAMGEM follow the ORANI-G : A

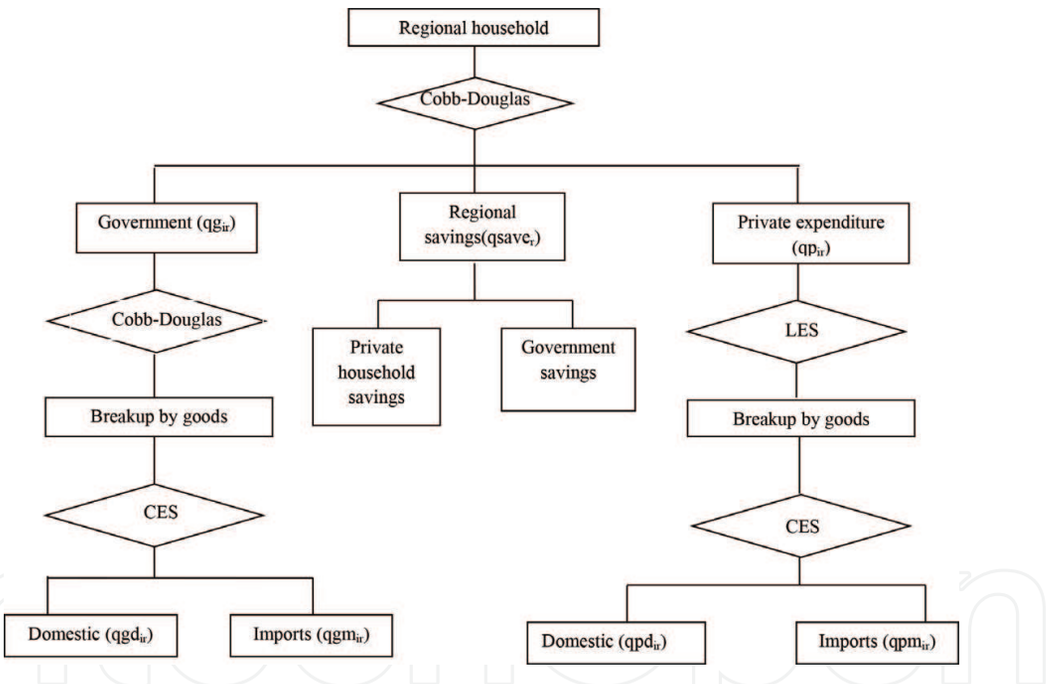


Figure 4. Structure of consumer behaviour. *Note:* CES: constant elasticity of substitution; LES: linear expenditure system; qg_{ir}: total quantity of goods consumed by Government (both domestic and imported); $qsave_r$: savings in real terms; qp_{ir}: total quantity of goods consumed by private households (both domestic and imported); qgd_{ir}: quantity of domestically produced goods consumed by Government; qgm_{ir}: quantity of imported goods consumed by Government; qpd_{ir}: quantity of domestically produced goods consumed by private households; qpm_{ir}: quantity of imported goods consumed by private households.

[3]Factor markets in the model are assumed to be perfectly competitive.

[4]The proportions of household consumption data are calculated from the household surveys mentioned above and are matched to the Global Trade Analysis Project household consumption data.

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General Equilibrium multi-household framework [32]. The Stone-Geary utility function or linear expenditure system function subject to the budget constraint (i.e. disposable income spent on consumption)[5] is maximized to determine the optimum allocation among the consumption of commodities by households, as stated in Ref. [33].

Regional governments intervene in their own markets by imposing taxes and subsidies. The revenue received from taxes, tariffs and transfers from households is allocated among consumption and government savings. Eight types of taxes and subsidies were specified in each country model: tariffs; export duties; production taxes and output subsidies; taxes on intermediate inputs; sales taxes imposed on consumer and public goods; factor taxes and income taxes. All of the equations related to production, investment, transportation and trade in SAMGEM are based on the standard GTAP model.

2.2. Policy simulations and model closure

The three policy simulations are analysed in both short-run and long-run frameworks. Three factors of production such as capital; skilled labour and unskilled labour are distinguished in the model. The factors are considered to be perfectly mobile across sectors. Labour is immobile across international borders, whereas capital is traded internationally up to the point of real return equalization.

2.2.1. Simulation 1: South Asian Free Trade Area (SAFTA)

This simulation considers the full implementation of the SAFTA, where all the SAARC countries eliminate tariffs on all products among members, while maintaining their existing tariff barriers with the rest of the world.

2.2.2. Simulation 2: South Asian Customs Union (SACU)

From the preceding studies on the trade reforms in South Asia, it was evident that attempts have been made to quantify the gains from customs union scenario in South Asia. In Ref. [34], the author estimated the static effects of a hypothetical customs union in South Asia, with the post-union common external tariff rate equal to the lowest pre-union tariff rate. On the other hand, in [35] it was analysed the static welfare effects of forming a customs union in South Asia with the common external tariff equal to the weighted average tariff rates of all country averages. Following Rahman et al., this simulation considers the SAFTA plus a 13% uniform external tariff rate to non-members. In selecting a common external tariff rate of 13% for non-members, the weighted average import tariff rate has been taken, as in [36]. In applying the common external tariff, 30 sectors have been divided into two groups, traded commodities and non-traded commodities.[6] Thus, the common external tariff rate is applied only to traded commodities.

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[5]The linear expenditure system, introduced by Stone (1954), incorporates subsistence consumption and is therefore more appropriate for issues related to income distribution and poverty. 'Linear expenditure systems and demand analysis: an application to the pattern of British demand'.

[6]Non-traded commodities include the industries in the services sector such as CMN_ROS, OSG_DWE, TRD_CNS and ELY_WTR

2.2.3. Simulation 3: unilateral trade liberalisation

This simulation considers the possibility of all South Asian countries unilaterally removing all their tariffs against all countries in the world, while the rest of the world retains tariffs against South Asia.

2.2.4. Model closure

These closure rules define the equilibrium conditions in the markets included in the model and determine the expected time period of the solution. In the short-run, it is assumed that trade balance is fixed with real consumption, investment and government spending moving together to accommodate it [37]. The South Asian countries are endowed with an excess supply of especially unskilled labour which can be drawn on by industries in the event of increased production of export-oriented industries due to trade liberalisation. Hence, in South Asia and the rest of the world, employment is allowed to change in the short-run as firms can employ more labour while the real price of labour is fixed. On the other hand, in the capital market the capital stock in each sector is held fixed, with real rates of returns to capital adjusting endogenously. The same applies for land and natural resources, which are included under capital in the model.

In the long-run, labour supply is assumed to be fixed, despite the fact that capital stock is allowed to vary. This reflects that capital can adjust over time with the natural rate of unemployment. Under this scenario, the real price of labour is allowed to vary while the real price of capital remains fixed. In addition, the trade balance, real consumption, government consumption and investments become endogenous in the model. Furthermore, both in the short-run and long-run, production technologies, the number of households, all policy variables (taxes and subsidies) and shift variables in household consumption are assumed to be exogenous. As the model can only be solved for $(n - 1)$ prices, one price is set exogenously, and all other prices are evaluated relative to this numeraire, as stated in [38]. Hence, the global average rate of return to primary factors is used as the numeraire, as in the standard GTAP model.

3. Analysis of modelling results

3.1. Impact on macroeconomic variables

As tariff reform affects all sectors in the economy, to keep the analysis concise, it is imperative to select the most significant sectors and variables to be examined under each policy option. When analysing the macroeconomic results, it is important to identify the implications on key variables such as the real GDP, aggregate employment, real factor prices, consumer price index, and terms of trade, trade volumes and per capita household utility in the economy. **Table 1** illustrates the projected macroeconomic results under different policy simulations. The interpretation of macroeconomic results begins with short-run effects.

It is noted that the gains in GDP are higher with the unilateral trade liberalisation followed by the customs union and the SAFTA zero tariff agreement with the exception in Sri Lanka where

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Macroeconomic variable	Change in real GDP (%)		Change in terms of trade (TOT) (%)		Change in volume of exports (%)		Change in volume of imports (%)		Change in trade balance (US Million)		Change in per capita utility (%)		Change real wages (unskilled) (%)		Change real wage rate (skilled) (%)		Change real rental rate (%)	
Region	**SR**	**LR**	**SR**	**LR**	**SR**	**LR**	**SR**	**LR**	**SR**	**LR**	**SR**	**LR**	**SR**	**LR**	**SR**	**LR**	**SR**	**LR**
SAFTA																		
India	0.13	0.18	0.26	0.28	1.04	0.95	1.07	1.18	0.00	−215.97	0.20	0.23	0.00	0.27	0.00	0.18	0.19	0.00
Pakistan	0.19	0.29	0.18	0.19	1.71	1.68	1.16	1.45	0.00	−83.62	0.26	0.35	0.00	0.46	0.00	0.36	0.33	0.00
Sri Lanka	0.76	1.58	0.06	−0.21	6.42	8.01	4.97	6.70	0.00	−71.12	0.85	1.39	0.00	1.83	0.00	1.91	1.37	0.00
Bangladesh	0.86	0.71	−1.10	−0.91	8.07	6.85	5.68	5.56	0.00	−94.93	0.68	0.48	0.00	0.98	0.00	0.92	0.87	0.00
Rest of South Asia	2.93	2.46	−0.70	−0.94	10.85	13.72	5.18	3.74	0.00	154.74	3.03	2.05	0.00	3.48	0.00	2.63	3.47	0.00
Customs union																		
India	1.02	1.06	−0.29	−0.55	3.92	4.93	3.21	2.52	0.00	1923.69	1.06	0.97	0.00	0.80	0.00	1.05	0.82	0.00
Pakistan	0.58	0.93	−0.22	−0.36	3.55	4.26	2.17	2.68	0.00	−21.51	0.56	0.83	0.00	0.84	0.00	0.83	0.72	0.00
Sri Lanka	0.14	−1.44	1.19	1.11	−2.80	−2.40	−2.15	−6.20	0.00	431.24	0.71	−0.79	0.00	−2.45	0.00	−2.05	−1.37	0.00
Bangladesh	2.46	2.49	−2.46	−2.31	14.97	14.20	12.22	12.18	0.00	−77.91	2.14	1.92	0.00	2.61	0.00	2.35	2.54	0.00
Rest of South Asia	3.16	2.74	−1.11	−1.38	9.02	11.98	4.63	3.11	0.00	168.26	3.05	2.10	0.00	3.55	0.00	2.84	3.60	0.00
Unilateral trade liberalisation																		
India	3.11	3.99	−4.28	−3.18	24.76	19.11	16.76	20.21	0.00	−9120.21	2.47	3.18	0.00	5.41	0.00	4.75	3.72	0.00
Pakistan	2.77	4.59	−3.84	−3.08	22.24	18.88	11.26	17.87	0.00	−2226.96	1.44	3.29	0.00	6.16	0.00	6.09	4.19	0.00
Sri Lanka	1.99	4.07	−1.75	−2.12	15.17	17.43	10.47	15.37	0.00	−342.75	1.12	2.65	0.00	4.95	0.00	5.46	3.41	0.00
Bangladesh	5.17	5.23	−6.04	−4.94	41.76	34.48	29.25	30.00	0.00	−766.49	4.22	3.88	0.00	6.57	0.00	5.82	5.90	0.00
Rest of South Asia	6.18	6.12	−3.78	−4.27	21.83	27.99	9.87	8.16	0.00	252.72	4.88	3.72	0.00	7.98	0.00	6.95	8.12	0.00

Source: Simulation results derived from the SAMGEM.
Note: SR = Short-run effects LR = Long-run effects.

Table 1. Projected macroeconomic results under different policy experiments.

