SHOULD AGRICULTURE BE EXEMPT FROM TRADE POLICY REFORMS IN SOUTH ASIA?

*Sumudu Perera, Mahinda Siriwardana and Stuart Mounter**

Contracting parties to the Agreement on South Asian Free Trade Area (SAFTA) are committed to trade liberalization within a fixed time frame. Most contracting parties have kept agriculture out of their tariff liberalization commitments. A key question therefore is: should agriculture receive dispensation given the sector's important contribution to South Asia's economic structure? An enhanced multi-household framework within a multi-country computable general equilibrium (CGE) approach was used to assess the impacts on trade flows, government fiscal revenues and income distribution among households in countries that are contracting parties to SAFTA, assuming full trade liberalization and trade liberalization with the protection of the agricultural sector. The results indicate that, although both policies would facilitate economic growth and lead to a reduction in income disparity among household groups in all South Asian countries, the overall welfare gains would be greater under full trade liberalization. Hence, the removal of agricultural sector tariffs should be an important consideration in future SAFTA discussions; such a step would be a principal means for strengthening intraregional trade.

JEL Classifications: F15, F13, F47.

Key words: Agricultural sector, income distribution, multi-country computable general equilibrium (CGE) model.

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I. INTRODUCTION

Trade policy analysts are concerned with the overall economic benefits that a country will receive in the event that free trade treaties are successfully negotiated (Siriwardana and Yang, 2007). The South Asian Association for Regional Cooperation (SAARC) was established in 1985 by seven countries, namely Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. In 2007, Afghanistan became the eighth member. In 1993, the member countries elected to liberalize trade under successive rounds of tariff concessions, with the ultimate objective of establishing a free trade agreement. The Agreement on SAARC Preferential Trading Arrangement (SAPTA), which was launched in 1995, was the first major political breakthrough for SAARC, as it was the initial regional trading agreement on economic cooperation in South Asia (Sawhney and Kumar, 2008). SAPTA was superseded by SAFTA, which came into force on 1 January 2006, with the expectation that the full implementation of the treaty would be accomplished by 31 December 2015. One of the main objectives of forming SAFTA was to strengthen intra-SAARC economic cooperation by decreasing tariff and non-tariff barriers and structural impediments to free trade. The agreement binds all contracting States to reducing tariffs to between 0 per cent and 5 per cent by 31 December 2015.

However, the progress of cooperative efforts among the South Asian countries has been slow, and South Asia's intraregional trade as a share of total trade has not increased from the 5 per cent levels witnessed in the 1980s and 1990s (Ratna and Sidhu, 2007). The failure of the SAFTA contracting parties to expand the level of intraregional trade may be attributable to, among other reasons, the imposition of restrictive rules of origin, the inclusion of long sensitive-item lists, poor trade facilitation and continued political conflicts between India and Pakistan. The extensive sensitive-item lists declared by individual countries contain most of the agricultural goods of export interest of other members. This is a major trade policy concern, as even the Doha negotiations on tariff liberalization in agriculture have failed to reach a stage of consensus where such tariff liberalization can be implemented. The division between developed countries and developing countries is very clear, despite a recent decision on agriculture (based on updating the rules concerning public stockholding for food security) made at the ninth Ministerial Conference of the World Trade Organization, held in Bali, Indonesia, in December 2013. At the same time, the sensitivity of agriculture has been recognized by countries in the subregion (notably India) that wish to protect their large and poor rural populations (Gilbert, 2008).

Given that South Asia ranks as one of the poorest areas in the world, it is important to consider the welfare implications of trade liberalization.[1] The present paper contains an examination of the short-run and long-run effects on household income distribution among socioeconomic groups in South Asia, assuming trade liberalization with and without agricultural sector protection.[2] The paper also contains estimates of changes in government revenue for each contracting party from the implementation of the alternative trade liberalization scenarios. This information, in addition to providing estimates of the overall costs and benefits of full SAFTA implementation, is useful in identifying key areas in which policy interventions may be warranted.

In recent years, CGE models have been used extensively to address the impacts of trade liberalization in developing economies, as they readily incorporate various channels through which trade reforms affect different groups in society (Gilbert, 2008). In the present paper, a multi-country CGE model for South Asia, based on the Global Trade Analysis Project (GTAP) model, is formulated. The CGE model links the major South Asian trading partners with the rest of the world. One of the shortcomings of the GTAP model is its representative-household specification, which restricts a detailed analysis of the welfare implications associated with various policy options. The CGE model employed in this study addresses this shortcoming through the inclusion of a multi-household framework, which is disaggregated by income classifications and geographical areas in the South Asian economies.

The present paper is divided into five main parts. In section I, an introduction is given. In section II, the contextual setting is provided by highlighting relevant characteristics of the South Asian economies. In section III, the structure of the model, the database development and the experimental design of the study are described. The results of the alternative trade policies are presented and discussed in section IV. Concluding remarks on policy implications are given in section V.

[1] According to the World Bank, more than half the world's poor live in South Asia (844 million people). See World Bank, *World Development Report 2010: Development and Climate Change* (Washington, D.C., 2010).

[2] The focus of this study is limited to tariff reforms, as they are considered to be one of the most widely used trade policy instruments. See R.M.A.K.B. Naranpanawa, "Trade liberalisation and poverty in a computable general equilibrium (CGE) model: the Sri Lankan case", PhD dissertation, Griffith University, 2005. The study does not consider non-tariff barriers or other impediments to free trade.

II. SOUTH ASIAN OUTPUT, TRADE AND POVERTY PATTERNS

Key characteristics of the South Asian economies

The *World Development Report 2010* (World Bank, 2010) indicated that the South Asian subregion has approximately 23 per cent of the world's population and 15 per cent of the world's arable land, but contributes only about 2.7 per cent of global gross GDP, 1.8 per cent of global trade and less than 4 per cent of global foreign investment flows. The South Asian subregion is tremendously diverse in terms of country size, economic and social development, geography, political systems, languages and cultures.

South Asia consists of a single large country, India, which is surrounded by a number of smaller countries, including Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, Pakistan and Sri Lanka. India's dominance in the subregion is apparent; the country accounts for more than 78 per cent of the subregion's GDP and 73 per cent of its population (World Bank, 2010). India also commands a leading position in international trade while maintaining a relatively low level of trade openness (35.5 per cent) with the rest of the world. Today, South Asia as a subregion is generally characterized by low per capita incomes, high incidence of poverty and poor infrastructure. Bhutan, India, Maldives and Sri Lanka are classified as lower-middle-income countries, and Afghanistan, Bangladesh, Nepal and Pakistan are low-income countries (World Bank, 2010).

Economic growth and sectoral compositions of GDP

Recent economic growth in South Asia has been impressive. From 1995 to 2004, the subregion's GDP grew at a rate of 6 per cent per annum – nearly twice the growth rate of the global economy (World Bank, 2005). Between 2004 and 2009, average GDP growth in South Asia was 7.1 per cent, which was higher than that in South-East Asia (5.6 per cent) but below that in East Asia (10.4 per cent) (World Bank, 2009a). Much of this surge in growth can be attributed to increasing globalization and the opening up of South Asian markets to the rest of the world (World Bank, 2009b).

Concomitant with this growth have been changes in the sectoral contributions to GDP in each economy. As indicated in table 1, all five countries listed have experienced similar adjustments. The importance of the service sectors in each economy has increased considerably, while the contributions of the agricultural sectors have declined, particularly in the last two decades.

Table 1. Sectoral composition of GDP, 1980, 1990 and 2012

Country	Agriculture as a percentage of GDP			Manufacturing as a percentage of GDP			Services as a percentage of GDP		
	1980	1990	2012	1980	1990	2012	1980	1990	2012
Bangladesh	32	30	18	14	13	29	48	48	53
India	36	31	17	17	17	26	40	41	57
Nepal	62	51	37	4	15	16	26	34	47
Pakistan	30	26	24	16	17	22	46	49	54
Sri Lanka	28	26	11	18	15	32	43	48	57
South Asia	**35**	**31**	**18**	**16**	**16**	**26**	**41**	**43**	**56**

Source: World Bank, World Development Indicators database (2012).

Note: South Asia refers to Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka for 1980 and 1990, and for these countries plus Afghanistan for 2012.

These figures, however, belie the indispensable role the agricultural sector plays in South Asia, particularly in employing the vast majority of the labour force. The World Bank (2010) reported that, in 2009, almost 55 per cent of the labour force was engaged in the agricultural sector.

Average tariff rates in South Asia

Historically, South Asia has been a relatively protected subregion, with individual countries imposing high tariff barriers in order to foster industrial development through import-substitution policies (Bandara, 2011). Sri Lanka was the pioneer in South Asian trade liberalization in the late 1970s, and by the early 1990s all of the countries in the subregion had, to various extents, begun implementing trade liberalization policies. A number of these countries have demonstrated a commitment to tariff reductions.[3] For example, the simple average ad valorem tariff in India fell from 35 per cent in 2002/03 to 15 per cent in 2007, while in Bangladesh the average protective rate fell by 20 per cent over the same period (WTO, 2007). Simple average 2013 tariff rates for the individual South Asian countries presented in table 2 indicate that tariffs were the lowest in Afghanistan and the highest in Bhutan.

[3] Bangladesh, India, Maldives, Nepal, Pakistan and Sri Lanka remain committed to freer multilateral trade as members of the World Trade Organization.

Table 2. Simple average tariff rates in South Asia, 2013

Country	All products		Agricultural products		Non-agricultural products	
	Bound	MFN applied	Bound	MFN applied	Bound	MFN applied
	Percentage		Percentage		Percentage	
Afghanistan	N/A	5.9	N/A	7.1	N/A	5.7
Bangladesh	169.2	14.4	192.0	17.2	37.3	14.0
Bhutan	N/A	21.9	N/A	40.0	N/A	22.0
India	48.6	13.7	113.1	33.5	34.5	10.4
Maldives	36.9	20.5	48.1	18.3	35.1	20.8
Nepal	26.0	12.3	41.5	13.9	23.7	12.0
Pakistan	59.9	13.5	95.5	15.5	54.6	13.2
Sri Lanka	30.2	9.9	50.0	25.8	19.7	7.5

Sources: World Trade Organization, Statistics database (2013). Available from http://stat.wto.org/Home/WSDBHome.aspx (accessed 10 January 2014); and United Nations Conference on Trade and Development, UNCTADstat database (2013). Available from http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx (accessed 10 January 2014).

