



PROJECT MUSE®

## Welfare Impacts of Preferential Trade Liberalization in South Asia

Amirul Islam, Ruhul Salim, Harry Bloch

The Journal of Developing Areas, Volume 49, Number 5, 2015 (Special Issue), pp. 285-292 (Article)

Published by Tennessee State University College of Business  
DOI: 10.1353/jda.2015.0070



➔ For additional information about this article  
<http://muse.jhu.edu/journals/jda/summary/v049/49.5.islam.html>

## **WELFARE IMPACTS OF PREFERENTIAL TRADE LIBERALIZATION IN SOUTH ASIA**

*Amirul Islam*

Chittagong University, Bangladesh

*Ruhul Salim*

*Harry Bloch*

Curtin University, Australia

### **ABSTRACT**

Focusing on the global trading relationship aggregated at the level of 15 regions and 10 sectors, we investigate in this paper the welfare effects of preferential trade liberalisation in South Asia from several simulation perspectives. The static version of the Global Trade Analysis Project (GTAP) model shows that countries that are initially more protected (such as India) are likely to capture the lion's share of the gain from the liberalization scheme. Countries that maintain status quo are the losers; prominent among them are the EU 25 and the North America region. However, these results are dramatically changed in the dynamic version of the GTAP model. In terms of deviations from the baseline scenario, the regional integration policy in South Asia turns out to be net welfare reducing for both the region and the rest of the world.

**JEL Classifications:** D58, D60, F15

**Key Words:** Regional Integration, South Asia, Welfare

**Corresponding Author's Email:** amiruli@yahoo.com

### **INTRODUCTION**

The ultimate goal of any trade policy, such as regional integration or preferential trade liberalization, is to enhance the welfare of the participating nations. The formation of a free trade area results in a new tariff structure and a new constellation of prices. Economic agents respond to these by choosing a different bundle of goods and services, which gives rise to welfare changes. Trade integration is a transmission channel through which welfare gains or losses might occur. However, as the pattern of trade and the efficiency of the sources of supply change with the formation of discriminatory trade blocs, the full welfare consequences of such moves may be broader.

Existing studies on the welfare effect of regional integration in South Asia focus primarily on the effect of intra-regional tariff concessions, ignoring the accompanying unilateral tariff liberalization by these countries. It is more practical to allow tariff liberalization to take place on both the unilateral and the preferential fronts while investigating the welfare effects of trade policies. The simulation experiments designed in this paper take into account these types of simultaneous policy changes. Moreover, the parameters of the model are considered here as random realizations from a uniform distribution, which will enable us to evaluate the results in the presence of parameter uncertainty. The results from the static version of the model are also compared with a

recursive dynamic version of the model, where it is shown that the results are substantially changed once dynamics are incorporated in the model.

The rest of the paper is organized as follows. Literatures on the welfare aspect of the regional trade agreement, employing both partial and general equilibrium approaches, are examined in Section 2. A brief overview of the global data base, GTAP, on which the simulation experiments of this paper are built, and the model structure are given in Section 3. Results of the various simulation experiments and their interpretations are in Section 4. An overall assessment of the findings and possible directions for future research are provided in the concluding section.

### **REVIEW OF RELATED LITERATURE**

Depending on the specific research question and the nature of policy experiments, researchers apply both the partial equilibrium and the general equilibrium methods to deal with the welfare aspect of trade policy changes. In examining the welfare effect of unilateral and other forms of regional integration policies in South Asia, Hossain (1997) finds, using a partial equilibrium simulation framework, that the unilateral liberalization is the most welfare improving for all countries, compared to the other forms of liberalization. Though a custom union (CU) produces more welfare changes than that of a free trade area (FTA), political difficulties over sacrificing the freedom of making external policies keeps the South Asian leaders interested only in the FTA. The welfare effects of a proposed bilateral FTA between Bangladesh and India for five selected products are examined in World Bank (2006). Of these five products, only readymade garments are of export interest to Bangladesh and the remaining four products, namely light bulbs, cement, sugar, and bicycle rickshaw tyres are import competing for Bangladesh. In the case of light bulb industry, it is found that competitive market structure produces strong consumer surplus (3.94 million US dollars) and a slightly negative producer surplus (-1.24 million US dollars) in the Bangladesh economy, Light bulb suppliers in India gain but other suppliers that were previously selling inputs to the Bangladesh bulb producers lose. The net welfare gain for the producers in India amounts to 1.06 million US dollars in the long run. The results are intensified as the demand elasticity parameters are raised. The overall welfare gain is reduced when the product market is assumed imperfect and the Indian suppliers collude with the dominant Bangladeshi producers to set the post-FTA price at a higher level.