GDP increases only marginally under the customs union. Moreover, the short-run gains in GDP are higher for least economies in the region (Bangladesh and Rest of South Asia). For instance, under the SAFTA, the real GDP in India increases by 0.13%, whereas in the rest of South Asia the same will increase by 2.93%. On the other hand, under the unilateral trade liberalisation gain in GDP for India is 3.11%, whereas for the rest of the South Asia GDP increases by 6.18%. This is because, apart from the least developed countries in the region, these economies have high pre-liberalisation levels of protection against imports in comparison to India, Pakistan and Sri Lanka [12]. Hence, the findings of the present study are consistent with those who hold the moderate view about the SAFTA that preferential trading agreement (PTA) would bring benefits to all countries in the region, and moving to unilateral trade liberalisation would bring significant gains to South Asia. The long-run projections in real GDP stipulate that the gains for all the South Asian economies are generally higher in comparison to the short-run under all three policies except for Sri Lanka under the customs union, in which case the real GDP declines by 1.44%. Hence, these results demonstrate the widely held notion of growth stimulation effects of trade liberalisation as established in the literature in [39].

The results suggest that employment will increase in all the South Asian countries under the three trade policy options, with the exception of Sri Lanka where unskilled labour employment will decline under the customs union scenario (**Figure 5**). Given the marginal increase in GDP, it may lead to increase in unemployment, particularly in unskilled labour in Sri Lanka during the short-run period after implementing this trade policy option. This shows that, if Sri Lanka were to maintain a common external tariff of 13%, it will imply increased protection, particularly in the manufacturing sector, which will cause negative impacts on GDP and employment. In addition, it is noted that employment will increase substantially under the unilateral trade liberalisation in all the South Asian countries and this result is consistent with changes in real GDP in respective economies. Furthermore, it is obvious that more employment opportunities will be created for the least developed economies in the region (Bangladesh and Rest of South

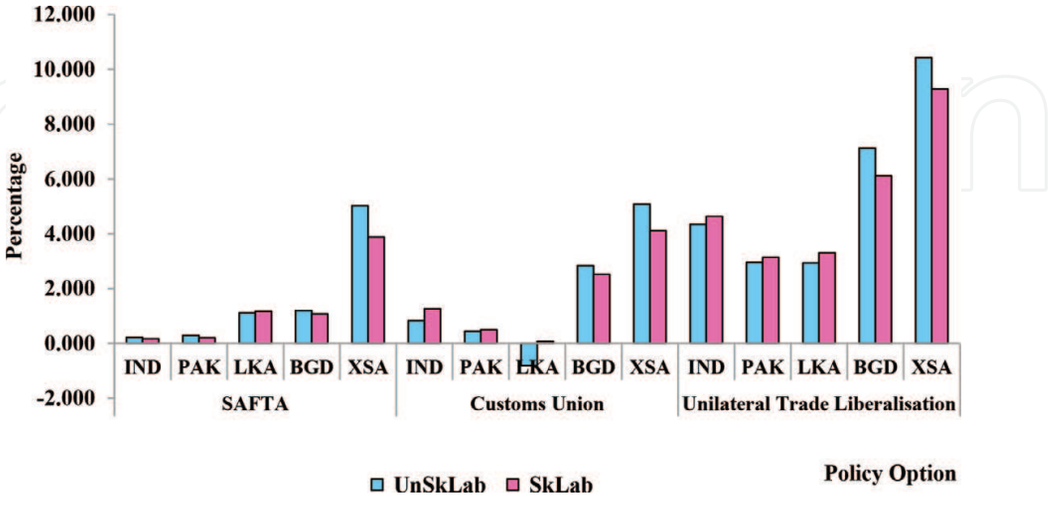


Figure 5. Changes in employment under different policy experiments in the short-run. Source: Simulation results derived from the SAMGEM.

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Asia) under all three trade policy options due to the expansion of labour-intensive industries in the short-run.

The economic interpretation of the increase in employment compared to real GDP lies in the assumption of fixed usage of capital and land in the short-run. When the capital and land are fixed, an increased use of labour causes the marginal product of labour to decline. It is important to note that, with perfect competition, real wage rate is equivalent to marginal product of labour and the real rental rate is equivalent to the marginal product of capital [40]. Since real wages are fixed in the short-run, to achieve a certain percentage increase in output, industries must increase labour inputs by a higher percentage than output increase. For instance, in India under the SAFTA, although the real GDP increases by 0.13%, unskilled and skilled labour employment is increased by 0.22 and 0.17%, respectively. The same tendency is observed in all South Asian countries under all trade policy options in the short-run.

Another important factor that affects change in real GDP is return on capital in the short-run. From **Table 1**, one can see that all the South Asian economies under different trade policy options, except Sri Lanka under the customs union, have a positive impact on the real rental rate. For Sri Lanka, the negative result occurred due to contraction in the manufacturing sector. The positive impacts on the others arise in the short-run, when a given capital stock is co-operating with more labour inputs leading to an increase in the rental rate of capital, as in [41]. Since there is a decline in consumer price index (CPI) under this trade policy option, it will eventually result in a rise in the real rental rate. **Table 2** illustrates the percentage change in the capital stock in the long-run under the different trade policy scenarios.

In analysing the causes for change in the real GDP in the long-run, it is important to note that the economic activity in all the South Asian economies (apart from Sri Lanka, under the customs union) becomes significantly higher as a result of greater reduction in overall prices due to tariff cuts under different trade policy options (**Table 3**). This is because lower prices of imports lead to a fall in CPI largely in the long-run (except in India and Pakistan under the SAFTA) which causes to change the pattern of domestic production and consequently these effects can influence the income and expenditure sides components of the real GDP. In addition, India and Pakistan are the two largest economies in the region and an increase in CPI in

Country/Region	Trade policy options		
	SAFTA	**Customs union**	**Unilateral trade liberalisation**
India	0.26	0.89	5.14
Pakistan	0.41	1.03	5.56
Sri Lanka	2.15	−2.77	5.43
Bangladesh	0.87	2.85	6.84
Rest of South Asia	4.12	4.35	10.56

Source: Simulation results derived from the SAMGEM.

Table 2. Percentage change in capital stock in the long-run.

Country/Region	SAFTA		Customs union		Unilateral trade liberalisation	
	SR	LR	SR	LR	SR	LR
India	0.26	0.29	−0.74	−1.01	−4.16	−2.94
Pakistan	0.17	0.20	−0.45	−0.55	−4.08	−3.19
Sri Lanka	−0.35	−0.56	−1.43	−1.67	−3.36	−3.44
Bangladesh	−0.89	−0.74	−1.89	−1.93	−4.93	−4.02
Rest of South Asia	−1.22	−1.35	−1.69	−1.90	−6.12	−6.18

Source: Simulation results derived from SAMGEM.
Note: SR: Short-run effects. LR: Long-run effects.

Table 3. Percentage change in consumer price index.

these economies may be due to an increase in demand for domestically produced goods by their domestic counterparts and the other South Asian economies.

Also, there is a greater reduction in CPI in all the countries under the customs union and unilateral trade liberalisation, as these economies import significant amounts of intermediate goods, electronic and machinery and equipment from other countries outside the region. It is worthwhile noting that, especially under unilateral trade liberalisation, the large amounts of imports cause a substantial decline in CPI in comparison to other two trade policy options.

The terms of trade (TOT) effect also provides an important measurement as to how well each country could play its role in the international market due to trade reforms. It is also considered an important component in welfare gains. The percentage changes in TOT reflect changes in export and import prices due to change in trade in each country. **Table 1** indicates that, in comparison to the other policy options, under the unilateral trade liberalisation scenario, TOT deteriorates in all countries in South Asia. In Ref. [42], the author pointed out that, due to trade liberalisation, the relative price of exports to imports can decrease more in small countries than in large countries, resulting in a large deterioration in the terms of trade. Since South Asia is a small player in the world economy, TOT deteriorates largely under the unilateral trade liberalisation. In [6], the author noted that when the countries in the region liberalise their trade regimes, imports into the region, especially manufacturing goods from their trading partners, will increase. Consequently, these countries need to export more of their own products to finance their import bills. Accordingly, this would result in a reduction in their export prices and deterioration in TOT in the South Asian countries under the unilateral trade liberalisation.

3.2. Impact on household income

The impact of different trade policy options at the household level can be determined from the results generated from the SAMGEM, whereas the effects on poverty and income inequality pertaining to Sri Lankan households can be ascertained from income distribution models, which will be explained in Section 4. **Figures A.1–A.13** in Appendix display the percentage

http://dx.doi.org/10.5772/intechopen.69506

change in real household income in South Asian economies under different trade policy options. The results indicate that overall household income will increase in all South Asian countries in response to trade liberalisation (again except in Sri Lanka under the customs union). Poor households gain from increased unskilled labour income while richer households gain more from capital and skilled labour. However, it is likely that trade liberalisation would lead to reductions in the flow of government transfers to all household groups, and this reduction is greater in rural households as they rely more on government transfers.

3.3. Impact on welfare

Equivalent variation (EV) is used to determine the overall level of welfare under each policy option. EV is an absolute monetary measure of welfare improvement in terms of income that results from the fall in import prices when tariffs are reduced or eliminated, as in Ref. [43]. **Table 4** illustrates the overall level of welfare as an absolute value in terms of US$ millions. Although India gains significantly under all three trade liberalisation scenarios in absolute terms, it is clear that the smaller economies (Bangladesh and the rest of South Asia) benefit more than the larger economies in the region under the same trade policy option in relative terms. Moreover, all the South Asian countries gain substantially under the unilateral trade liberalisation, followed by the customs union (with the exception of Sri Lanka) and the SAFTA.

It is also clear that Bangladesh and the rest of South Asia gain less in the long-run compared to the short-run under all three policy options. This is consistent with the percentage change in real GDP in these countries as noted in **Table 1**. Many scholars who analysed South Asia's trade liberalisation have generated debate over the desirability of the SAFTA with differing viewpoints. The present study holds a moderate view of the SAFTA and is in agreement with the findings in [5]. The findings reveal that the SAFTA still ensures considerable benefits for small countries in the region, although there are less potential gains from SAFTA than of unilateral trade liberalisation. The results of the present study are also consistent with the studies undertaken by United Nations Conference on Trade and Development and with [44, 45]

	SAFTA		**Customs union**		**Unilateral trade liberalisation**	
	US$ millions					
	SR	**LR**	**SR**	**LR**	**SR**	**LR**
India	1146.58	1344.94	6217.29	5661.53	14488.29	18675.71
Pakistan	226.94	302.79	482.87	717.90	1248.95	2856.99
Sri Lanka	152.44	247.89	126.58	−141.24	199.67	472.44
Bangladesh	344.99	241.72	1084.18	975.87	2144.32	1970.68
Rest of South Asia	386.16	261.35	388.88	267.71	621.93	474.18

Source: Simulation results derived from SAMGEM.
Note: SR: Short-run effects LR: Long-run effects.

Table 4. Projected equivalent variations under different trade policy options.

as these studies suggest that the SAFTA would create some welfare gains for its member countries and smaller economies would gain more from the PTA than the larger economies in the region.

4. The impact of trade liberalisation on poverty and income inequality in Sri Lanka

This section aims to contribute to the on-going debate on the trade-poverty nexus by investigating the income inequality and poverty impacts of two trade liberalisation policies which were favourable to Sri Lanka (the SAFTA and unilateral trade liberalisation), especially on different household groups in the urban, rural and estate sectors. Unlike most of the other South Asian economies, Sri Lanka executed a series of unilateral tariff reductions and significantly reduced non-tariff barriers during the period 1977–2000 [46]. However, Sri Lanka's trade policies have become more restrictive as economic conditions deteriorated following the Tamil Tiger attack on Colombo airport in July 2001 [47]. As noted in Ref. [48], the average level of nominal protection increased from around 12% in 2001–2002 to almost 30% in 2008–2010. Hence, there has been a major reversal of the liberal trade policies of the previous 24 years, and from late 2004 there has been a deliberate move back to import-substitution protectionism in both the agricultural and manufacturing sectors.