Notes: The latest tariff data available for Bhutan are from 2007 and those for Bangladesh are from 2011.
MFN – most favoured nation.

The 2007 simple average bilateral tariff rates on selected traded commodities presented in table 3, and the 2009 average effective bilateral tariff rates on agricultural products listed in table 4 highlight that agricultural products are typically subjected to high levels of protection.

It is evident from the tables that there is a reluctance by South Asian countries to instigate commensurate tariff cuts on agricultural commodities. Agricultural trade in the subregion is characterized by similar export and import commodities, with high concentrations of a few products. The top five export commodities account for more than 60 per cent of total agricultural sector exports from South Asian economies. For example, milled rice, frozen beef and sugar are among India's top five agricultural exports (World Bank, 2010). India's applied tariff rates on these products are 70 per cent, 33 per cent and 60 per cent, respectively (Serletis and Allen, 2009). Such heavy weightings of agricultural exports with their high import tariff rates seriously inhibit intraregional trade (Sawhney and Kumar, 2008), as does the increasing prevalence of non-tariff barriers, including sanitary and phytosanitary measures (Hoekman and Nicita, 2008; Nanda, 2012; Bellanawithana, Wijerathne and Weerahewa, 2009; Keane and others, 2013; Mohan, Khorana and Choudhury 2012). Furthermore, as

Table 3. Simple average bilateral tariff rates on selected traded commodities in South Asia, 2007

Commodity	India (IND)				Pakistan (PAK)				Sri Lanka (LKA)				Bangladesh (BGD)				Rest of South Asia (XSA)			
	PAK	LKA	BGD	XSA	PAK	LKA	BGD	XSA	PAK	LKA	BGD	XSA	PAK	LKA	BGD	XSA	PAK	LKA	BGD	XSA
Rice (paddy and processed)	0.00	24.60	4.97	0.00	0.00	25.40	5.00	2.23	0.00	0.00	0.00	11.80	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheat, cereal and grains	8.67	7.28	0.42	0.25	100.00	3.00	5.00	2.5	0.00	0.00	0.00	15.00	0.00	9.98	0.00	0.00	0.00	5.88	0.00	0.00
Vegetables and fruits	7.53	4.61	16.20	12.80	28.20	9.04	19.90	7.98	0.40	0.48	5.67	15.00	39.20	0.00	0.00	2.50	16.00	14.40	0.00	25.00
Oilseeds and vegetable oils	9.02	9.12	1.34	0.20	28.90	19.10	0.79	3.5	0.00	1.82	10.20	9.87	23.80	0.00	0.00	0.00	45.60	6.11	0.00	0.00
Plant-based fibres and crops	5.40	23.40	8.32	5.16	27.30	7.77	1.06	4.04	0.03	0.18	23.60	19.60	7.55	5.46	0.00	2.50	19.40	5.01	27.60	24.90
Sugar	10.00	21.60	13.50	2.47	0.00	21.90	0.00	4.87	0.00	0.00	0.00	1.61	10.00	0.00	25.80	0.00	25.30	0.00	0.00	0.00
Dairy products and milk	23.90	17.50	24.90	1.67	0.00	0.00	0.00	8.49	0.00	0.00	0.00	10.80	20.70	0.00	0.00	0.00	25.80	0.00	0.00	0.00
Fish	5.00	12.90	24.80	6.12	30.00	13.20	0.00	2.5	0.00	0.00	23.70	19.70	0.11	0.00	0.00	0.00	0.00	0.00	12.30	0.00
Meat	5.11	21.50	13.40	2.58	23.10	0.00	20.80	6.22	0.00	0.00	0.00	19.80	7.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Food products necessaries	18.30	14.80	15.20	8.51	32.90	11.40	14.60	4.6	0.00	4.90	13.80	16.20	23.20	11.80	14.40	42.40	35.80	15.00	11.60	25.00
Beverages and tobacco	24.60	158.00	23.90	8.24	54.90	143.00	0.00	16.9	67.10	0.00	25.00	23.20	22.70	0.00	0.00	40.50	32.50	0.00	0.00	0.00
Textiles	12.80	0.25	15.40	3.99	14.20	0.795	18.70	7.02	11.40	4.32	22.50	26.10	6.82	10.20	1.06	24.50	7.53	21.70	0.54	0.00
Wearing apparel	22.90	4.43	24.00	10.80	14.30	10.1	23.30	10.2	10.20	17.70	24.00	23.30	7.49	18.00	10.20	28.40	0.00	0.00	14.20	0.00
Metal products	9.34	2.20	8.67	4.83	16.00	4.76	12.00	3.43	0.00	3.35	18.10	22.50	11.50	13.60	11.30	17.70	6.99	12.50	20.20	0.00

Source: Center for Global Trade Analysis, GTAP database, version eight (2012).

Note: XSA – rest of South Asia (Bhutan, Maldives and Nepal).

Table 4. Average effective bilateral tariffs on agricultural products, 2009

(Percentage)

Exporting country	Importing country							
	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
Afghanistan	–	19.50	–	34.69	–	–	11.54	15.00
Bangladesh	4.38	–	36.67	37.36	23.93	19.29	12.22	24.78
Bhutan	–	24.05	–	1.07	–	22.50	15.88	–
India	5.57	14.48	44.48	–	15.51	11.29	9.16	19.60
Maldives	–	–	–	65.00	–	–	31.43	25.15
Nepal	–	11.34	46.00	39.17	25.00	–	8.67	13.66
Pakistan	6.61	17.76	–	27.29	14.13	8.91	–	11.02
Sri Lanka	7.13	18.27	–	9.13	15.48	18.33	15.93	–

Sources: World Bank, World Integrated Trade Solution database (2012). Available from http://wits.worldbank.org/ (accessed 28 December 2013); and N. Nanda, "Agricultural trade in South Asia: barriers and prospects", SAWTEE Working Paper, No. 03/12 (Kathmandu, South Asia Watch on Trade, Economics and Environment, 2012). Available from www.scribd.com/doc/195408373/Agricultural-Trade-in-South-Asia (accessed 28 December 2013).

Note: The tariff figures are simple averages of effective tariffs.

Samaratunga, Karunagoda and Thibbotuwawa (2007) noted, South Asian trade negotiations have yielded relatively fewer opportunities for agricultural trade compared with non-agricultural trade because of its politically sensitive nature.

Poverty and income distribution in South Asia

After sub-Saharan Africa, South Asia is home to the world's largest concentrations of poverty. Notwithstanding its strong economic growth in recent years, the subregion is still home to about 65 per cent of the poor living in the Asian and Pacific region (World Bank, 2010). This is despite the progress made in poverty reduction following the trade liberalizing reforms instigated in the 1990s.[4] The percentages listed in table 5 demonstrate the poverty and income inequality profiles of the South Asian countries.

The poverty headcount measure indicates the share of the population with a standard of living below the poverty line. The Gini coefficient is the most commonly used measure of income inequality. The coefficient varies between 0, which reflects

[4] Poverty in the South Asian subregion fell from 52 per cent in 1996 to about 33 per cent in 2006 (World Bank, World Development Indicators database, 2009).

Table 5. Poverty and income inequality profiles in South Asia

Country	Year	Headcount $1/day (percentage)	Gini coefficient
Bangladesh	2005	35.3	33.2
India – rural	2005	40.2	30.5
India – urban	2005	19.6	37.6
Nepal	2004	24.7	47.3
Pakistan	2005	9.0	31.2
Sri Lanka	2002	5.8	40.2

Source: John Gilbert, "Trade policy, poverty, and income distribution in CGE models: an application to SAFTA", Department of Economics and Finance Working Paper Series, No. DEFWP2008-02 (Logan, Utah, Huntsman School of Business, Utah State University, 2008). Available from ftp://repec.bus.usu.edu/RePEc/uth/wpaper/DEFWP2008-02.pdf (accessed 2 June 2010).

complete equality, and 1, which indicates complete inequality (in complete inequality, one person has all the income or consumption while all of the others have none) (Coudouel, Hentschel and Wodon, 2002, pp. 35-48).

As an example, Sri Lanka has the lowest incidence of poverty but ranks high in terms of income inequality. As can be seen in table 5, poverty is significantly higher in the rural areas of India than in its urban areas, as is the case in the other South Asian countries.[5] This underlines the importance of understanding the likely welfare impacts from tariff reductions on agricultural products, given the high dependence of the working population on the agricultural sector.

III. THE MODEL AND THE DATA

The present study uses the South Asia multi-country CGE model (SAMGEM), which links countries and regions globally through trade and investment. A distinguishing feature of SAMGEM is the inclusion of a multi-household framework that disaggregates the household sector into different income groups in different geographical areas of Bangladesh, India, Pakistan and Sri Lanka.

[5] Four fifths of all extremely poor people in South Asia live in rural areas. See United Nations, Statistics Division, "International agencies". Available from http://unstats.un.org/unsd/methods/inter-natlinks/sd_intstat.htm (accessed 8 April 2012).

Database

The data used in this study were the same as those in GTAP (version seven),[6] which are indicative of the global economy in 2004 (Narayanan and Walmsley, 2008). For the SAMGEM specification, these data are aggregated into 16 countries and areas, 30 sectors and 4 primary factors (see table A.1).

The household sector in Sri Lanka is divided into 30 household groups, consisting of 10 rural groups, 10 urban groups and 10 estate sector groups,[7] disaggregated according to income deciles and geographical regions. For India, the household sector is split into 24 groups, consisting of 12 rural groups and 12 urban groups, disaggregated according to monthly per capita consumer-expenditure classes. For Pakistan, the disaggregation comprises 10 household groups, consisting of 5 rural groups and 5 urban groups, based on income quintiles. The Bangladesh household sector is divided into 38 groups, consisting of 19 rural groups and 19 urban groups, based on monthly per capita consumer expenditure.