Siriwardana (2000) analyses the effects of bilateral trade liberalization in South Asia with special emphasis on Sri Lanka. Within the Global Trade Analysis Project (GTAP) framework, the author experiments with bilaterally liberalizing the Sri Lankan economy against three groups of countries – South Asia (SA), ASEAN-4, and the other ASEAN countries. In most of the experiments, the welfare change for Sri Lanka measured in terms of equivalent variation significantly improves, the strongest effects being felt with the SA. Raihan and Razzaque (2007), in a Bangladesh focused study, consider two simulations, one allowing for 100 per cent tariffs cut by all members on the traded commodities and the other adding a simultaneous 50 per cent multilateral tariffs slash by Bangladesh. Their analysis from the first simulation shows that Bangladesh suffers a welfare loss of about -184.1 million US dollars, while all other regions in South

Asia gain, India being the prominent beneficiary of the full liberalization. A large amount of trade diversion from India to Bangladesh, especially in the agricultural and other manufacturing products, replaces efficient alternative supply sources for Bangladesh and gives rise to the welfare loss. However, in simulation two, when Bangladesh liberalizes with the outside regions as well, the welfare loss is eliminated and the net welfare change turns positive.

## **DATA AND METHODOLOGY**

### **Description of the Data base**

The global data base GTAP 8.1 (released in May, 2013) is used here for simulating welfare changes. The data base contains consumption, production, trade flows, support and protection data, and other information on 57 sectors for 134 regions mapped from 244 GTAP countries. These data are for the base year 2007. To keep track of the simulation results and for analytical convenience, the GTAP data base is aggregated into 15 regions and 10 sectors in this study.

### **Methodology**

Like any standard equilibrium analysis, trade policy simulations developed for this paper is based on the following four steps: choosing the model structure, collecting and organizing the relevant benchmark data in a social accounting matrix (SAM) format, choosing or calibrating parameter values of the equations system, and finally changing the policy variables of interest to see how the endogenous variables of the system respond and how do they compare with the base data. The model structure is based on the standard GTAP model, which is publicly available and the equation system solved is described in Hertel and Tsiag (1997). In practice the model contains numerous variables and some of them represent blocs of variables defined over appropriate sets. The variable “tms (i, r, j)”, for example, represent a bloc of  $10 \times 15 \times 15$  or 2250 variables defined over traded commodities and regions. Some variables, such as population defined over regions and equilibrium quantity defined over endowment commodity and regions are treated as exogenous in the model. The rest of the variables that includes among others quantity defined over traded commodities and regions and prices of imports by households, are endogenous. Algebraic modelling language “GEMPACK” is used to solve this system of equations. Once the base model is solved, policy variables, such as tariffs on imported commodities, are changed to carry out counterfactual experiments which yield new sets of values for the endogenous variables in the system. Policy appraisals are then made based on the pairwise comparison between the benchmark and the counterfactual values, or by comparing the functional values based on these two distinct sets of pre- and post-simulation tables (for example, we compare the EVs or the GDPs derived from the benchmark and the counterfactual tables).

**WELFARE EFFECTS UNDER VARIOUS TRADE POLICY SIMULATIONS:  
Welfare Change in the Static GTAP Model**

Three simulations are considered in analysing the welfare effects in this setting. In the first simulation, the SAFTA members are assumed to grant each other a 15 per cent tariff concession in all traded sectors, while maintaining status quo with the other regions. The second set of simulations maintains the 15 per cent regional tariff concession, but now allows unilateral tariffs of each member to fall by 10 per cent individually as part of the respective country's independent liberalization program. This captures the effect of autonomous liberalization policy observed over the past few decades in South Asia. The third simulation is similar to the second one, but instead of unilateral liberalization by a single country, we assume all members to simultaneously reduce their unilateral tariffs in addition to the 15 per cent regional concession.