4.1. Income inequality in Sri Lanka

In the Sri Lankan case, Lorenz curves are estimated at the national level as well as for the different sectors (urban, rural and estate) by using the CFS 2003–2004 household survey data. S-Gini coefficients are also calculated for different sectors and different household groups to determine the extent to which trade liberalisation helps to reduce inequality between different groups in different sectors. **Figure 6** illustrates the estimated Lorenz curves for Sri Lanka at the national level and for the different sectors.

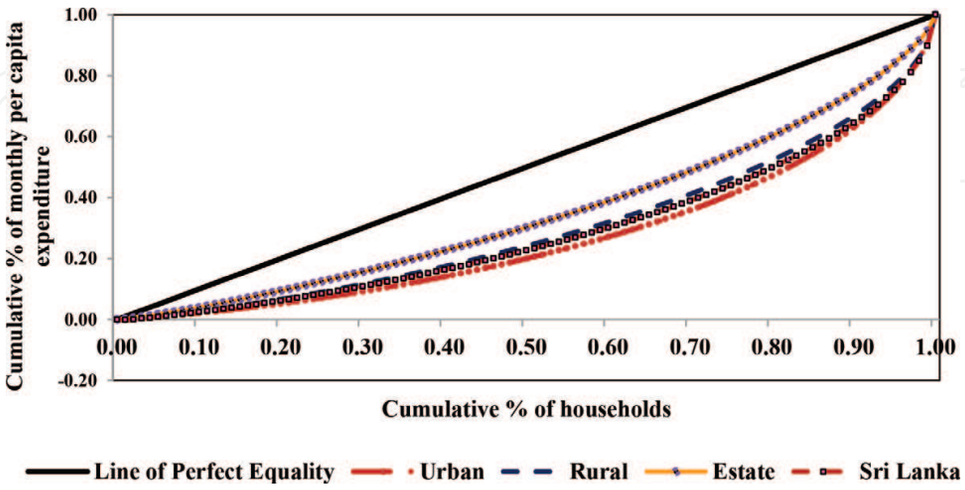


Figure 6. Base year Lorenz curves for Sri Lanka. Source: Author's estimations from the distributive analysis (DAD) Programme [11].

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When comparing the urban, rural and estate sectors and each of its Lorenz curves, it is clear that the urban sector Lorenz curve dominates the rural sector, which in turn dominates the estate sector Lorenz curve. Hence, it is evident that inequality is highest in the urban sector and lowest in the estate sector. Further, the figure shows that the rural sector lies in between.

Given these base year scenarios, it is an interesting exercise to determine whether the SAFTA and unilateral trade liberalisation would reduce inequality in different sectors in Sri Lanka. In Ref. [49], the authors explained that when the gap between two Lorenz curves is marginal, it is appropriate to estimate the difference between two Lorenz curves. The differences (i.e. the difference between base year and after trade liberalisation) between Lorenz curves under the SAFTA and unilateral trade liberalisation in the short-run and in the long-run in the urban, rural and estate sectors are plotted in **Figure 7**.

The horizontal axis of each graph represents the household deciles while the vertical axis shows the difference between the base year and the post-trade liberalisation income distributions. Note that the curves under the SAFTA and unilateral trade liberalisation exhibit a U shape, indicating a reduction in inequality, with a greater reduction in the long-run than in the short-run under both policy options. Moreover, the reduction is more pronounced under unilateral trade liberalisation than under the SAFTA in all three Sri Lankan sectors.

The complete pattern of income distribution can be analysed using the Lorenz curve. Nevertheless, the S-Gini index is the most commonly applied inequality measure, probably because of its link to the Lorenz curve which provides an intuitive and graphical representation of

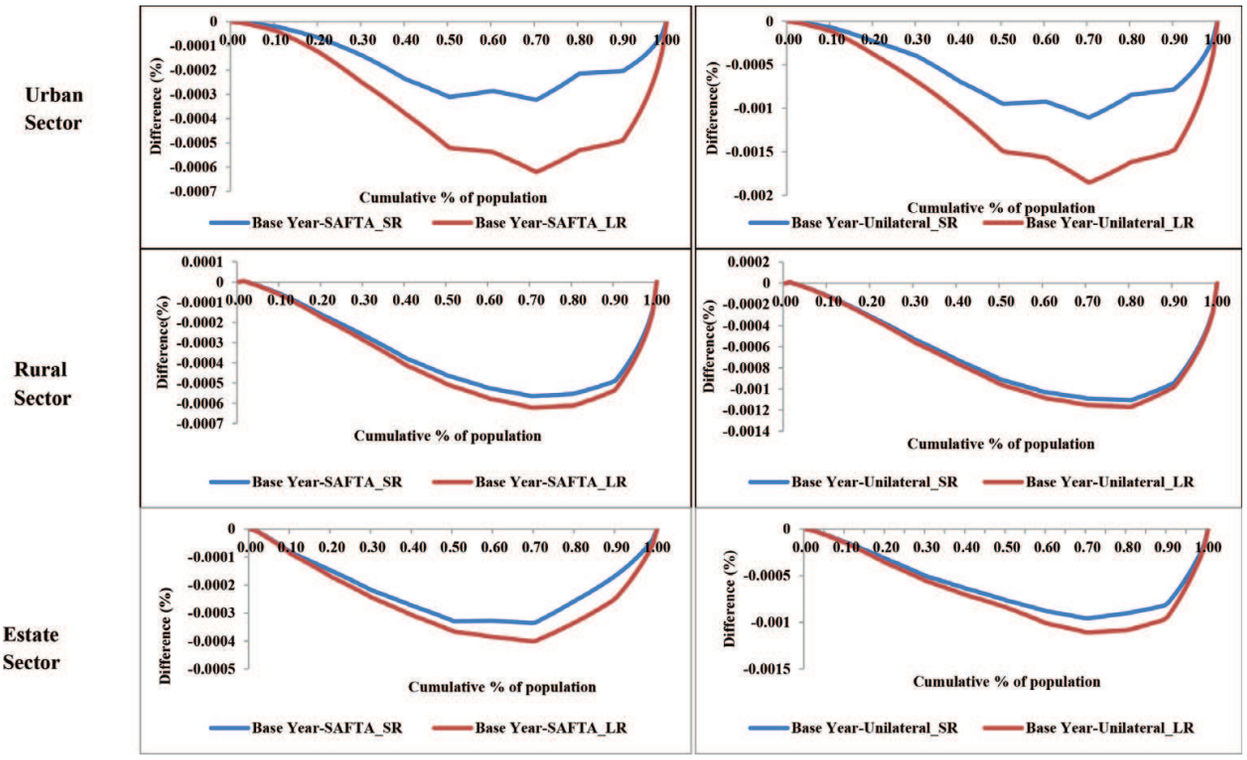


Figure 7. Difference between Lorenz curves under different trade policy options. Source: Author's estimations from the distributive analysis (DAD) Programme [11].

inequality, [50]. **Table 5** illustrates the Gini coefficients for Sri Lanka at the national level based on the monthly per capita expenditure for different survey periods.

The Gini index was 0.41 in 2002 and increased to 0.43 in 2003–2004. Two reasons can be identified for the inequality rise. One may be the Tsunami that hit Asia, creating a devastating experience to most of the Asian economies. This natural disaster increased the vulnerability of coastal communities in Sri Lanka. The other reason is the political unrest associated with the civil war which prevailed for almost three entire decades. These two major incidents adversely affected different socio-economic groups in Sri Lanka, thereby raising inequality. However, by 2009–2010, inequality had fallen as a result of the improved political and economic stability in the country. The extent of the income inequalities among different household groups for the urban, rural and estate sectors in Sri Lanka under the base year, the SAFTA and unilateral trade liberalisation are given by the S-Gini coefficients in **Tables 6**–**8**.

The base year S-Gini coefficients of the urban, rural and estate sectors' households based on the per capita expenditure are recorded as 0.4659, 0.4040 and 0.2991, respectively. Thus, indicating that the income disparity between households is highest in the urban sector and lowest in the estate sector. This shows that there is a greater homogeneous consumption pattern among households in the estate sector than the other two sectors.

When examining the overall inequality in all the three sectors; urban, rural and estate sector, the values have decreased under both liberalisation policies, this has occurred in both the short- and the long-run. The estimated S-Gini coefficients for household groups in all three sectors reveal that there are reductions in inequality under the two trade policies. Hence, it is clear that trade liberalisation has a positive impact on income disparity among household groups with lower inequality in the estate sector than in the urban and rural sectors in Sri Lanka. The low standard deviation values reported in the parentheses indicate that all the calculated S-Gini-coefficients are significant at 5% significance level (95% confidence limit).

4.2. Non-parametric estimation of poverty in Sri Lanka

Poverty indicators are estimated for the base year and post-liberalisation scenarios for different household groups in the urban, rural and estate sectors in Sri Lanka using the Foster-Greer-Thorbecke (FGT) index. The most commonly used indicator of poverty is the poverty head-count ratio ($\alpha = 0$) [51]. This indicator signifies the proportion of the population earning income less than or equal to the poverty line income level. Other useful poverty

	Survey period				
	2002	**2003/04***	**2005**	**2006/07**	**2009/10**
Gini coefficient of household expenditure at national level	0.41	0.43	0.40	0.41	0.37

Source: Household Income and Expenditure Survey Reports, Various Issues, Department of Census and Statistics, Sri Lanka [27].
Note: *Author's estimation from the CFS 2003–2004 [49].

Table 5. Gini-coefficient of household expenditure for Sri Lanka.

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Group	Expenditure share by household group (%)	S-Gini coefficient				
		Base year	SAFTA		Unilateral trade liberalisation	
			Short-run	Long-run	Short-run	Long-run
Total	**100**	**0.4659 (0.0134)**	**0.4655 (0.0135)**	**0.4652 (0.0134)**	**0.4646 (0.013)**	**0.4638 (0.0135)**
Between groups		**0.4525 (0.0135)**	**0.4522 (0.0137)**	**0.4518 (0.0133)**	**0.4513 (0.0136)**	**0.4505 (0.0134)**
S-Gini by household groups						
Decile 1	2.12	0.1227 (0.008)	0.1226 (0.009)	0.1225 (0.008)	0.1225 (0.008)	0.1224 (0.008)
Decile 2	3.12	0.0436 (0.001)	0.0435 (0.002)	0.0434 (0.001)	0.0434 (0.002)	0.0433 (0.0015)
Decile 3	3.95	0.0321 (0.001)	0.0320 (0.002)	0.0320 (0.001)	0.0320 (0.001)	0.0321 (0.0012)
Decile 4	4.84	0.0340 (0.001)	0.0339 (0.001)	0.0339 (0.003)	0.0339 (0.001)	0.0339 (0.0013)
Decile 5	5.89	0.0321 (0.001)	0.0320 (0.001)	0.0320 (0.001)	0.0320 (0.001)	0.0320 (0.0011)
Decile 6	7.16	0.0332 (0.001)	0.0331 (0.001)	0.0331 (0.001)	0.0331 (0.001)	0.0330 (0.0011)
Decile 7	8.69	0.0383 (0.004)	0.0382 (0.002)	0.0382 (0.001)	0.0382 (0.001)	0.0381 (0.0014)
Decile 8	11.28	0.0491 (0.002)	0.0490 (0.002)	0.0490 (0.002)	0.0490 (0.001)	0.0490 (0.0018)
Decile 9	15.78	0.0679 (0.003)	0.0678 (0.003)	0.0678 (0.003)	0.0678 (0.002)	0.0677 (0.0029)
Decile 10	37.17	0.2738 (0.032)	0.2737 (0.033)	0.2736 (0.032)	0.2736 (0.032)	0.2735 (0.0321)

Source: Author's estimations from the Distributive Analysis (DAD) Programme.
Note: The respective standard errors are reported in parenthesis at 95% confidence limit [49].