Additional data on household income and expenditure were sourced from the Central Bank of Sri Lanka (*Consumer Finances and Socio Economic Survey 2003/04*), the National Sample Survey Organization of India (*Household Consumer Expenditure Survey in India*), the Pakistan Bureau of Statistics (*Household Income and Expenditure Survey 2004/05*) and the Bangladesh Bureau of Statistics (*Household Income and Expenditure Survey 2004/05*). Data for 2003/04 and 2004/05 were used for consistency with the 2004 GTAP database. The commodity groups in the household survey data for each of the South Asian countries were matched and categorized 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 survey results for each country provide some key insights into household income patterns. In summary, they indicate that unskilled labour income and land and natural resources are the main income sources for rural households. In Bangladesh, India and Pakistan, the majority of the rural poor household groups are engaged in agricultural farming. In Sri Lanka, many rural households and urban low-income households are employed in the garment industry, choosing to abandon the

[6] GTAP version eight had not been released at the time of the construction of the SAMGEM database.

[7] 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 per cent of the total population of Sri Lanka. See World Bank, *World Development Report 2009: Reshaping Economic Geography* (Washington, D.C., 2009).

agricultural sector following the launch of the 200 Garment Factory Programme in 1990 (Kelegama, 2005). Hence, the income derived from land in the rural household sector in Sri Lanka (with the exception of the estate sector) is proportionately less than it is in the other South Asian economies. The survey results also reveal that the income received from skilled labour and capital is proportionately greater in urban sector households than it is in rural sector households in all of the South Asian economies.

Most of the elasticity values in the model are taken from the GTAP (version seven) database. The income or expenditure elasticity values for different household groups were obtained from previous empirical estimates (Rajapakse, 2011; Majumder, 1986; Yen and Roe, 1986; Burney and Khan, 1991).

Model

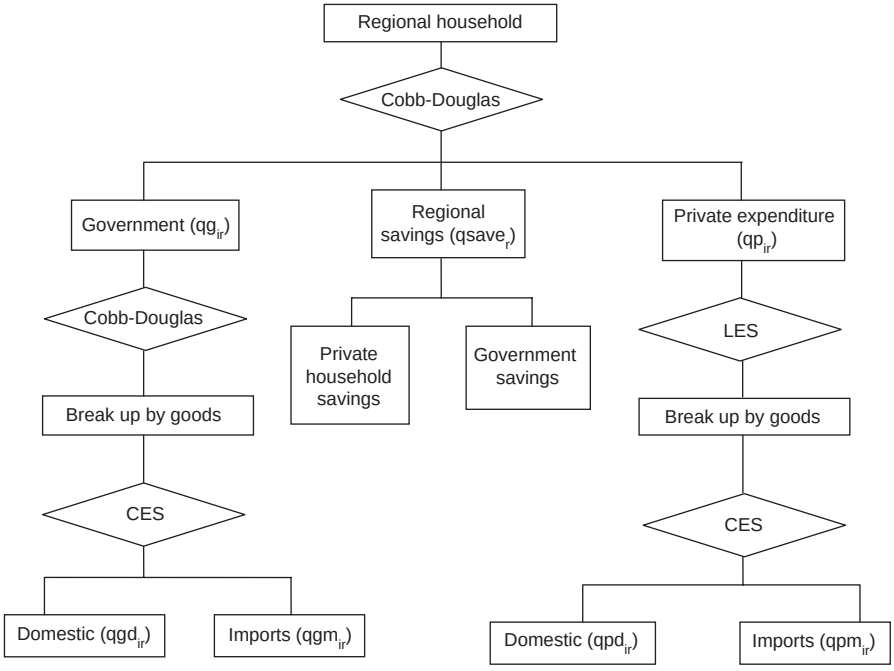
In SAMGEM, private households own the factors of production. Household income, which consists of labour income and capital income, is allocated to savings and consumption using exogenous shares calculated from the household survey data for each country.[8] Labour income is defined as wages and salaries. Capital income is profit from household investments and the income received from land and natural resources. Households receive fixed proportions of sectoral capital income based on their initial supply of capital services. Labour income is determined by the household supply of labour in each industry and the corresponding wage rates. It is expected that the household composition of sectoral labour income would change as labour moves between industries in response to trade liberalization. The structure of the regional household activities in SAMGEM is illustrated in figure 1.[9]

Household consumption demand is determined using a linear expenditure system function. This is one of the key differences between the GTAP model and SAMGEM. The household consumption equations in SAMGEM follow the ORANI-G multi-household framework (Centre of Policy Studies, 2004), whereas consumption in the GTAP model is determined using a constant difference elasticity function. The optimum allocation among the consumption of commodities by households is determined by maximizing the Stone-Geary utility function or linear expenditure

[8] 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.

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

Figure 1. 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.

system function subject to the budget constraint (that is, disposable income spent on consumption).[10]

Regional governments intervene in their own markets by imposing taxes and subsidies. The revenue received from taxes, tariffs and transfers from households are allocated among consumption and government savings. Eight types of taxes and subsidies were specified in each country model: tariffs; export duties; production

[10] The linear expenditure system, introduced by Stone (1954), incorporates subsistence consumption and is therefore more appropriate for issues related to income distribution and poverty. See R. Stone, "Linear expenditure systems and demand analysis: an application to the pattern of British demand", *Economic Journal,* vol. 64, No. 255, pp. 511-527 (1954).

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.

Policy simulations and model closure

The two policy simulations described below are analysed in both short-run and long-run frameworks. The model distinguishes four factors of production: land; capital; skilled labour; and unskilled labour. The factors are considered to be perfectly mobile across sectors. Labour and land are immobile across international borders, while capital is traded internationally up to the point of real return equalization.

In the short run, real wages are held constant with employment adjusting in each industry. The capital stock in each country is also held constant, with rates of return to capital adjusting endogenously. Furthermore, the trade balance is fixed, with real consumption, investment and government spending moving together to accommodate it (Horridge, 2000).

In the long run, the capital stock in each country is allowed to vary while the labour supply remains constant. This allows for capital adjustment over time with economies operating at their natural rates of unemployment. Hence, the price of labour can vary while the price of capital remains fixed. The supply of land is assumed to be fixed in both the short run and long run, while the rental rate varies according to the corresponding demand. In the long run, the trade balance, real consumption, government consumption and investment are all endogenous. Since the model can only be solved for (n-1) prices, one price is set exogenously and all other prices are evaluated relative to this numéraire (Brockmeier, 2001). Accordingly, as in the standard GTAP model, the global average return to primary factors is specified as the numéraire in the model.

Simulation 1: South Asia forms a free trade area (SAFTA-1)

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

Simulation 2: Agricultural sector protection (SAFTA-2)

This second simulation models the implementation of SAFTA with agricultural sector most-favoured-nation applied tariffs maintained (as in table 2). Existing tariff barriers with the rest of the world are also maintained.

IV. SIMULATION RESULTS

The results of the two trade liberalization scenarios for the South Asian economies are discussed in terms of the estimated short-run and long-run impacts on GDP, employment, trade, household income, government revenue and economic welfare. The preferable policy outcomes are determined on the basis of equivalent variation.

Macroeconomic impacts

The short-run and long-run macroeconomic implications of the two trade liberalization scenarios in South Asia are presented in table 6. Several important points emerge from these projections. Under both policies, there are short-run and long-run increases in real GDP in all of the South Asian economies. Noticeably, the real GDP gains are higher with full trade liberalization (SAFTA-1). For India, Pakistan and Sri Lanka, the long-run gains are greater than the short-run gains, while the opposite is true for Bangladesh and for the "rest of South Asia" grouping.

The changes in real GDP can be analysed from either the expenditure (demand) side or the income (supply) side. In terms of expenditure, real GDP consists of real household consumption, real investment, real government expenditure and the net trade volume. The income side is composed of tax payments and total payments to factors of production. In the short run, the level of capital stock, technology and real wages remain unaffected by the policy shocks. However, aggregate employment varies, as it is endogenous in the model.

In the long run, economic activity increases significantly in all of the South Asian economies, especially in the larger economies in the subregion, as overall price levels fall as a result of tariff cuts. On the income side, real wages adjust as economies are operating at their natural rates of unemployment. As long-run capital expansion occurs, the substitution of capital for labour is possible with real returns on capital remaining fixed.

The results indicate that employment increases in all the South Asian economies, particularly in the unskilled labour sector, when tariffs on all products are eliminated among those economies. Furthermore, the removal of quantitative restrictions encourages a shift of resources from the production of import-substitution products to the production of export-oriented goods. With the South Asian countries tending to specialize in agricultural and labour-intensive manufacturing products, an increased demand for labour is likely to occur in such industries as rice (paddy and processed), wheat, cereal and grains, vegetables and fruits, textiles, wearing apparel, leather and wood products. Approximately 55 per cent of South Asia's labour force is

Table 6. Macroeconomic performance under SAFTA-1 and SAFTA-2

(Percentage)

Macroeconomic variable	India (IND)		Pakistan (PAK)		Sri Lanka (LKA)		Bangladesh (BGD)		Rest of South Asia (XSA)	
	Short run	Long run	Short run	Long run	Short run	Long run	Short run	Long run	Short run	Long run
SAFTA -1										
Change in real GDP	0.108	0.115	0.171	0.194	0.994	1.611	0.979	0.725	2.930	2.019
Change in terms of trade	0.263	0.275	0.186	0.165	0.167	-0.324	-1.115	-1.062	-0.703	-0.179
Change in volume of exports	0.989	0.964	1.694	1.821	5.698	8.551	8.151	7.718	10.842	8.768
Change in volume of imports	1.027	1.016	1.151	1.215	4.499	6.313	5.737	5.427	5.173	4.381
Change in per capita utility	0.249	0.255	0.294	0.354	0.055	0.154	0.505	0.187	3.035	1.879
Change in employment – unskilled	0.170	–	0.223	–	2.456	–	1.424	–	5.027	–
Change in employment – skilled	0.132	–	0.161	–	3.022	–	1.241	–	3.890	–
Change in capital	–	0.293	–	0.519	–	8.282	–	2.113	–	3.412
SAFTA -2										
Change in real GDP	0.106	0.111	0.133	0.156	0.632	1.004	0.485	0.396	1.802	1.495
Change in terms of trade	0.176	0.178	0.101	0.082	0.343	0.044	-0.687	-0.674	-0.823	-0.600
Change in volume of exports	0.728	0.737	0.771	0.893	3.494	5.241	4.895	4.754	6.605	5.863
Change in volume of imports	0.741	0.750	0.533	0.596	2.944	4.055	3.431	3.326	2.948	2.684
Change in per capita utility	0.092	0.124	0.130	0.184	0.031	0.042	0.384	0.276	1.696	1.202
Change in employment – unskilled	0.169	–	0.167	–	1.654	–	0.587	–	2.754	–
Change in employment – skilled	0.129	–	0.166	–	1.980	–	0.481	–	2.459	–
Change in capital	–	0.366	–	0.438	–	5.290	–	0.923	–	2.412

employed in the agricultural sector (World Bank, 2010); thus, the liberalization of the agricultural sector is potentially an important policy consideration for reducing unemployment in the subregion.[11]

India, Pakistan and Sri Lanka benefit from terms of trade improvements under both policy scenarios in the short run. However, there is a noticeable deterioration in Sri Lanka's terms of trade in the long run under SAFTA-1, which is due to a reduction in export prices relative to import prices.[12] This suggests that long-run trade liberalization would see Sri Lanka losing international export competitiveness against the larger economies in the subregion, such as India and Pakistan, which trade in similar products.[13] However, with agricultural tariffs maintained, Sri Lanka benefits from long-run terms of trade improvement due to a reduction in agricultural imports from the other South Asian countries.