**TABLE 1. WELFARE EFFECTS OF ALTERNATIVE TRADE  
LIBERALIZATION SCENARIOS**  
(Millions of US Dollars)

Country/ Region	SAFTA tariff cut by 15%	SAFTA cut of 15% plus autonomous cut of 10% by					SAFTA by - 15% & ALL by -10%	
		BD	IN	NE	PK	SL		RS
Oceania	-2.89 (0.02)	-2.81 (0.02)	-2.26 (0.04)	-2.93 (0.02)	-6.02 (0.14)	-3.42 (0.03)	-2.97 (0.02)	-5.93 (0.14)
East Asia	-36.15 (0.89)	-54.85 (0.11)	-214.08 (2.36)	-37.07 (0.90)	-82.87 (1.24)	-51.4 (0.70)	-37.24 (0.94)	-296.68 (0.41)
Southeast Asia	-13.68 (0.02)	-15.65 (0.02)	-51.76 (0.14)	-13.78 (0.02)	-17.42 (0.05)	-15.49 (0.00)	-13.88 (0.02)	-59.56 (0.16)
Bangladesh	3.69 (0.54)	72.66 (0.49)	-7.25 (0.67)	3.67 (0.54)	1.00 (0.56)	3.31 (0.54)	3.64 (0.54)	58.59 (0.04)
India	189.51 (3.20)	190.67 (3.15)	1313.89 (11.26)	189.38 (3.20)	186.8 (3.09)	193.32 (3.2)	189.14 (3.21)	1314.78 (2.23)
Nepal	29.86 (0.10)	29.82 (0.10)	27.26 (0.04)	33.96 (0.15)	29.83 (0.10)	29.85 (0.10)	29.86 (0.10)	31.28 (0.12)
Pakistan	27.95 (0.43)	27.49 (0.44)	17.35 (0.23)	27.93 (0.43)	299.87 (5.56)	27.83 (0.43)	28.18 (0.44)	288.89 (0.23)
Sri Lanka	0.81 (0.11)	0.40 (0.11)	-9.64 (0.41)	0.82 (0.11)	-1.29 (0.16)	67.31 (1.35)	0.83 (0.11)	54.36 (0.12)
Rest of SA	15.02 (0.23)	15.06 (0.24)	15.56 (0.25)	15.02 (0.23)	11.71 (0.03)	14.32 (0.23)	20.13 (0.34)	16.72 (0.04)
North America	-22.1 (1.25)	-46.52 (2.54)	-155.33 (5.67)	-22.81 (1.27)	-77.47 (4.09)	-38.04 (2.24)	-22.85 (1.28)	-252.53 (0.02)
Latin America	-5.94 (0.14)	-7.01 (0.16)	-38.14 (0.75)	-6.08 (0.14)	-15.98 (0.42)	-8.29 (0.16)	-6.16 (0.14)	-51.97 (0.15)
EU_25	-33.75 (0.77)	-47.18 (1.31)	-281.85 (3.85)	-32.15 (0.94)	-92.44 (2.71)	-47.44 (1.38)	-35.15 (0.82)	-367.46 (0.12)
MENA	-2.11 (0.01)	-2.13 (0.02)	-6.66 (0.25)	-2.13 (0.01)	-6.27 (0.09)	-3.57 (0.03)	-2.11 (0.01)	-12.35 (0.27)
SSA	-5.7 (0.03)	-5.78 (0.08)	-20.38 (0.08)	-5.75 (0.04)	-11.55 (0.39)	-6.34 (0.06)	-5.56 (0.05)	-26.85 (0.41)
ROW	-24.21 (0.21)	-25.89 (0.19)	-85.84 (0.00)	-24.52 (0.22)	-53.13 (0.91)	-29.76 (0.61)	-24.24 (0.23)	-122.32 (1.41)

Note: numbers inside the parentheses are the standard errors of the random welfare results. Region Codes: BD – Bangladesh, IN – India, NE – Nepal, PK – Pakistan, SL – Sri Lanka, RS – Rest of South Asia, MENA – Middle East and North Africa, SSA – Sub-Saharan Africa, ROW – rest of the world.

Table 1 shows country and region specific welfare change of tariff reforms in accordance with the simulation experiments described above. The welfare measure is based on equivalent variation and expressed in millions of US dollars in the base year 2007 prices. These welfare-change results are accompanied by the standard errors of the results that arise from the random selection of the parameter values. To be specific, the parameters representing the elasticity of substitution between domestic and imported commodities (ESUBD(i)) are taken as random realization from a uniform distribution with mean equal to the values assumed in the parameter file and variation around these values by  $\pm 10$  per cent. The magnitudes of these standard errors confirm that the sensitivity of the results is not too strong. In most of the cases they are within the 5 per cent bound of the mean values, and hence one can be confident that changing the parameter values will not destabilize the results.

There are both gainers and losers from the policy changes. India tops the list of gainers from the SAFTA liberalization. This is consistent with the expectation, as India has the highest amount of distortion in the base data. The welfare changes are negligible for Sri Lanka and Bangladesh (0.81 million and 3.69 million US dollars respectively). The other South Asian countries enjoy moderate welfare gains. The welfare gain for Nepal, Pakistan and the Rest of South Asia are 29.86 million, 27.95 million, and 15.02 million US dollars respectively. Indian unilateral liberalization has remarkably negative effects on the welfare of Bangladesh and Sri Lanka. These two countries move into the region of welfare loss and suffer -7.25 and -9.64 million US dollars from the unilateral move of India. However, these losses are effectively tackled when they also campaign liberalization unilaterally. The last column of Table 1 shows that their welfare in the latter case improves to 58.59 million and 54.36 million US dollars respectively.