Table 6. Decomposition of inequality by household group using the S-Gini index: urban sector.

measures can be estimated such as the poverty gap ($\alpha = 1$) which measures the extent to which individuals fall below the poverty line and poverty severity ($\alpha = 2$) which averages the squares of the poverty gaps relative to the poverty line.

Figure 8 illustrates the base year Kernel Density Functions of per capita expenditure for the urban, rural and estate sector household groups in Sri Lanka. The vertical axis presents an estimate of the probability density at a value of x (monthly per capita expenditure). The vertical line is the poverty line in each sector in the base year.

Group	Expenditure share by household group (%)	S-Gini coefficient				
		Base year	SAFTA		Unilateral trade liberalisation	
			Short-run	Long-run	Short-run	Long-run
Total	100	0.4040 (0.0070)	0.4033 (0.0070)	0.4032 (0.0071)	0.4026 (0.0073)	0.4025 (0.0072)
Between groups		0.3911 (0.0061)	0.3904 (0.0062)	0.3904 (0.0061)	0.3898 (0.0067)	0.3897 (0.0066)
S-Gini by household groups						
Decile 1	2.60	0.2584 (0.0672)	0.2583 (0.0672)	0.2582 (0.0672)	0.2581 (0.0672)	0.2580 (0.0673)
Decile 2	4.12	0.0363 (0.0005)	0.0363 (0.0005)	0.0363 (0.0005)	0.0362 (0.0056)	0.0361 (0.0005)
Decile 3	4.96	0.0276 (0.0004)	0.0275 (0.0004)	0.0275 (0.0004)	0.0274 (0.0004)	0.0273 (0.0004)
Decile 4	5.81	0.0247 (0.0003)	0.0246 (0.0003)	0.0246 (0.0003)	0.0245 (0.0003)	0.0244 (0.0003)
Decile 5	6.71	0.0245 (0.0003)	0.0244 (0.0003)	0.0244 (0.0003)	0.0243 (0.0003)	0.0242 (0.0003)
Decile 6	7.81	0.0264 (0.0004)	0.0263 (0.0003)	0.0263 (0.0004)	0.0262 (0.0004)	0.0262 (0.0003)
Decile 7	9.17	0.0283 (0.0004)	0.0283 (0.0004)	0.0283 (0.0004)	0.0283 (0.0004)	0.0282 (0.0004)
Decile 8	11.10	0.0365 (0.0005)	0.0365 (0.0005)	0.0364 (0.0005)	0.0363 (0.0005)	0.0363 (0.0005)
Decile 9	14.58	0.0560 (0.0009)	0.0559 (0.0008)	0.0558 (0.0008)	0.0557 (0.0008)	0.0557 (0.0008)
Decile 10	33.14	0.3025 (0.0178)	0.3026 (0.0178)	0.3025 (0.0178)	0.3024 (0.0178)	0.3024 (0.0178)

Source: Author's estimations from the Distributive Analysis (DAD) Programme.
Note: The respective standard errors are reported in parenthesis at 95% confidence limit [49].

Table 7. Decomposition of inequality by household group using the S-Gini index: rural sector.

In using the Kernel method, the poverty headcount ratio is calculated by taking the sum of the estimated densities until the poverty line of income (per capita expenditure) level is reached [52]. The estimated density functions in **Figure 8** indicate that the urban sector has the smallest proportion of households living below the poverty line with the highest proportion in the estate sector.

The changes in the monetary poverty lines are taken into consideration in calculating the FGT indices for the different trade policy scenarios. **Table 9** below displays the percentage changes

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Group	Expenditure share by household group (%)	S-Gini coefficient				
		Base year	SAFTA		Unilateral trade liberalisation	
			Short-run	Long-run	Short-run	Long-run
Total	**100**	**0.2991 (0.0134)**	**0.2986 (0.0134)**	**0.2985 (0.0134)**	**0.2980 (0.0134)**	**0.2978 (0.0134)**
Between Groups		**0.2915 (0.0135)**	**0.2912 (0.0136)**	**0.2911 (0.0135)**	**0.2905 (0.0136)**	**0.2904 (0.0135)**
S-Gini by household groups						
Decile 1	4.02	0.1054 (0.0209)	0.1053 (0.0209)	0.1052 (0.0209)	0.1051 (0.0209)	0.1050 (0.0209)
Decile 2	5.44	0.0279 (0.0014)	0.0279 (0.0014)	0.0279 (0.0014)	0.0279 (0.0014)	0.0279 (0.0014)
Decile 3	6.16	0.0188 (0.0011)	0.0188 (0.0011)	0.0188 (0.0011)	0.0188 (0.0011)	0.0188 (0.0011)
Decile 4	6.94	0.0166 (0.0009)	0.0166 (0.0009)	0.0166 (0.0009)	0.0166 (0.0009)	0.0166 (0.0009)
Decile 5	7.60	0.0220 (0.0011)	0.0220 (0.0011)	0.0220 (0.0011)	0.0220 (0.0011)	0.0220 (0.0011)
Decile 6	8.53	0.0188 (0.0011)	0.0188 (0.0011)	0.0188 (0.0011)	0.0188 (0.0011)	0.0188 (0.0011)
Decile 7	9.75	0.0272 (0.0015)	0.0272 (0.0015)	0.0272 (0.0015)	0.0272 (0.0015)	0.0272 (0.0015)
Decile 8	11.31	0.0263 (0.0017)	0.0263 (0.0017)	0.0263 (0.0017)	0.0262 (0.0017)	0.0262 (0.0017)
Decile 9	14.12	0.0399 (0.0027)	0.0399 (0.0027)	0.0399 (0.0027)	0.0398 (0.0027)	0.0398 (0.0027)
Decile 10	26.13	0.1923 (0.0305)	0.1923 (0.0305)	0.1923 (0.0305)	0.1923 (0.0305)	0.1923 (0.0305)

Source: Author's estimations from the Distributive Analysis (DAD) Programme.
Note: The respective standard errors are reported in parenthesis at 95% confidence limit [49].

Table 8. Decomposition of inequality by household group using the S-Gini index: estate sector.

in the average poverty lines related to the SAFTA and unilateral trade liberalization for urban, rural and estate sectors.

There is a decline in the percentage change in poverty line for all the three sectors under both trade liberalisation options, although the magnitude of the decrease is higher in the long-run. Furthermore, the reductions are larger under unilateral trade liberalisation due to the non-discriminatory nature of the policy. When considering prices of a basic commodity bundle, the reduction in prices of this bundle is larger in the rural and estate sectors than the urban sector

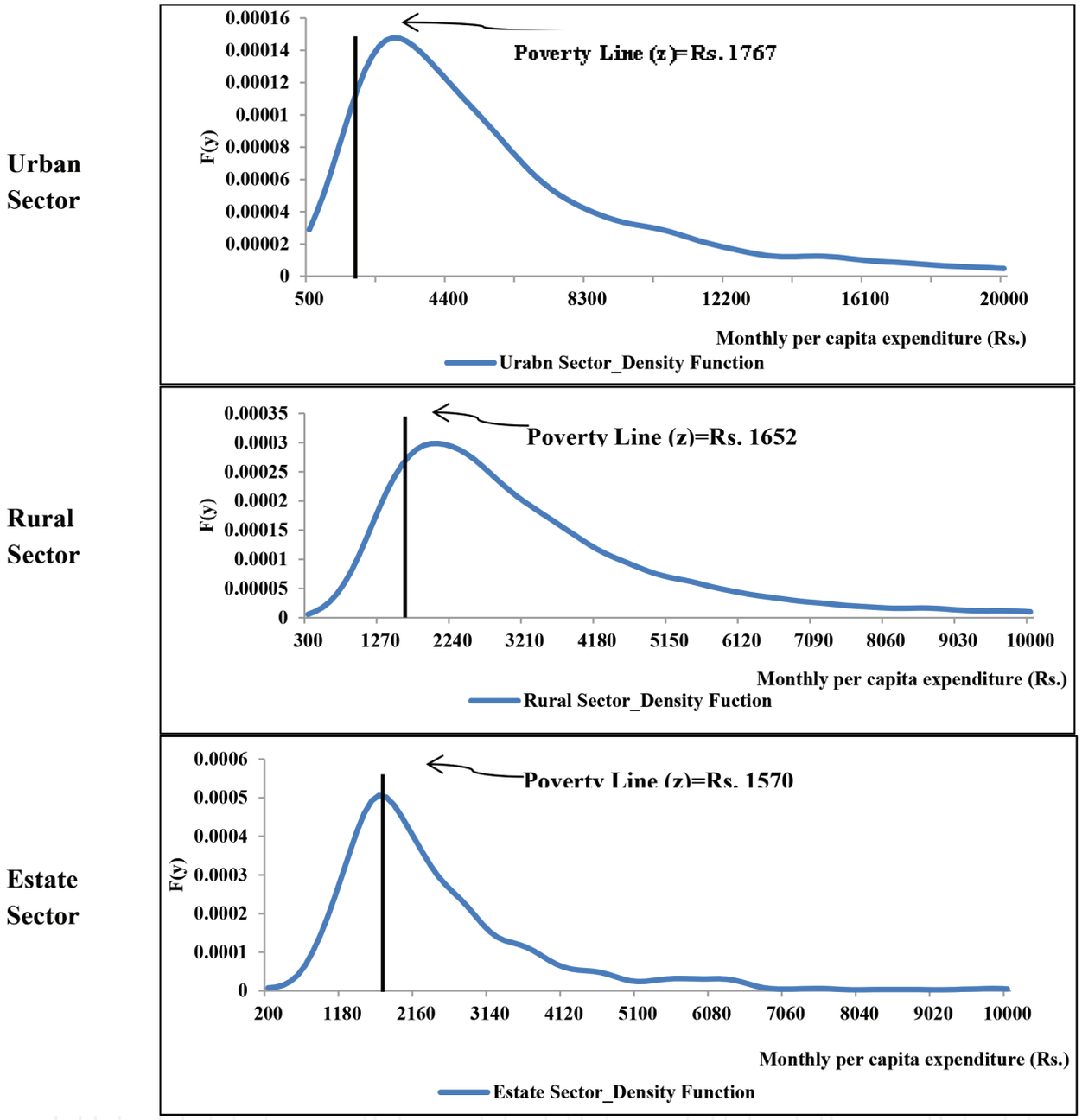


Figure 8. Density function: base year 2003–2004. Source: Author's estimations from the Distributive Analysis (DAD) Programme [49].

households. This could be due to composition of food items in the commodity bundles of rural and estate sectors. With the removal of tariffs under the two trade policy options, the prices of the basic goods are cheaper in comparison to manufacturing and industrial goods. The estimated values of per capita expenditure and the new prices generated under the trade policy options were used in calculating FGT indices to ascertain the post-simulation poverty profiles in each of the sectors. The FGT poverty indices were calculated for different household groups in all three sectors and are presented in **Tables 10–12**. All three indices (i) the poverty headcount ratio (α_0), (ii) the poverty gap (α_1) and (iii) poverty severity (α_2) make it clear that

Sector	SAFTA		Unilateral trade liberalisation	
	Short-run	Long-run	Short-run	Long-run
Urban	−0.337	−0.560	−3.339	−3.467
Rural	−0.639	−1.062	−3.982	−4.557
Estate	−0.690	−1.115	−4.203	−4.778

Source: Author's estimations from the DAD (Distributive Analysis) Programme [49].