Sectoral trade impacts

The percentage changes in sectoral exports and imports of the principal traded commodities are listed in tables 7 and 8. Without internal trade impediments (SAFTA-1), there are positive adjustments in most traded commodity groups in all countries. As expected, the proportionate changes are greater in magnitude for agricultural products than for manufactured goods, given the proportionately higher agricultural tariff rates prevailing prior to trade liberalization (see table 3). Consistent with expectations, there are also noticeable increases in exports and imports of agricultural commodities of relative importance to each economy. For example, paddy rice is one of India's main agricultural export commodities (Bank of India, 2010) and it is an important food import for both Bangladesh and Sri Lanka (Central Bank of Bangladesh, 2010; Central Bank of Sri Lanka, 2011). Indian paddy rice exports are estimated to increase by more than 10 per cent, with import increases of 50 per cent plus projected for Bangladesh and Sri Lanka.

The smaller South Asian economies are more dependent on the agricultural sector in comparison with the larger economies in the subregion. The inclusion of the agricultural sector in tariff elimination is particularly advantageous for such export industries as vegetables and fruits, oilseeds and vegetable oils, and milk and other dairy products in countries such as Bangladesh and Sri Lanka.

[11] Employment impacts on informal labour markets are not considered in this study.

[12] A decomposition of the terms of trade effects is available from the authors upon request.

[13] These products include textiles and wearing apparel.

The contracting parties to SAFTA currently maintain the most-favoured-nation tariff rates for their sensitive-item lists, which contain mostly agricultural products. Keeping these tariffs intact greatly inhibits intraregional trade, as indicated in the lower half of tables 7 and 8 (SAFTA-2).

Household income impacts

As discussed in section III, private households in the South Asian countries are grouped according to per capita income. Total factor income is distributed among the different household groups based on the shares calculated from the household survey data for each country. The total factor incomes of the household groups differ depending on the degrees of factor ownership.

Tariff cuts typically reduce the domestic price of imported manufactured goods that are used as inputs, as well as reduce the prices of imported consumer goods. Therefore, tariff elimination may lead to an increase in competition in the domestic market and create greater incentives to reduce costs and to increase efficiency. This may lead to a fall in the consumer price index and an increase in real factor returns. However, a change in nominal household income depends on both the changes in factor employment and their respective nominal returns. It is expected that, in the short run, with real wages held fixed, a reduction in the consumer price index would lead to a corresponding decrease in nominal wages. Hence, the impact on skilled and unskilled labour income depends on the net effect of changes in nominal wages and total employment, whereas capital income in the short run depends on the change in nominal returns to the rental rate based on the demand for capital in each industry.

In the long run, the supply of labour is exogenous. Therefore, nominal wages determine the demand for labour in each industry and hence determine skilled and unskilled labour income. Conversely, the stock of capital is endogenous in the long run, and nominal rental rate decreases are necessary to maintain a fixed real-capital rental rate when reductions occur in the consumer price index. For this reason, income accruing to capital owners depends on the net effects of changes in nominal rental returns and capital stock. Nevertheless, expectations are that total household income will increase in the long run due to the better utilization of resources. With full employment, capital and labour can move from less efficient sectors to more efficient sectors, thereby increasing the efficiency of factor allocations.

The resulting percentage changes in labour income (both skilled and unskilled), capital income and rental income on land (including income from natural resources) for households located in different geographical areas in the South Asian countries are presented in annex figures A.1 to A.5. It is worth noting that all sources of household income increase in India and Pakistan under both trade policy options in

Table 7. Percentage change in exports under SAFTA-1 and SAFTA-2

Commodity	Short run (percentage change)					Long run (percentage change)				
	India	Pakistan	Sri Lanka	Bangladesh	XSA	India	Pakistan	Sri Lanka	Bangladesh	XSA
SAFTA-1										
Paddy and processed rice	11.43	1.33	2.63	4.49	1.23	11.21	1.37	2.42	5.21	-2.92
Wheat, cereal and grains	1.32	8.98	1.83	117.58	7.42	1.45	9.03	2.42	117.76	1.01
Vegetables and fruits	4.79	17.98	23.31	6.36	68.27	4.70	17.84	22.77	6.33	63.38
Oilseeds and vegetable oils	2.10	-0.27	117.03	120.58	100.48	1.95	-0.36	121.50	121.13	98.48
Plant-based fibres and crops	5.44	3.69	11.07	28.83	44.21	5.28	3.24	9.96	28.99	36.22
Sugar	24.81	11.33	4.90	5.67	15.73	24.89	11.43	4.73	4.65	9.91
Dairy products and milk	24.06	34.92	24.51	34.48	9.36	23.85	34.51	28.61	34.40	3.14
Fish	-0.01	-0.61	0.41	1.56	-0.01	-0.05	-0.62	1.91	2.09	-0.71
Meat	-2.19	5.27	41.68	11.79	9.39	-2.42	4.89	45.92	12.01	2.62
Food products necessaries	-0.14	8.46	0.99	3.28	17.07	-0.24	8.18	3.51	4.02	16.82
Beverages and tobacco	7.69	-2.50	2.48	3.64	57.58	7.65	-2.44	5.50	4.08	57.64
Textiles	1.19	2.56	4.64	7.77	12.52	0.96	2.78	9.74	6.99	7.06
Wearing apparel	-1.15	-1.23	-2.58	9.44	12.52	-1.50	-0.98	1.06	9.01	9.10
Metal products	1.50	0.38	86.16	31.70	49.10	1.51	0.09	88.22	30.96	46.60
SAFTA-2										
Paddy and processed rice	2.61	-0.29	-0.60	0.97	2.20	2.37	-0.24	-0.79	1.30	0.14
Wheat, cereal and grains	-14.64	-32.86	-3.74	39.68	-95.55	-14.72	-32.85	-3.43	39.81	-99.15
Vegetables and fruits	-0.16	-4.88	6.49	2.89	2.49	-0.34	-4.98	6.13	2.88	-0.29
Oilseeds and vegetable oils	-4.78	-52.46	-7.20	73.28	-20.73	-5.06	-52.49	-4.33	73.57	-21.48
Plant-based fibres and crops	-6.45	-14.75	1.41	-26.47	-72.93	-6.77	-15.08	0.66	-26.34	-77.44
Sugar	5.01	-27.26	-24.68	0.02	3.58	4.92	-27.15	-24.81	-0.39	0.38

Table 7. *(continued)*

Commodity	Short run (percentage change)					Long run (percentage change)				
	India	Pakistan	Sri Lanka	Bangladesh	XSA	India	Pakistan	Sri Lanka	Bangladesh	XSA
					SAFTA-2					
Dairy products and milk	7.88	-20.44	-44.62	-4.70	-114.75	7.74	-20.68	-42.01	-4.66	-118.07
Fish	-0.40	-0.21	-0.59	-21.36	0.61	-0.46	-0.21	0.36	-21.09	0.28
Meat	-1.89	-4.59	-12.04	-7.08	-23.66	-2.28	-4.88	-9.39	-6.98	-27.40
Food products necessaries	-1.05	-4.61	-4.35	-1.47	-10.50	-1.12	-4.80	-2.78	-1.15	-10.33
Beverages and tobacco	7.88	-2.25	1.96	2.92	56.61	7.88	-2.19	3.87	3.14	57.18
Textiles	1.78	2.82	4.38	4.29	12.06	1.54	3.01	7.54	4.00	9.46
Wearing apparel	-0.57	-0.64	-2.68	7.22	12.41	-0.87	-0.40	-0.43	7.07	11.00
Metal products	1.84	0.67	86.08	30.00	49.38	1.97	0.56	87.33	29.75	48.42

Note: XSA – rest of South Asia (Bhutan, Maldives and Nepal).

Table 8. Percentage change in imports under SAFTA-1 and SAFTA-2

Commodity	Short run (percentage change)					Long run (percentage change)				
	India	Pakistan	Sri Lanka	Bangladesh	XSA	India	Pakistan	Sri Lanka	Bangladesh	XSA
SAFTA-1										
Paddy and processed rice	1.83	21.55	70.61	55.95	0.12	1.92	21.51	70.79	55.39	0.25
Wheat, cereal and grains	1.34	1.10	1.22	3.21	3.21	1.21	1.27	4.65	3.18	5.21
Vegetables and fruits	4.46	4.00	15.81	11.17	1.98	4.43	3.98	16.16	11.11	2.17
Oilseeds and vegetable oils	2.91	2.32	4.81	3.90	4.42	3.01	2.63	7.12	3.50	4.41
Plant-based fibres and crops	8.73	4.76	16.26	3.93	5.36	8.58	5.00	17.36	3.39	6.27
Sugar	8.15	2.84	0.43	-0.24	-0.05	8.21	2.85	1.37	0.10	0.30
Dairy products and milk	1.69	2.54	0.27	14.56	5.24	1.68	2.78	-0.28	14.17	5.36
Fish	2.36	1.23	1.41	22.08	1.89	2.53	1.41	0.57	21.88	1.85
Meat	1.88	1.35	-0.30	-1.27	3.25	1.93	1.53	-1.56	-1.48	3.72
Food products necessaries	4.53	4.76	1.33	4.57	3.57	4.58	6.01	1.17	4.02	3.22
Beverages and tobacco	4.03	0.72	1.87	5.82	-2.94	4.06	0.75	0.64	5.28	-2.98
Textiles	2.65	1.88	-1.20	10.75	6.60	2.63	1.92	1.74	10.67	6.55
Wearing apparel	5.23	0.95	6.49	16.87	-0.23	5.12	0.91	5.55	16.95	-0.24
Metal products	0.85	0.96	14.36	4.47	11.05	0.79	1.04	14.99	4.19	9.32
SAFTA-2										
Paddy and processed rice	-4.10	-17.36	22.56	12.50	-5.03	-3.92	-17.43	22.66	12.17	-4.97
Wheat, cereal and grains	-6.88	-0.15	-3.07	-8.75	-12.30	-6.85	-0.01	-1.00	-8.76	-11.05
Vegetables and fruits	0.35	0.16	2.57	0.89	-1.51	0.44	0.19	2.79	0.85	-1.38
Oilseeds and vegetable oils	0.37	-0.64	-3.40	0.55	-10.46	0.56	-0.37	-2.03	0.45	-10.47
Plant-based fibres and crops	-6.21	-1.76	-0.87	-1.52	-4.10	-6.14	-1.55	-0.19	-1.71	-3.52
Sugar	-9.27	0.88	-1.14	-0.11	-8.16	-9.09	0.89	-0.55	0.05	-7.94