### **Results from the Dynamic GTAP Model**

#### ***Welfare Outcome***

The simulation experiment in the dynamic GTAP model consists of three consecutive batches of runs: the base run, the base re-run, and the policy deviation run. The base case scenario reflect the future state of the economies over the simulation period, and are built on taking inputs from macro-economic forecasts and expected policy environments. For the purpose of this study, the simulations are taken to start from 2007 and proceed for the next five periods, each consisting of five years. The baseline projections are based on Chappuis and Walmsley (2011), where the authors provide long-run macroeconomic projections for the GTAP regions.

The policy deviations are implemented in two phases: a 15 per cent and a 25 per cent additional (compared to the base run) tariff reduction in the traded commodities among the SAFTA members are enforced in the first period (2007 to 2012) and in the second period (2013 to 2017) respectively. Though there is no policy shock after these periods, the effects of the previous policies continue to be felt throughout the future. The results of these experiments on the EV outcome of the SAFTA members are shown in Table 2. The dynamic effects of the tariff reduction scheme are reported as the cumulative differences between the outcomes of the two scenarios: the base run or the control path and the perturbation of that path by the policy deviations.

When these results are compared with the EV results obtained before under the static simulations scenarios in Table 1, the effects of introducing dynamics are found dramatic. In the static case, all of the South Asian countries enjoyed higher welfare under the three alternative tariff liberalization scenarios. Now in the dynamic case, except for India and Nepal, these countries are losers in the long run compared to the base run forecast. For Bangladesh, Pakistan, Sri Lanka, and the rest of South Asia, the welfare losses increase over time. The accumulated welfare loss at the end of the simulation period for these countries stand at 10250 million, 14330 million, 1140 million, and 5771 million US dollars, or 15 per cent, 3.5 per cent, and 48 per cent of the base-year GDPs respectively. Though the welfare of India and Nepal increase over time, the overall welfare of the region as well as of the world as a whole turns out negative.

**TABLE 2. TWO-STAGE TARIFF REDUCTION AND THE DYNAMICS OF WELFARE CHANGE**

*(Millions of US Dollars; Percentages of Base-Year GDP in Parentheses)*

	Cumulative EV Changes				
	2007-12	2013-17	2018-22	2023-27	2029-32
<b>NAFTA</b>	-110 (<-0.001)	-1524 (-0.009)	-8295 (-0.050)	-15290 (-0.093)	-18951 (-0.115)
<b>EU25</b>	65 (<0.001)	1642 (0.010)	-5640 (-0.034)	-15352 (-0.091)	-21318 (-0.127)
<b>ROW</b>	-1037 (-0.005)	-7739 (-0.039)	-23142 (-0.117)	-40161 (-0.204)	-50170 (-0.254)
<b>ASEAN</b>	-185 (-0.014)	-1114 (-0.086)	-2200 (-0.170)	-3369 (-0.260)	-4080 (-0.315)
<b>Bangladesh</b>	-314 (-0.459)	-6457 (-9.438)	-7819 (-11.429)	-9247 (-13.516)	-10250 (-14.982)
<b>India</b>	3183 (0.258)	3334 (0.270)	10013 (0.812)	15913 (1.291)	18424 (1.494)
<b>Nepal</b>	218 (2.120)	636 (6.185)	1894 (18.419)	3823 (37.178)	5128 (49.869)
<b>Pakistan</b>	-110 (-0.077)	-12470 (-8.710)	-13996 (-9.776)	-14323 (-10.004)	-14330 (-10.009)
<b>Sri Lanka</b>	-154 (-0.476)	-2445 (-7.558)	-1876 (-5.799)	-1294 (-4.000)	-1140 (-3.524)
<b>RSA</b>	-195 (-1.623)	-2799 (-23.292)	-3804 (-31.655)	-4989 (-41.516)	-5771 (-48.024)

*Source: Authors' calculation.*

### ***Impact on Functional Distribution of Income***

There are five factors of production in the model and the solution values for the price variables corresponding to these factors give us some idea about the changes in factor earnings over the simulation period. Table 3 shows the cumulative differences in factor prices along the policy path and the baseline scenario. The factor price changes are more

or less in line with the prediction of the Stolper-Samuelson factor price equalization theorem. South Asian countries are labour-abundant and in accordance with the theory wages are expected to rise faster than the capital rentals. Except for Nepal, skilled and unskilled wages rise almost at the same rate within each countries of the region. The accumulated wage gains are higher for the smaller economies, ranging from 120 to 191 per cent, and smaller for India, only around 5 per cent. For Bangladesh and Pakistan, the wage gains are about 12 to 17 per cent, while wage rise moderately in Sri Lanka by 76 per cent.