Table 9. Percentage changes in poverty lines in different sectors in Sri Lanka.

poverty is higher in the estate sector than in the urban and rural sectors in Sri Lanka. This confirms the conclusions drawn from the Kernel density functions in **Figure 8**.

The decomposition of FGT indices based on different household groups in the urban sector (**Table 10**) indicates that only households belonging to the first decile fall below the poverty line in all cases. For instance, in the base year, 72.92% of the households in the first decile fall below the poverty line. In the short-run, this is reduced to 70.94% under the SAFTA and down to 50% with unilateral trade liberalisation.

Based on the FGT decomposition by household groups in the rural sector (**Table 11**), it is evident that all the households belonging to the first decile and 60.14% of the households in the second decile fall below the poverty line in the base year. Nevertheless, the second decile percentages fall considerably under both trade liberalisation policies with the largest reductions occurring under unilateral trade liberalisation.

The decomposition of FGT indices by household groups in the estate sector (**Table 12**) indicates that, in the base year, 100% of households in the first two deciles and 42.37% of the households in the third deciles fall below the poverty line. Under the SAFTA, there is a fall in poverty in households belonging to the third decile; though, under the unilateral trade liberalisation poverty in the third decile is eliminated. In all three sectors, the poverty reductions are greater in the long-run under the two trade policy options.

An examination of the base year (2003–2004) poverty profiles in Sri Lanka reveals that poverty in terms of headcount ratio (α_0) is the lowest in the urban sector and highest in the estate sector. The rural population consists of 82% of the total population and thus the highest numbers of poor persons are expected to be in the rural sector (Department of Census and Statistics 2006–2007). The overall conclusions of this study support that, there is a higher incidence of poverty in rural provinces (inclusive of the estate sector) and the rural sector of Western province in Sri Lanka.

The Sri Lankan economic growth was restricted to the urban manufacturing and services sectors after the trade liberalization in 1977. Moreover, this growth was predominantly limited to the Western province and the capital city. This kept the regional, agricultural households isolated from the growth process. Thus, the growth in consumption as well as income too had little or no growth at all in those remote areas. The Central Bank of Sri Lanka Annual Report (2004) indicated that the contribution to GDP originating from agriculture declined during the

Household group	Base year (z = Rs 1767)			SAFTA						Unilateral trade liberalisation					
				Short-run (z = Rs 1761)			Long-run (z = Rs 1757)			Short-run (z = Rs 1707)			Long-run (z = Rs 1705)		
	$\alpha = 0$ (%)	$\alpha = 1$ (%)	$\alpha = 2$ (%)	$\alpha = 0$ (%)	$\alpha = 1$ (%)	$\alpha = 2$ (%)	$\alpha = 0$ (%)	$\alpha = 1$ (%)	$\alpha = 2$ (%)	$\alpha = 0$ (%)	$\alpha = 1$ (%)	$\alpha = 2$ (%)	$\alpha = 0$ (%)	$\alpha = 1$ (%)	$\alpha = 2$ (%)
Total	**7.32 (0.006)**	**1.50 (0.001)**	**0.53 (0.000)**	**7.12 (0.006)**	**1.46 (0.002)**	**0.51 (0.000)**	**6.90 (0.006)**	**1.43 (0.001)**	**0.50 (0.000)**	**5.01 (0.005)**	**1.16 (0.001)**	**0.41 (0.000)**	**4.87 (0.005)**	**1.15 (0.001)**	**0.40 (0.000)**
Decile 1	72.92 (0.036)	15.01 (0.014)	5.30 (0.007)	70.94 (0.037)	14.62 (0.014)	5.16 (0.007)	69.59 (0.038)	14.31 (0.014)	5.08 (0.007)	50.00 (0.041)	11.60 (0.013)	4.10 (0.006)	48.64 (0.041)	11.49 (0.013)	4.06 (0.006)
Decile 2	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 3	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 4	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 5	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 6	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 7	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 8	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 9	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)

Note: z = Poverty Line. The respective standard errors are reported in parenthesis at 95% confidence limit.
Source: Author's estimations from the Distributive Analysis (DAD) Programme [49].

Table 10. FGT poverty indices under the base year and different trade policy options: urban sector.

Household group	Population share (%)	Base year (z = Rs 1652)			SAFTA						Unilateral trade liberalisation					
					Short-run (z = Rs 1641)			Long-run (z = Rs 1634)			Short-run (z = Rs 1586)			Long-run (z = Rs 1576)		
		$\alpha = 0$ (%)	$\alpha = 1$ (%)	$\alpha = 2$ (%)	$\alpha = 0$ (%)	$\alpha = 1$ (%)	$\alpha = 2$ (%)	$\alpha = 0$ (%)	$\alpha = 1$ (%)	$\alpha = 2$ (%)	$\alpha = 0$ (%)	$\alpha = 1$ (%)	$\alpha = 2$ (%)	$\alpha = 0$ (%)	$\alpha = 1$ (%)	$\alpha = 2$ (%)
Total	**100.00**	**16.02 (0.003)**	**4.27 (0.003)**	**1.07 (0.004)**	**15.31 (0.004)**	**4.10 (0.003)**	**1.01 (0.001)**	**14.95 (0.003)**	**4.01 (0.003)**	**0.97 (0.001)**	**12.21 (0.003)**	**3.41 (0.003)**	**0.74 (0.003)**	**11.08 (0.003)**	**3.30 (0.003)**	**0.71 (0.003)**
Decile 1	10	100 (0.000)	38.86 (0.033)	10.55 (0.003)	100 (0.000)	37.96 (0.033)	9.99 (0.003)	100 (0.000)	37.43 (0.033)	9.67 (0.003)	100 (0.000)	33.48 (0.036)	7.54 (0.002)	100 (0.000)	32.65 (0.036)	7.51 (0.002)
Decile 2	10	60.14 (0.015)	3.88 (0.001)	0.34 (0.001)	53.11 (0.016)	3.11 (0.001)	0.24 (0.001)	49.48 (0.017)	2.68 (0.001)	0.20 (0.001)	22.15 (0.013)	0.64 (0.000)	0.025 (0.000)	18.01 (0.012)	0.40 (0.000)	0.012 (0.000)
Decile 3	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 4	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 5	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 6	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 7	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 8	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 9	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 10	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)

Note: z = Poverty Line. The respective standard errors are reported in parenthesis at 95% confidence limit.
Source: Author's estimations from the Distributive Analysis (DAD) Programme [49].

Table 11. FGT poverty indices under the base year and different trade policy options: rural sector.

http://dx.doi.org/10.5772/intechopen.69506

Household group	Population share (%)	Base year (z = Rs 1570)			SAFTA						Unilateral trade liberalisation					
					Short-run (z = Rs 1560)			Long-run (z = Rs 1552)			Short-run (z = Rs 1504)			Long-run (z = Rs 1494)		
		$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$
		(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Total	**100.00**	**24.20 (0.017)**	**4.93 (0.004)**	**1.65 (0.002)**	**23.36 (0.017)**	**4.66 (0.004)**	**1.56 (0.002)**	**23.02 (0.017)**	**4.48 (0.004)**	**1.50 (0.002)**	**17.31 (0.015)**	**3.44 (0.004)**	**1.17 (0.002)**	**16.30 (0.015)**	**3.27 (0.004)**	**1.11 (0.002)**
Decile 1	10	100 (0.00)	35.73 (0.018)	14.74 (0.019)	100 (0.00)	34.76 (0.018)	14.12 (0.019)	100 (0.00)	34.14 (0.018)	13.73 (0.019)	100 (0.00)	29.81 (0.019)	11.24 (0.019)	100 (0.00)	28.91 (0.020)	10.78 (0.019)
Decile 2	10	100 (0.00)	12.09 (0.005)	1.64 (0.001)	100 (0.00)	10.85 (0.005)	1.36 (0.001)	100 (0.00)	9.98 (0.005)	1.18 (0.001)	72.88 (0.057)	4.44 (0.005)	0.37 (0.005)	62.71 (0.063)	3.59 (0.004)	0.27 (0.001)
Decile 3	10	42.37 (0.064)	1.36 (0.002)	0.05 (0.000)	33.89 (0.061)	0.82 (0.002)	0.02 (0.000)	30.05 (0.059)	0.52 (0.001)	0.01 (0.000)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 4	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 5	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 6	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 7	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 8	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 9	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)
Decile 10	10	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)	0.0 (0.00)

Note: z = Poverty Line. The respective standard errors are reported in parenthesis at 95% confidence limit.
Source: Author's estimations from the DAD (Distributive Analysis) Programme [49].

Table 12. FGT poverty indices under the base year and different trade policy options: estate sector.

http://dx.doi.org/10.5772/intechopen.69506

last two decades. Agriculture's contribution to GDP was just over 17%, the share of manufacturing had been steady at 27–28% leaving the service sector as the dominant sector, contributing approximately 54% to GDP. While examining the shares of employment in the three sectors; agriculture, industry and services it was revealed that agriculture accounts to 30.2%, and the other two 25 and 44.8, respectively in 2004. Comparing the output and the employment structures, data indicate that labour productivity is relatively low in agriculture where nearly one third of the workers are engaged in producing just one-sixth of the country's value added. If the poverty levels are to be reduced, agricultural productivity will be a must, especially in the rural and estate sectors in Sri Lanka. This becomes even more important when considering the fact that 90% of the poor live in the rural agricultural economy.

According to Ref. [12], similar disadvantages were faced by the Sri Lankan estate sector and the rural poor households. These disadvantages include remoteness, poor infrastructural facilities, low level and poor quality education and dependence on agriculture for livelihoods. The only difference between the rural poor and estate sector households is in their access to public health services, which is worse in the estate sector than in other areas. Thus, it can be concluded that lack of mainstream economic infrastructure is one of the main reasons for the high incidence of poverty in the estate sector.

5. Conclusion and policy recommendation

In probing the impact of trade liberalisation, it was revealed that the welfare gains are predicted to be highest under the unilateral trade liberalisation for all trading partners, followed by the customs union option (except in Sri Lanka) and the SAFTA. Although the SAFTA does not bring significant welfare gains for member countries, it could bring spillover benefits (improvement in infrastructure, benefits of economies of scale and new technology) which are beyond those declared in the agreement. Therefore, the SAFTA is preferable as a pathway to co-ordinating liberalisation in the region. As noted in Ref. [5], it is feasible to continue the process of unilateral trade liberalisation in parallel to regional integration in South Asia, which will help to improve both extra-regional and intra-regional trade in the economies in South Asia.

The results of this study indicate that the three trade policies positively contribute to the economic growth and that they do not conflict with the poverty reduction goals in South Asian economies. However, it is worth noting that, although trade liberalisation can help to reduce poverty, it may not be the magic bullet against poverty reduction, [53]. Therefore, other growth-enhancing reforms need to be pursued along with recommended trade policies to reap the maximum benefits of implementing such trade reforms to alleviate poverty in the region.