Table 8. ***(continued)***

Commodity	Short run (percentage change)					Long run (percentage change)				
	India	Pakistan	Sri Lanka	Bangladesh	XSA	India	Pakistan	Sri Lanka	Bangladesh	XSA
					SAFTA-2					
Dairy products and milk	-3.11	0.71	0.62	7.56	-0.72	-3.00	0.90	0.27	7.44	-0.53
Fish	-24.53	0.07	-1.97	9.32	-0.64	-24.28	0.23	-2.51	9.26	-0.62
Meat	-1.21	0.10	0.54	-0.53	-2.57	-1.00	0.25	-0.24	-0.60	-2.25
Food products necessaries	-0.73	1.47	-2.45	1.76	-0.58	-0.66	2.56	-2.55	1.55	-0.75
Beverages and tobacco	3.38	0.46	2.07	4.20	-2.96	3.76	0.48	1.29	4.08	-2.98
Textiles	2.24	1.86	-1.28	10.27	6.49	2.38	1.89	0.53	10.25	6.53
Wearing apparel	3.69	0.74	6.49	17.22	-0.28	4.35	0.71	5.90	17.26	-0.29
Metal products	0.95	0.77	14.27	4.34	8.55	0.89	0.85	14.65	4.23	7.97

Note: XSA – rest of South Asia (Bhutan, Maldives and Nepal).

the short run and in the long run. Most of the other South Asian countries import agricultural goods from India and Pakistan so it is not surprising that the gains to rural landholders in India and Pakistan are greater when tariffs are eliminated on agricultural commodities. The main gains in rural sector income are from land and from unskilled labour, but the gains are much smaller under SAFTA-2, when levels of agricultural protection are maintained. Urban household gains occur from increases in skilled labour and capital income, which mainly result from an increased demand for labour-intensive manufacturing goods.

Conversely, landowners in Bangladesh and Sri Lanka lose under free intraregional trade, as imported agricultural product prices fall. In Bangladesh, there are positive income gains to landholders if agricultural tariffs remain in place, as imports of agricultural goods from neighbouring trading partners are restricted. In aggregate, household incomes in the smaller economies (the "rest of South Asia" grouping) are significantly higher when all tariffs are abolished, as the agricultural sectors constitute a major part of GDP in these economies. A key outcome among household groups in all the South Asian economies is that long-run trade liberalization would lead to reductions in income disparities due to increased efficiencies in the utilization of factor inputs. In Sri Lanka, there is little benefit to rural unskilled workers who are engaged in the agricultural sector. The poor estate-sector household groups are also vulnerable to liberalization, as they are heavily dependent on the agricultural sector. Unskilled labour income in Sri Lanka's urban sector increases, which is most likely a migration response as unskilled workers move from rural to urban areas to gain employment.

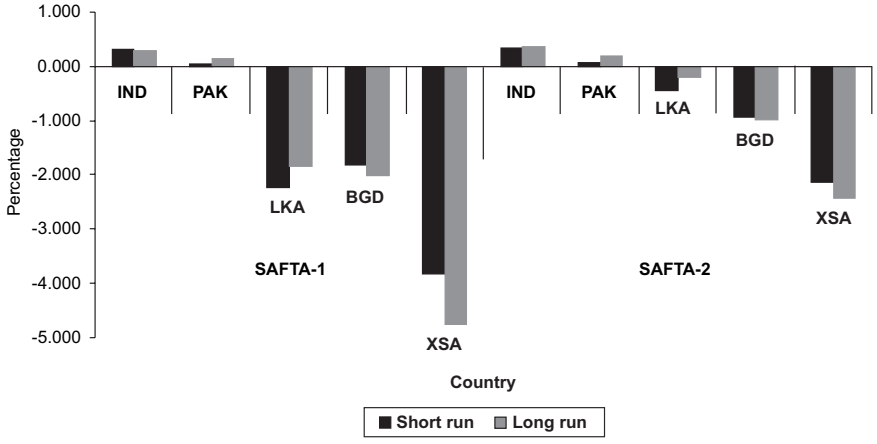
Government revenue impacts

The percentage changes in total government revenues for the South Asian economies under each trade option are illustrated in figure 2. Excluding India and Pakistan, the elimination of all import tariffs would reduce government revenues in all of the South Asian economies. As expected, the magnitudes of the reductions are smaller with agricultural protection status quo. The marginal increases in total government revenues in India and Pakistan are most likely attributable to the significant volumes of trade in which both economies engage with countries outside the subregion.

Welfare impacts

Equivalent variation is used to assess the welfare implications of each policy option. Equivalent variation is an absolute monetary measure of welfare improvement in terms of income that results from a fall in import prices when tariffs are reduced or eliminated.

Figure 2. Percentage change in government revenue under SAFTA-1 and SAFTA-2



Note: BGD – Bangladesh; IND – India; PAK – Pakistan; LKA – Sri Lanka; XSA – rest of South Asia (Bhutan, Maldives and Nepal).

The overall welfare measures and their proportions of total regional income (household income and government revenues) are listed in table 9. In absolute terms, the gains to India are significant under both trade liberalization scenarios. These findings are not dissimilar from the conclusions of Bandara and Yu (2003), who found that the potential absolute gains to India from SAFTA were considerable. However, as depicted in table 9, in relative terms the smaller economies (namely Bangladesh and the countries in the "rest of South Asia" grouping) benefit more than the larger economies under the same trade policy options. For instance, under SAFTA-1, real GDP gains in India and in the "rest of South Asia" grouping are 0.24 per cent and 2.78 per cent, respectively. This result stems from the smaller economies having higher overall pre-liberalization levels of protection in comparison with those in India, Pakistan and Sri Lanka (see table 2).

It is also evident that the gains to all the South Asian countries are higher under SAFTA-1 than they are under SAFTA-2. For the smaller economies, the short-run gains outweigh the long-run gains under both policy options; this is consistent with the percentage changes in real GDP in these countries (see table 6). The smaller economies, which have less supply capacity than the larger economies, are subjected to the long-run competitive pressures exerted by their larger regional and global trading partners. The gains for Sri Lanka are quite small compared with those for the other countries as a result of reductions in household income (landowners), especially in the rural sector.

Table 9. Projected equivalent variations under SAFTA-1 and SAFTA-2

Country/region/area	SAFTA-1				SAFTA-2			
	Short run		Long run		Short run		Long run	
	Millions of United States dollars	Percentage of regional income	Millions of United States dollars	Percentage of regional income	Millions of United States dollars	Percentage of regional income	Millions of United States dollars	Percentage of regional income
India	1 457.8	0.24	1 521.7	0.25	537.2	0.09	725.4	0.12
Pakistan	255.8	0.27	307.6	0.32	112.7	0.12	159.6	0.17
Sri Lanka	12.0	0.06	29.7	0.15	5.9	0.03	8.2	0.04
Bangladesh	256.6	0.46	95.1	0.17	194.9	0.35	140.1	0.25
Rest of South Asia	386.6	2.78	239.4	1.72	216.1	1.55	153.2	1.10
United States of America	-187.2	0.00	-38.2	0.00	-232.7	0.00	-59.8	0.00
Canada	-12.3	0.00	-1.4	0.00	-13.4	0.00	0.2	0.00
European Union	-276.1	0.00	-120.7	0.00	-315.0	0.00	-194.3	0.00
ASEAN-6	-87.5	-0.01	-54.1	-0.01	-64.9	-0.01	-70.3	-0.01
High-income Asia	-89.7	-0.01	-61.4	-0.01	-97.6	-0.01	-72.4	-0.01
Japan	-150.5	0.00	-53.3	0.00	-166.3	0.00	-69.9	0.00
China	-116.3	-0.01	-84.6	-0.01	-118.8	-0.01	-93.4	-0.01
Rest of Middle East	-67.9	-0.01	-72.0	-0.01	-45.7	-0.01	-58.8	-0.01
Australia and New Zealand	-32.2	0.00	-12.7	0.00	-11.0	0.00	-5.7	0.00
Russian Federation and rest of former Union of Soviet Socialist Republics	-3.3	0.00	10.4	0.00	3.4	0.00	-5.3	0.00
Rest of world	-163.7	0.00	-63.8	0.00	-101.1	0.00	-78.0	0.00

Notes: ASEAN-6 – Indonesia, Malaysia, Philippines, Thailand, Singapore and Viet Nam.

High-income Asia – Hong Kong, China; Republic of Korea; and Taiwan Province of China.

Rest of former Union of Soviet Socialist Republics – Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Ukraine and Uzbekistan.

Rest of Middle East – Bahrain, Iraq, Islamic Republic of Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates and Yemen.

Rest of South Asia – Bhutan, Maldives and Nepal.