**TABLE 3. CUMULATIVE DIFFERENCES IN FACTOR PRICE CHANGES BETWEEN THE BASELINE SCENARIO AND THE POLICY PATH**

	Bangladesh	India	Nepal	Pakistan	Sri Lanka	Rest of South Asia
Land	21.02	6.81	157.99	20.84	80.94	168.74
Unskilled Labour	13.98	5.29	132.28	17.00	75.03	120.05
Skilled labour	12.26	4.34	191.03	17.02	76.75	126.31
Capital	-2.16	1.38	47.44	-0.17	6.93	-3.97
Natural Resources	21.73	7.61	260.38	28.47	109.27	334.25

*Note: Figures in the table are differences, at the end of the simulation period, between the percentage changes according to the policy path and the baseline projection.*

## CONCLUSIONS

Alternative scenarios of trade liberalization policies and their potential impact on welfare are examined in this paper from the perspective of the static GTAP framework and its recursive dynamic extension. The results from the static version of the model show that, given the policy stance of the other countries, it is in each individual South Asian country's interest to unilaterally liberalize their economies along with the regional liberalization. The economy implementing unilateral reform substantially improves its welfare and effectively shields itself from the detrimental effect of unilateral trade liberalization policies of the other members.

The dynamic version of the GTAP model shows that, except for India and Nepal, all other South Asian countries lose welfare. From the distributional perspective, the price of labour rises faster than the price of capital in the long run in all member states. Prices of natural resources rise sharply in Nepal and in the rest of the South Asia (i.e., Bhutan and the Maldives) as these countries produce and export natural resource intensive products. Increases in the GDP price indexes, however, cause net welfare loss in some of these countries. Thus the policy implication of this paper is that, as long as the welfare effects of preferential trade liberalization is concerned, the South Asian countries



should pursue alternative unilateral or multi-lateral trade liberalization policies instead of the regional discriminatory trade policy.

The study can be extended or supplemented in several directions in future works. The ten-sector level aggregation considered here may not be sufficient for some practical trade policy problems. Trade policy measures are often taken at finer level of disaggregation, focusing on particular industries. The negotiations of the USA with her trading partners over the voluntary export restraints (VERs), for example, have been centred on the steel industry. A sector-focused general equilibrium model is required to analyse the effect of policy changes in such a situation. Since clothing is an important industry in South Asia, sector-focused CGE models for the South Asian countries can be built to determine the effect of policy shocks or external shocks on this and other related sectors. Highlighting a few related industries at finer levels and relegating others into few broad sectors through flexible aggregation will make the effects on upstream and downstream industries more transparent.

## REFERENCES

Chappuis, T., and T. L. Walmsley, "Projections for World CGE Model Baselines", *GTAP Research Memorandum No. 22*, University of Purdue, West Lafayette, Indiana, 2011.

Hertel, T. W., and M. E. Tsigas, "Structure of GTAP", in T. W. Hertel, ed. *Global Trade Analysis: Modelling and Applications*, Cambridge: Cambridge University Press, 1997, pp. 13-73.

Hossain, M. M., *A Theoretical and Empirical Analysis of Trade Liberalization in South Asia*, Dissertation submitted for the degree of doctor of philosophy, Canberra: Australian National University, 1997.

Huff, K. M., and T. W. Hertel, "Decomposing Welfare Changes in the GTAP Model", *GTAP Technical Paper No. 5*, Lafayette, Indiana: Purdue University, 2000.

Raihan, S., and M. A. Razzaque, *Welfare Effects of South Asian Free Trade Area (SAFTA), Regional Trading Arrangements (RTAs) in South Asia: Implications for the Bangladesh Economy*, Paper prepared for the UNDP Regional Centre, Colombo, 2007.

Siriwardana, M., *Effects of Trade Liberalization in South Asia with Special Reference to Sri Lanka*, Paper presented at the third annual conference on global economic analysis, Monash University, Melbourne, Australia, June, 2000. , pp. 27-30.

World Bank, *India-Bangladesh Bilateral Trade and Potential Free Trade Agreement, Volume II: Methodology and Selected Case Studies*. Dhaka: World Bank Office, 2006.