The poverty and income inequality analysis indicates that the unilateral trade liberalisation in South Asia predicts a more favourable result for the Sri Lankan households. Lorenz curves for the base year showed that the inequality is highest in the urban sector compared to the rural and estate sectors. This is further confirmed by the estimated S-Gini coefficients which reflect that under the SAFTA and unilateral trade liberalisation there is a reduction in estimated

S-Gini index. The poverty headcount ratio in the base year is highest for the estate sector while it is lowest in the urban sector. The decline in poverty in all three sectors under the two trade policies is evident in the FGT indices. The poverty reduction is higher under unilateral trade liberalisation than under the SAFTA. In Sri Lanka, poverty is predominant in the rural and the estate sectors and the results suggest that Sri Lanka can achieve significant progress towards poverty reduction as a result of implementing trade reforms. This study makes it quite clear that policy makers in Sri Lanka should give great emphasis to the detailed pathways through which trade liberalisation can have a positive impact on the poor and distribute benefits from trade liberalisation more fairly among all parties in the country to eradicate inequality and poverty from Sri Lanka.

Appendices

Country/region/area	Sector
India (IND)	Rice (paddy and processed)
Sri Lanka (LKA)	Wheat, cereal and grains
Pakistan (PAK)	Vegetables and fruits
Bangladesh (BGD)	Oilseeds and vegetable oils
Rest of South Asia (XSA) (Bhutan, Maldives and Nepal)	Plant-based fibres and crops
United States of America (USA)	Sugar
Canada (CAN)	Dairy products and milk
European Union (EU)	Fishing
ASEAN-6 (ASE) Singapore, Thailand, Vietnam, Indonesia, Philippines, Malaysia	Meat
High-income Asia (HIA) (Hong Kong, China; Republic of Korea; Taiwan Province of China)	Food products necessaries
Japan (JPN)	Beverages and tobacco products
China (CHN)	Textiles
Rest of Middle East (XME) Bahrain, Iraq, Islamic Republic of Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates and Yemen`	Wearing apparel
Australia and New Zealand (AUS_NZ)	Leather, wood products
Russian Federation and Rest of Former Soviet Union (RUS_XSU)	Paper products
Rest of world (ROW)	Chemicals, rubber and plastic products
	Metal products

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Country/region/area	Sector
Primary factors	Electronic equipment
Skilled labour	Machinery and equipment
Unskilled labour	Manufacturing necessaries
Capital (including land and natural resources)	Motor vehicles and transport equipment
	Petroleum and coal
	Gas manufactures and distributers
	Tradable services
	Non-tradable services
	Other primary products
	Trade and construction
	Electricity
	Water and air transport
	Oil and natural resources

Note: SAMGEM: South Asia multi-country computable general equilibrium model.

Table A.1. SAMGEM aggregation.

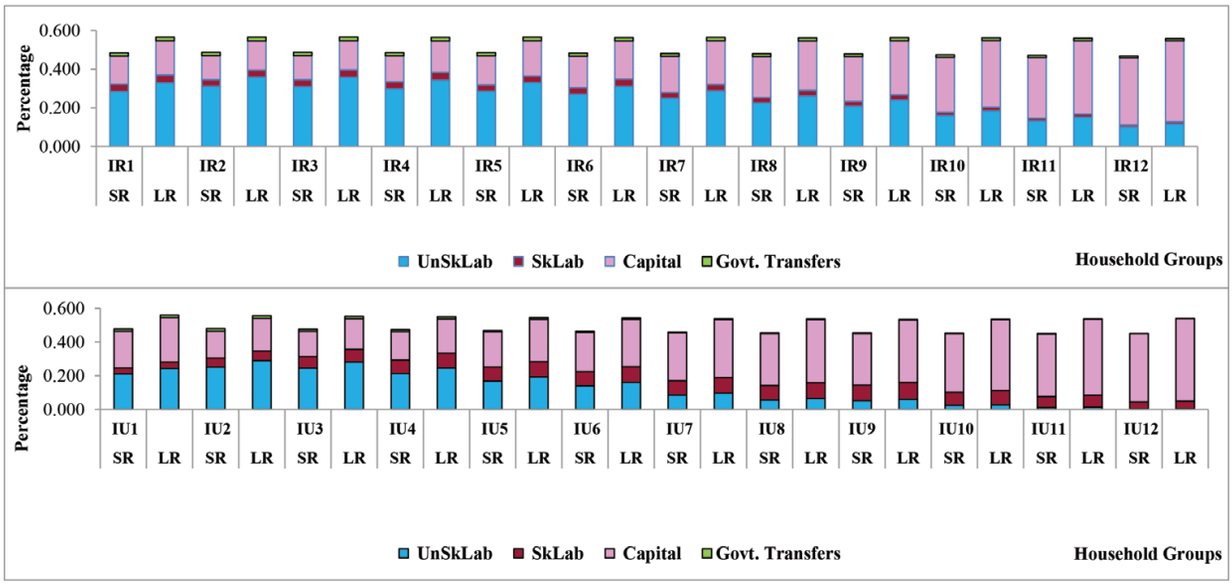


Figure A.1. Projections of change in household income under SAFTA: India. Source: Simulation results derived from SAMGEM. *Note*: SR: Short-Run; LR: Long-Run; IR1–IR12: Rural Household Groups; IU1–IU12: Urban Household Groups.



Figure A.2. Projections of change in household income under customs union: India. Source: Simulation results derived from SAMGEM. Note: SR: Short-Run; LR: Long-Run; IR1–IR12: Rural Household Groups. IU1–IU12: Urban Household Groups.

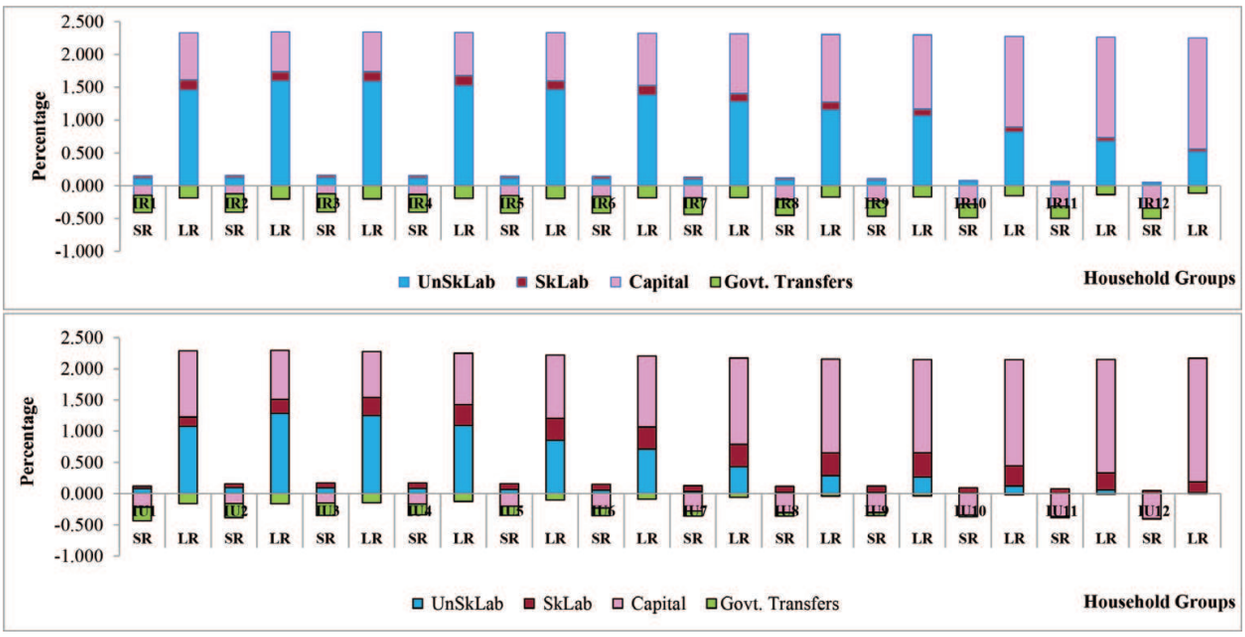


Figure A.3. Projections of change in household income under unilateral trade liberalisation: India. Source: Simulation results derived from SAMGEM. *Note*: SR: Short-Run; LR: Long-Run; IR1–IR12: Rural Household Groups; IU1–IU12: Urban Household Groups.

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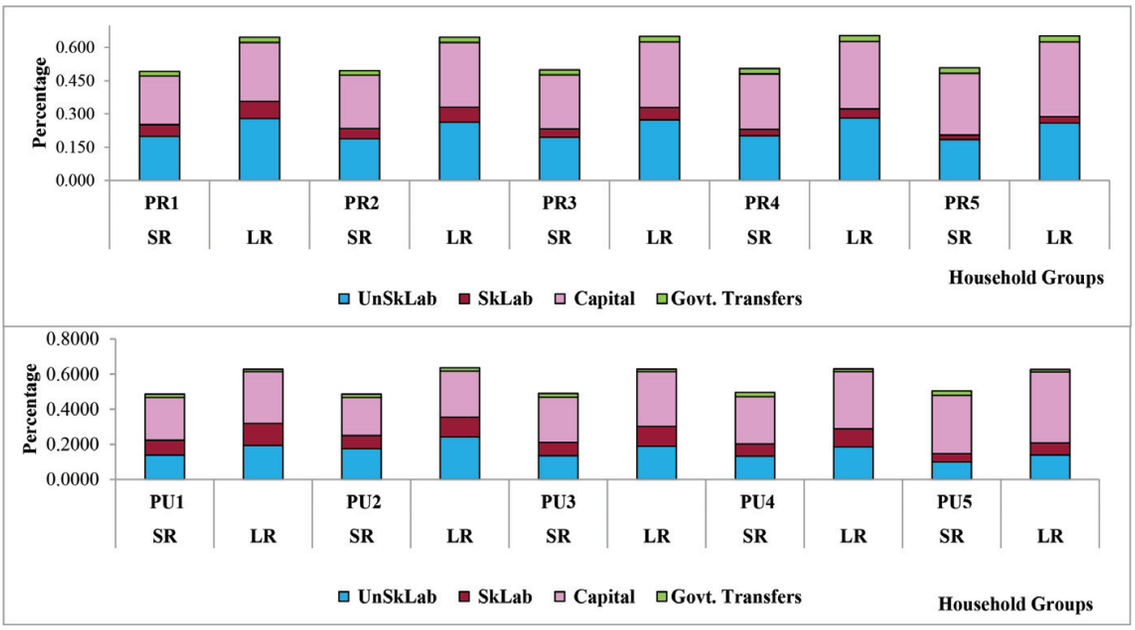


Figure A.4. Projections of change in household income under SAFTA: Pakistan. Source: Simulation results derived from SAMGEM. *Note*: SR: Short-Run; LR: Long-Run; PR1–PR5: Rural Household Groups; PU1–PU5: Urban Household Groups.