In relative terms, the short-run and long-run welfare differences are not huge. There are a few reasons for this. The first reason is the low level of intraregional trade among the South Asian countries. Industrial countries continue to assume a major share of the subregion's trade, while developing countries outside South Asia have been the second-most important group (IMF, 2009). As noted in section I, this is a serious impediment to cooperation and economic integration in the subregion, and it underpins the importance of identifying and implementing appropriate policy measures to improve intraregional trade among SAARC members. Numerous countries have also entered into bilateral trade agreements with deeper commitments that further restrict intraregional trade. India's bilateral agreements with Afghanistan, Bhutan, Nepal and Sri Lanka, and Pakistan's agreements with Afghanistan and Sri Lanka are worthy of mention in this context. Second, the calculated welfare measures reflect only the changes in formal employment, as data on informal labour are not readily available. Reddy (2013) noted that South Asia would be one of the subregions that would witnesses a very fast growth in the size of its labour force and that the majority of agricultural labour was found in the unorganized sector. Therefore, the liberalization of the agricultural sector in particular is a key element in attempting to reduce the wedge between the formal and informal labour sectors. Third, the static nature of the model means that dynamic adjustments from the short run to the long run are not fully captured in terms of capital and labour force growth.

V. CONCLUDING REMARKS

In summary, the two trade policies analysed in this paper would facilitate economic growth in all of the South Asian countries. However, the potential gains are considerably smaller with zero tariff exemptions for agricultural products. There are likely long-run welfare gains for all of the South Asian countries, although for Bangladesh and the countries in the "rest of South Asia" grouping, the short-run gains outweigh the long-run gains. The results indicate that employment would increase in all the South Asian countries under both policy options, although the rate of increase would be greater under SAFTA-1.

Industry level results indicate that the South Asian countries can foster trade among SAFTA contracting parties by eliminating tariffs, particularly in the agricultural sector. This would lead to substantial increases in exports of such agricultural products as paddy rice and processed rice; wheat, cereals and other grains; and vegetables and oilseeds, particularly in India and Pakistan, and to significant increases in imports of agricultural goods in the smaller economies (Bangladesh, Sri Lanka and the "rest of South Asia" grouping). Thus, it seems pertinent that the contracting parties revise their sensitive-item lists. The removal of both tariffs and non-tariff barriers in the agricultural sector should expedite the development of intraregional trade.

The findings from this study also reveal that all sources of household income would increase in India and Pakistan under both trade policy options. Therefore, the initiation of appropriate policies to more productively utilize agricultural land and the large labour endowments in both countries would further augment the production and exports of agricultural commodities.

However, landowners in Bangladesh are worse off with uniform tariff elimination, and in Sri Lanka there are negative impacts on income from land under both policy options. That being the case, the Governments of these economies may also need to consider policies to increase productivity in the agricultural sector, as a large percentage of the poor are dependent on this sector for their livelihood. Governments could introduce compensation policies as a temporary measure to smooth consumption in the most vulnerable households to enable them to adjust to interim employment or income losses. Nevertheless, this is a short-term solution and appropriate long-term policies are needed to enhance competitiveness in the agricultural sectors. For example, one of the main problems the rural populations in these economies encounter is water scarcity, and most farmers do not have access to sufficient water resources to undertake their agricultural activities (World Bank, 2010). Hence, actions are needed to improve and to expand irrigation and water conservation systems. Moreover, it is essential to improve the investment climate and marketing infrastructure (for example, upgrading rural roads to facilitate easier market access), and to develop services to enhance market efficiency. Rural farmers are mostly dependent on informal financial-sector arrangements and are unfamiliar with formal banking systems. Developing improved agricultural credit facilities and increasing the education of the rural poor are key policies that would help to alleviate poverty in the subregion.

The analyses presented in the present paper are subject to certain qualifications. First, SAMGEM is a comparative static version of the GTAP model and does not capture any of the dynamic effects of trade liberalization. Second, the assumptions of the model do not make allowances for imperfect competition, which may exist in commodity and factor markets. Third, the model does not consider the bilateral free trade agreements that have been negotiated between the member countries of SAARC. Finally, the model's results are based solely on tariff reforms, and non-tariff barriers are assumed to be absent in all policy simulations. As discussed in section I, tackling non-tariff barriers and restrictive rules of origin are important issues that need to be addressed to promote intraregional trade in South Asia. However, incorporating these issues within a single model poses significant challenges because of their diverse and complex nature, and because of the lack of available evidence, particularly on non-tariff barriers. These are considered priority areas for future research.

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ANNEX

Table A.1. SAMGEM aggregation

Country/region/area	Sector
India	Rice (paddy and processed)
Sri Lanka	Wheat, cereal and grains
Pakistan	Vegetables and fruits
Bangladesh	Oilseeds and vegetable oils
Rest of South Asia	Plant-based fibres and crops
United States of America	Sugar
Canada	Dairy products and milk
European Union	Fishing
ASEAN-6	Meat
High-income Asia	Food products necessaries
Japan	Beverages and tobacco products
China	Textiles
Rest of Middle East	Wearing apparel
Australia and New Zealand	Leather, wood products
Russian Federation and rest of former Union of Soviet Socialist Republics	Paper products
Rest of the world	Chemicals, rubber and plastic products
	Metal products
Primary factors	Electronic equipment
Land (including natural resources)	Machinery and equipment
Skilled labour	Manufacturing necessaries
Unskilled labour	Motor vehicles and transport equipment
Capital	Petroleum and coal
	Gas manufactures and distributers
	Tradable services
	Non-tradable services
	Other primary products
	Trade and construction

Table A.1. ***(continued)***

Country/region/area	Sector
	Electricity
	Water and air transport
	Oil and natural resources

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

ASEAN-6 – Indonesia, Malaysia, Philippines, Thailand, Singapore and Viet Nam.

High-income Asia – Hong Kong, China; Republic of Korea; and Taiwan Province of China.

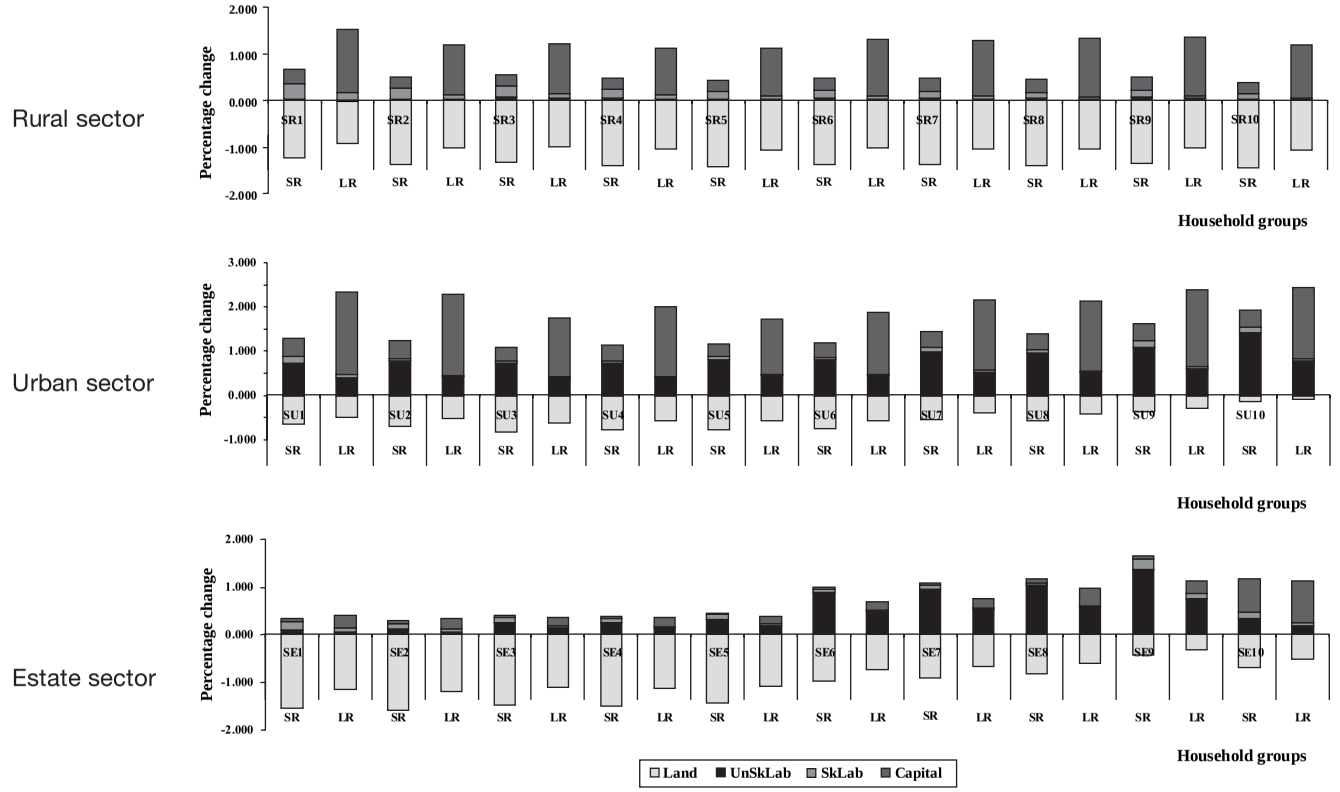
Rest of former Union of Soviet Socialist Republics – Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Ukraine and Uzbekistan.

Rest of Middle East – Bahrain, Iraq, Islamic Republic of Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates and Yemen.

Rest of South Asia – Bhutan, Maldives and Nepal.

Figure A.1. Impact on household income under SAFTA-1 and SAFTA-2: Sri Lanka

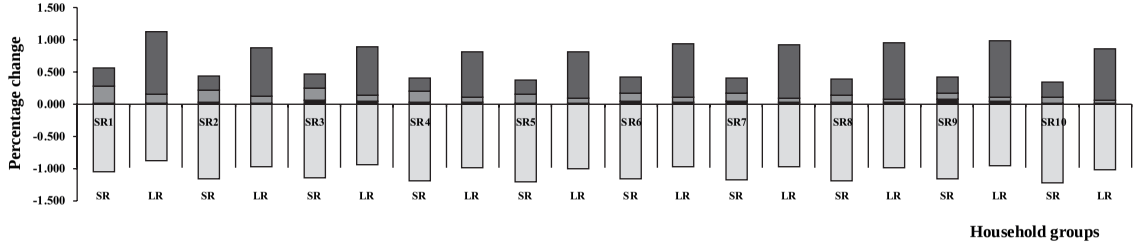
Impact on household income under SAFTA-1



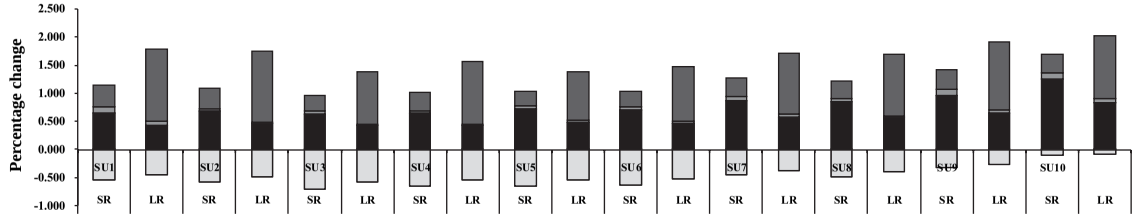
Notes: SR – short run; LR – long run; UnSkLab – unskilled labour; SkLab – skilled labour.
SR1-SR10 – rural household groups; SU1-SU10 – urban household groups; SE1-SE10 – estate sector household groups.

Impact on household income under SAFTA-2

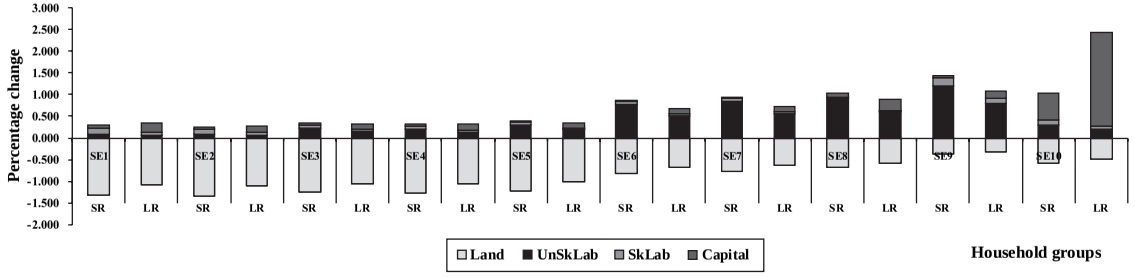
Rural sector



Urban sector



Estate sector

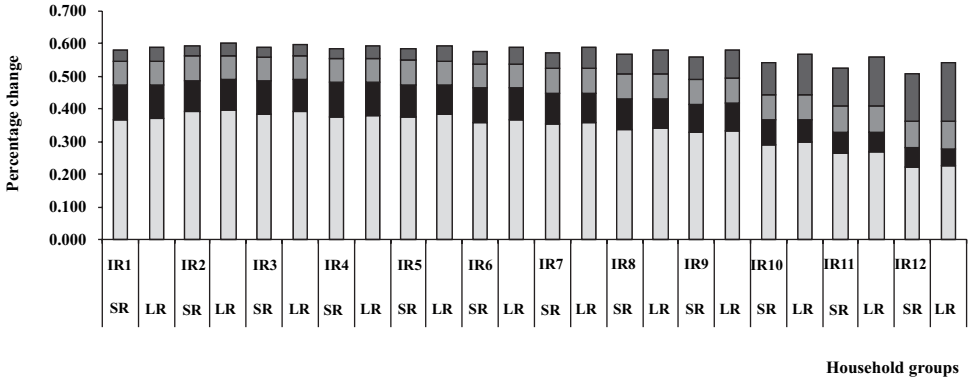


Notes: SR – short run; LR – long run; UnSkLab – unskilled labour; SkLab – skilled labour.
SR1-SR10 – rural household groups; SU1-SU10 – urban household groups; SE1-SE10 – estate sector household groups.

Figure A.2. Impact on household income under SAFTA-1 and SAFTA-2: India

Impact on household income under SAFTA-1

Rural sector



Urban sector

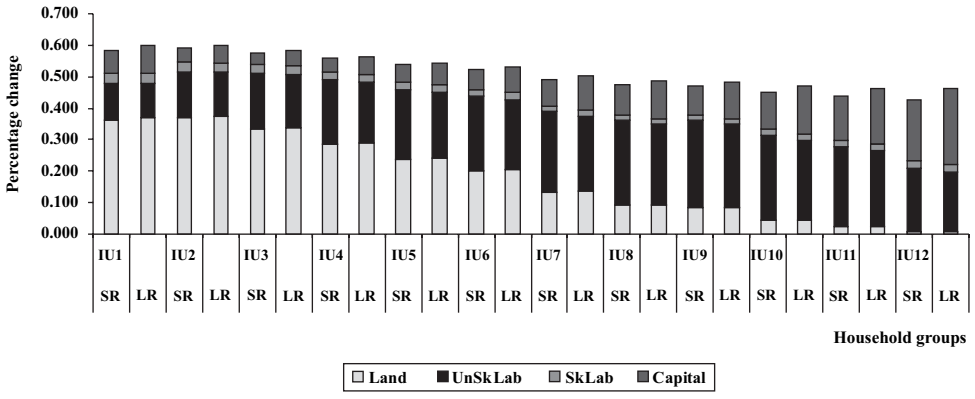
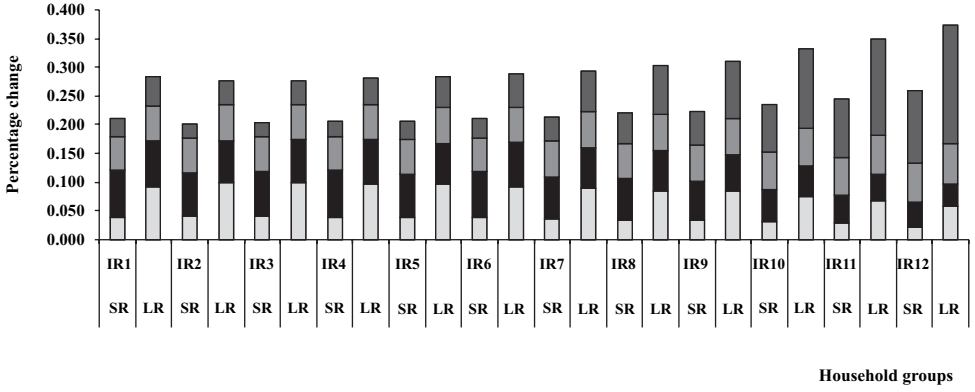


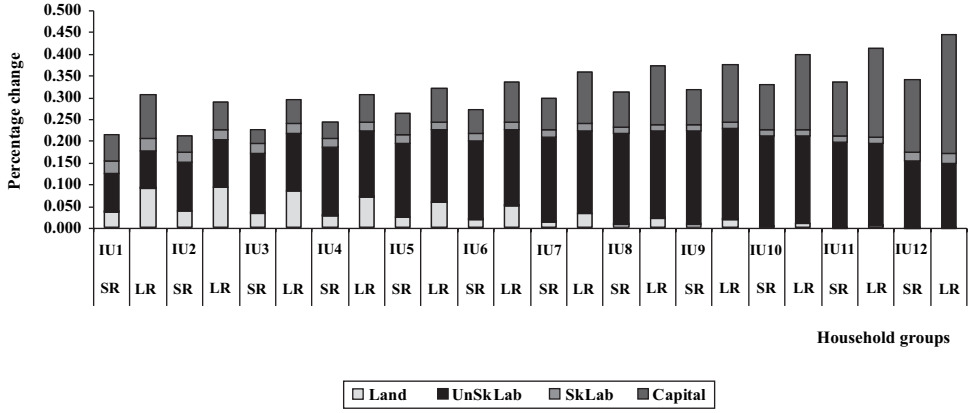
Figure A.2. *(continued)*

Impact on household income under SAFTA-2

Rural sector



Urban sector

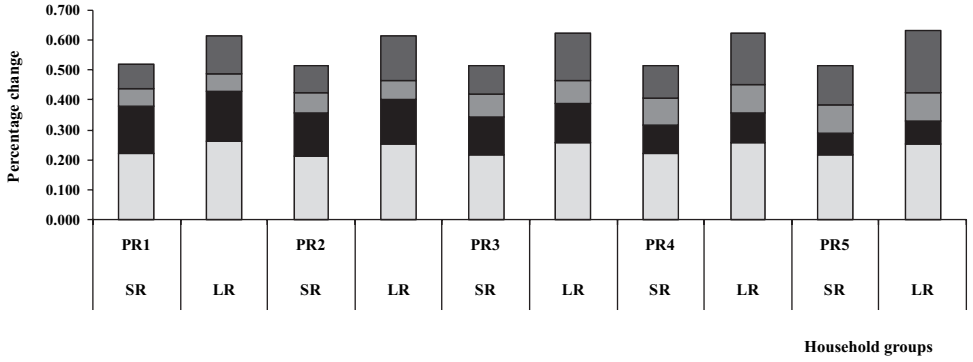


Notes: SR – short run; LR – long run; UnSkLab – unskilled labour; SkLab – skilled labour.
IR1-IR12 – rural household groups; IU1-IU12 – urban household groups.