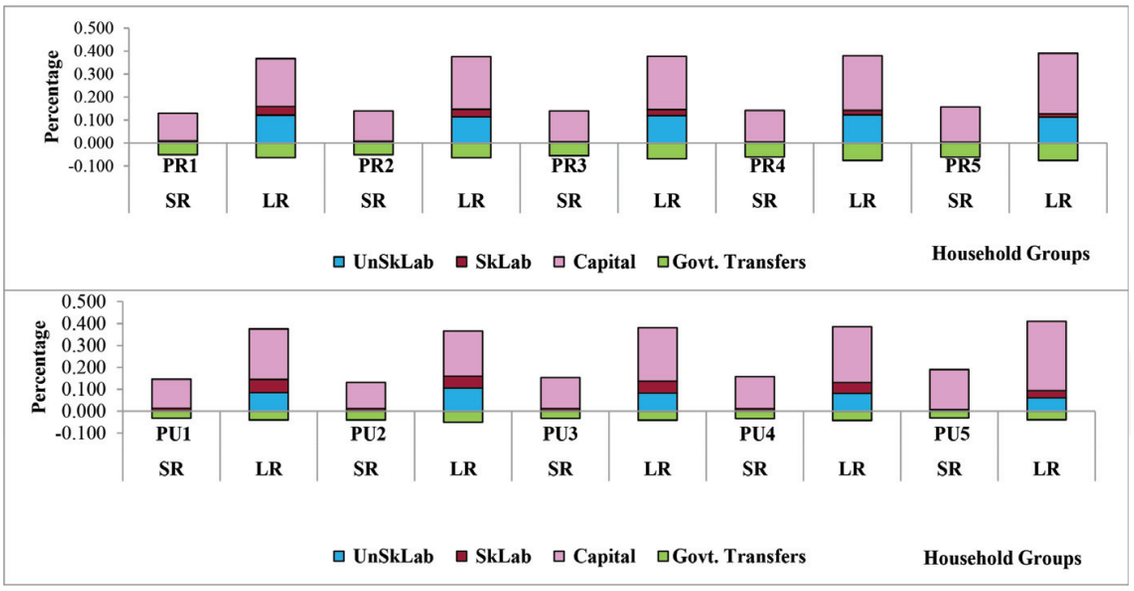


Figure A.5. Projections of change in household income under customs union: Pakistan. Source: Simulation results derived from SAMGEM. *Note*: SR: Short-Run; LR: Long-Run; PR1–PR5: Rural Household Groups; PU1–PU5: Urban Household Groups.

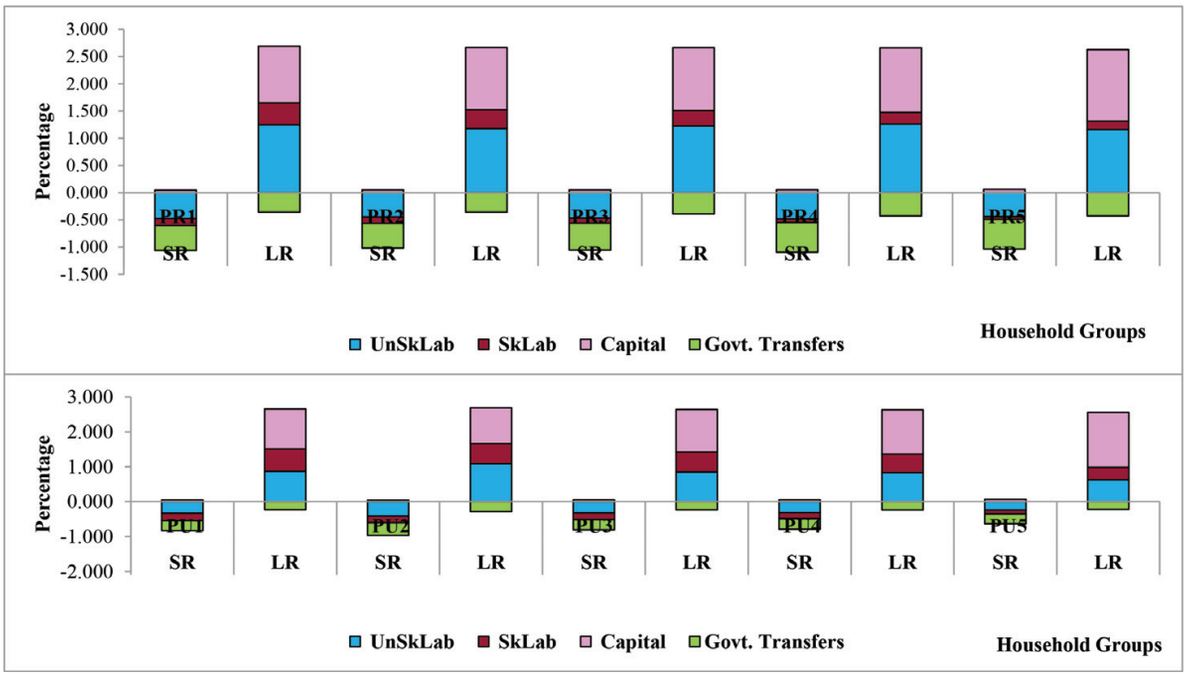


Figure A.6. Projections of change in household income under unilateral trade liberalisation: Pakistan. Source: Simulation results derived from SAMGEM. *Note*: SR: Short-Run; LR: Long-Run; R1–PR5: Rural Household Groups; PU1–PU5: Urban Household Groups.

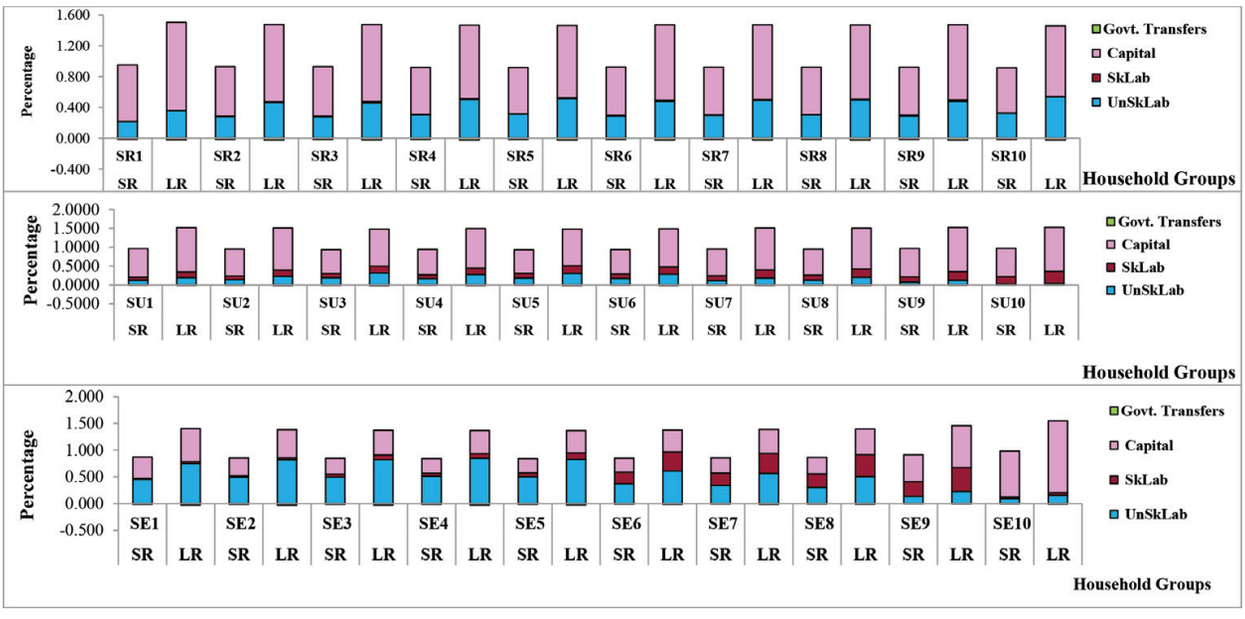


Figure A.7. Projections of change in household income under SAFTA: Sri Lanka. Source: Simulation results derived from SAMGEM. *Note*: SR: Short-Run; LR: Long-Run; SR1–SR10: Rural Household Groups; SU1–SU10: Urban Household Groups; SE1–SE10: Estate Sector Household Groups.

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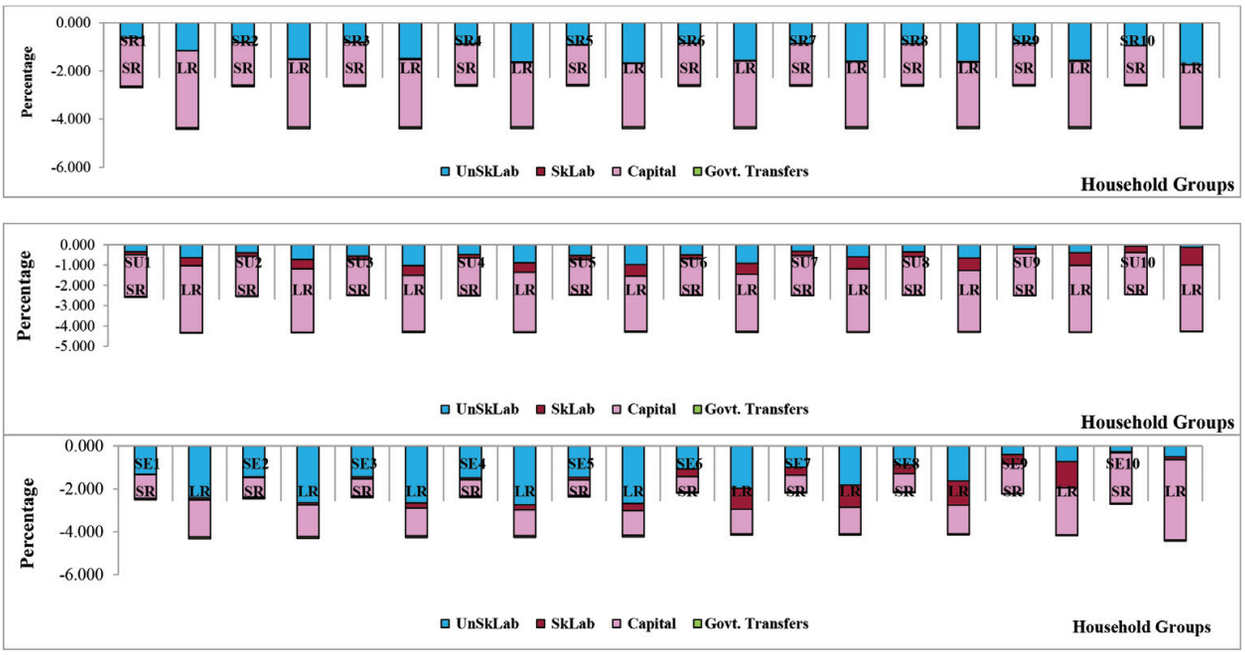


Figure A.8. Projections of change in household income under customs union: Sri Lanka. Source: Simulation results derived from SAMGEM. *Note*: SR: Short-Run; LR: Long-Run; SR1–SR10: Rural Household Groups; SU1–SU10: Urban Household Groups; SE1–SE10: Estate Sector Household Groups.