Figure A.3. Impact on household income under SAFTA-1 and SAFTA-2: Pakistan

Impact on household income under SAFTA-1

Rural sector



Urban sector

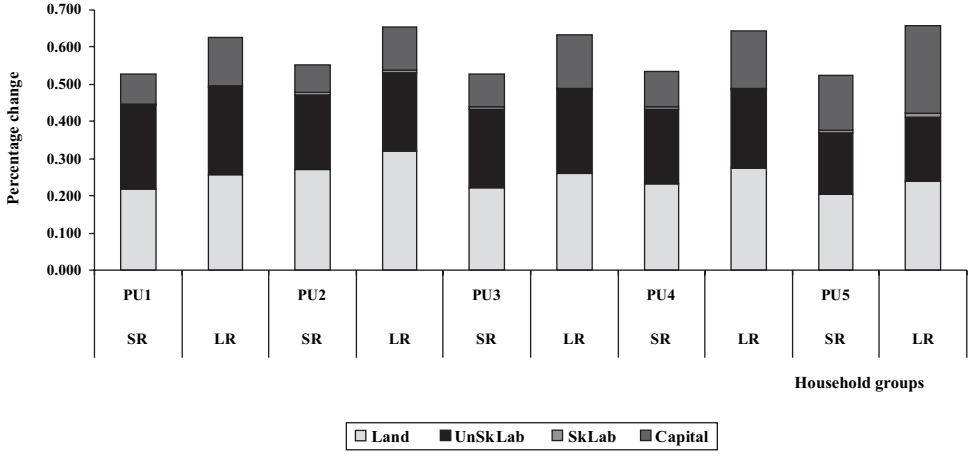
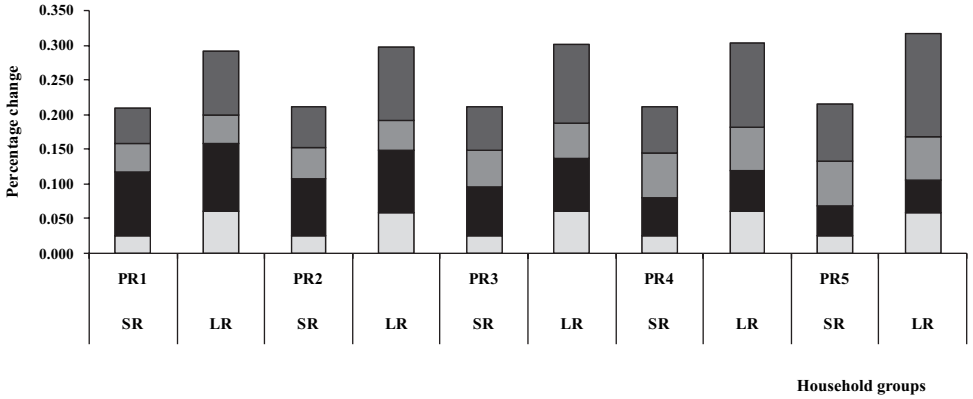


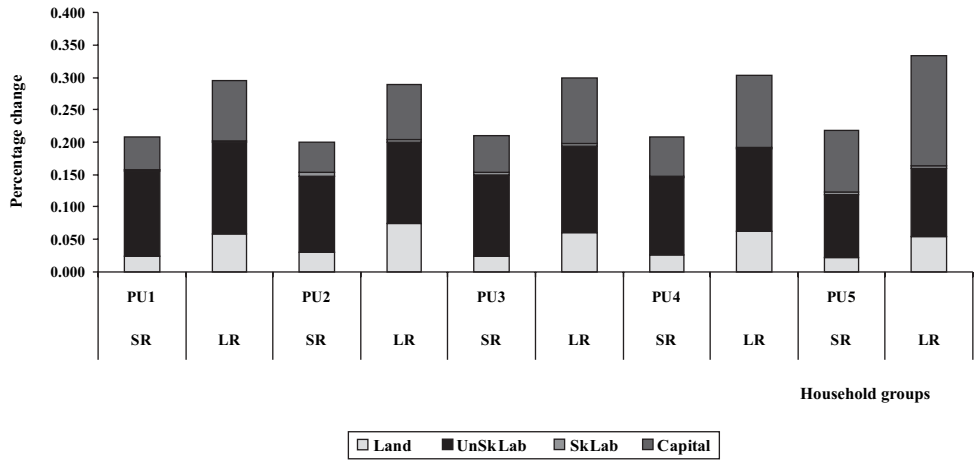
Figure A.3. ***(continued)***

Impact on household income under SAFTA-2

Rural sector



Urban sector

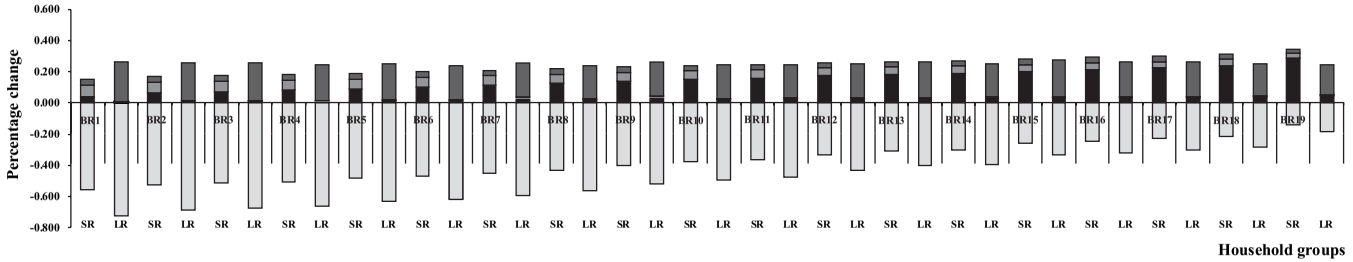


Notes: SR – Short run; LR – Long run; UnSkLab – unskilled labour; SkLab – skilled labour.
PR1-PR5 – rural household groups; PU1-PU5 – urban household groups.

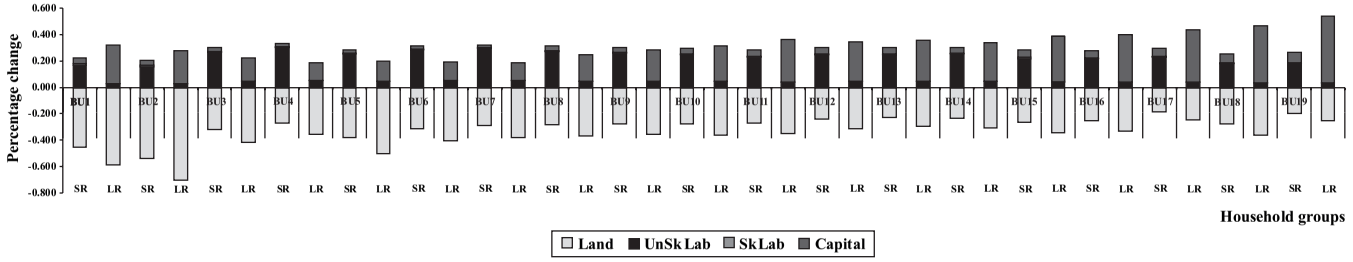
Figure A.4. Impact on household income under SAFTA-1 and SAFTA-2: Bangladesh

Impact on household income under SAFTA-1

Rural sector



Urban sector

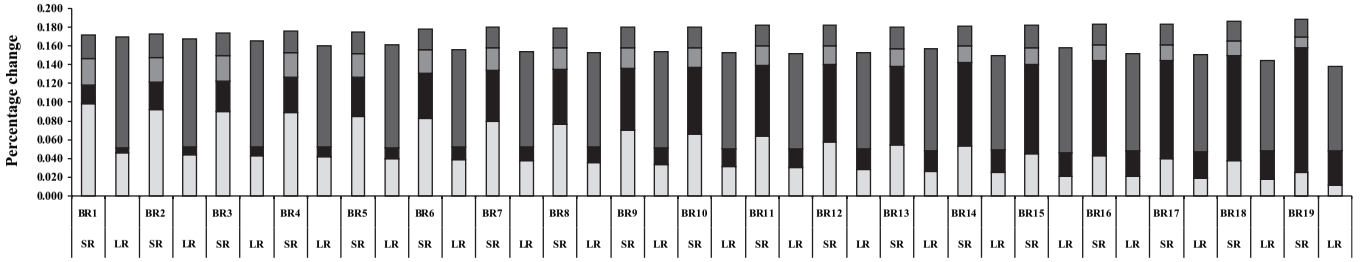


Notes: SR – short run; LR – long run; UnSkLab – unskilled labour; SkLab – skilled labour.
BR1-BR19 – rural household groups; BU1-BU19 – urban household groups.

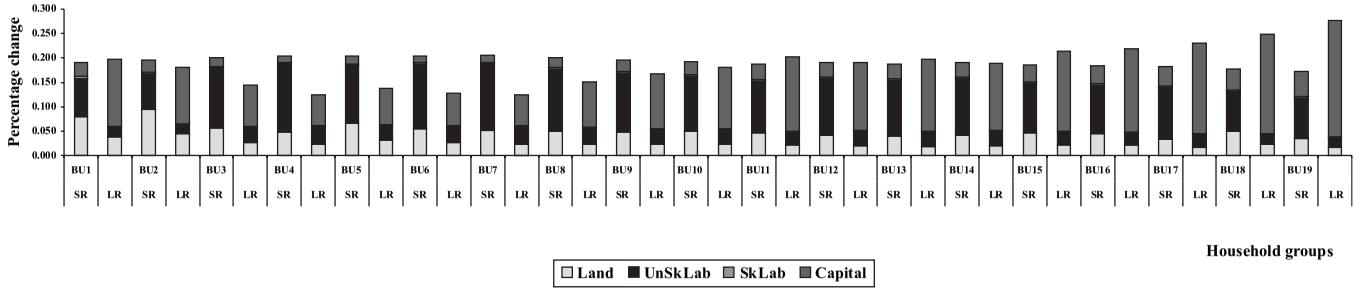
Figure A.4. ***(continued)***

Impact on household income under SAFTA-2

Rural sector

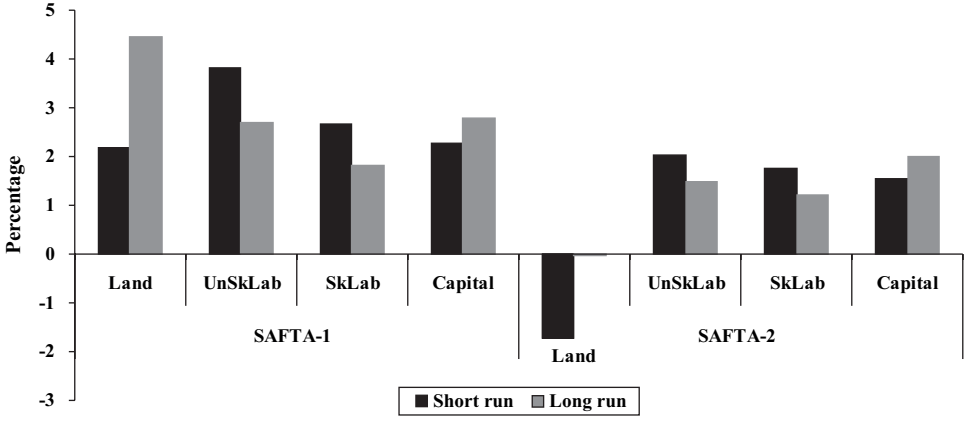


Urban sector



Notes: SR – short run; LR – long run; UnSkLab – unskilled labour; SkLab – skilled labour.
BR1-BR19 – rural household groups; BU1-BU19 – urban household groups.

Figure A.5. Impact on household income under SAFTA-1 and SAFTA-2: Rest of South Asia



Note: UnSkLab – unskilled labour; SkLab – skilled labour.