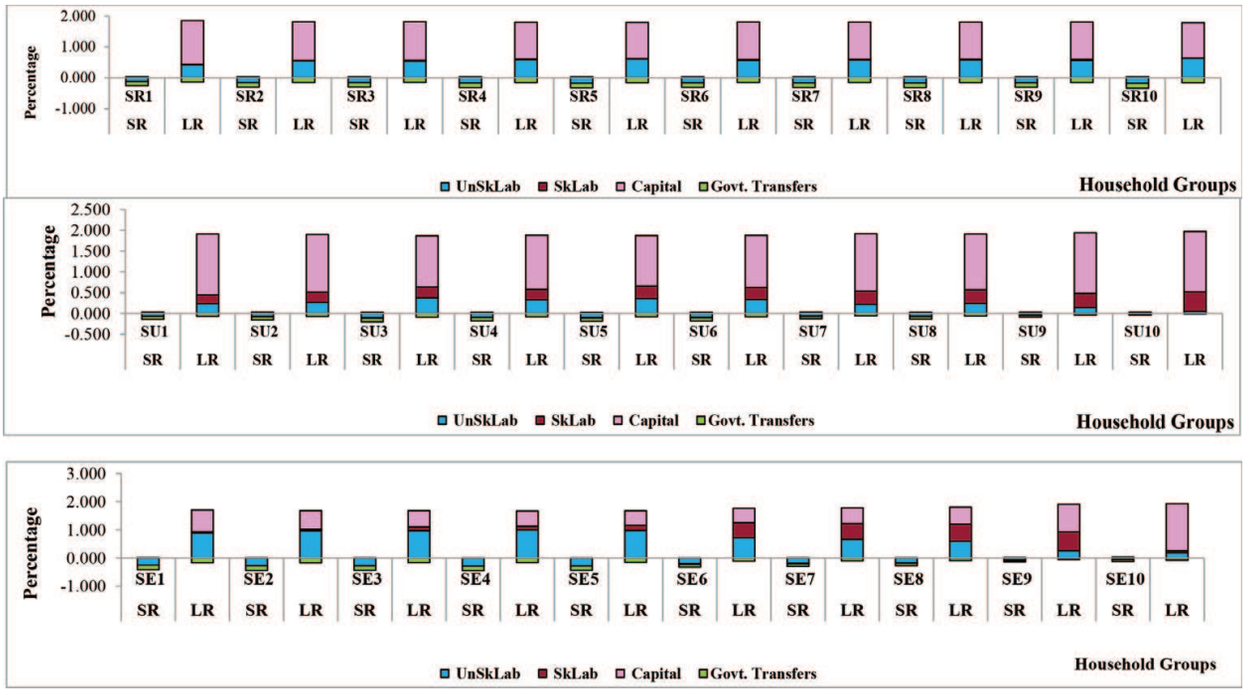


Figure A.9. Projections of change in household income under unilateral trade liberalisation: Sri Lanka. Source: Simulation results derived from SAMGEM. *Note*: SR: Short-Run; LR: Long-Run; SR1–SR10: Rural Household Groups SU1–SU10: Urban Household Groups; SE1–SE10: Estate Sector Household Groups.

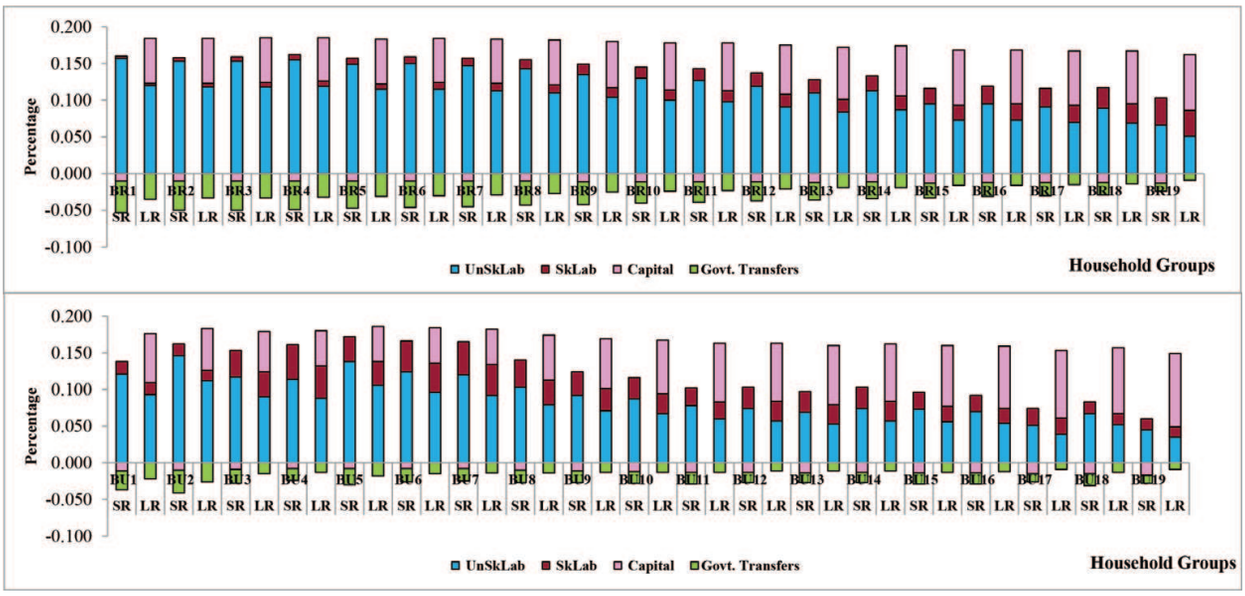


Figure A.10. Projections of change in household income under SAFTA: Bangladesh. Source: Simulation results derived from SAMGEM. *Note*: SR: Short-Run; LR: Long-Run; BR1–BR19: Rural Household Groups; BU1–BU19: Urban Household Groups.

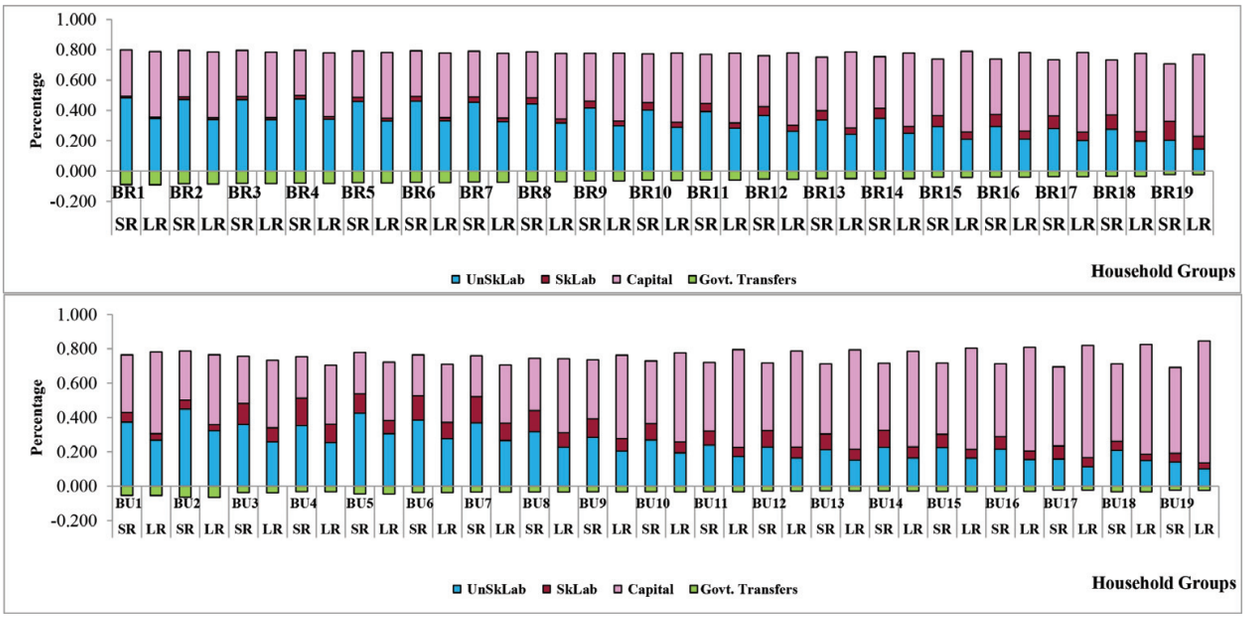


Figure A.11. Projections of change in household income under customs union: Bangladesh. Source: Simulation results derived from SAMGEM. *Note*: SR: Short-Run; LR: Long-Run; BR1–BR19: Rural Household Groups; BU1–BU19: Urban Household Groups.

http://dx.doi.org/10.5772/intechopen.69506

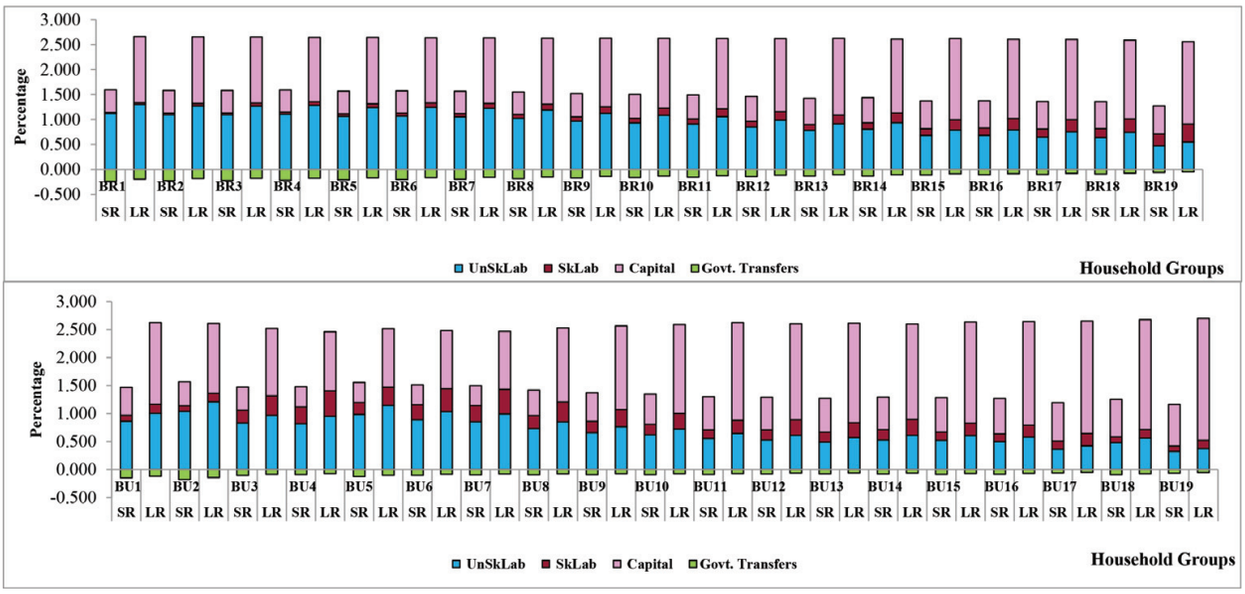


Figure A.12. Projections of change in household income under unilateral trade liberalisation: Bangladesh. Source: Simulation results derived from SAMGEM. *Note*: SR: Short-Run; LR: Long-Run; BR1–BR19: Rural Household Groups; BU1–BU19: Urban Household Groups.

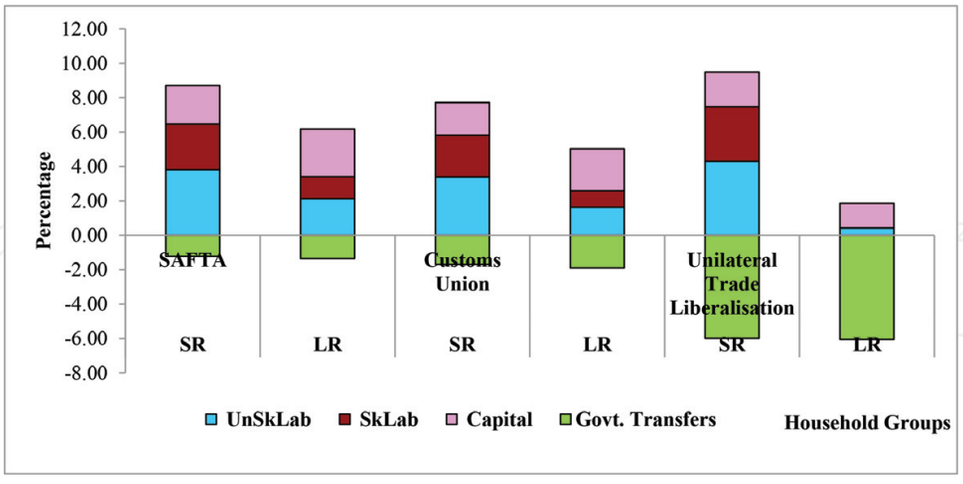


Figure A.13. Projections of change in household income under different trade policy options: Rest of South Asia. Source: Simulation results derived from SAMGEM. *Note*: SR: Short-Run; LR: Long-Run.

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