

Potential Gains from Post-UR Trade Reform: Impacts on Developing Countries¹

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Abstract

The impacts of further trade liberalization after the Uruguay Round are assessed using the Global Trade Analysis Project (GTAP) model, a multi-region, general equilibrium model. The analysis quantifies the trade impacts and welfare gains from trade liberalization by developed countries only, by developing countries only, from full multilateral liberalization, and from partial multilateral liberalization. It goes beyond past modeling of global trade reform by incorporating key tariff preferences.

The simulation results indicate that each liberalizing country group benefits more from liberalization by its partners than from its own reforms. Liberalization by developing countries only will result in expansion of trade two and half times greater than the trade expansion from developed country liberalization. Developed countries reap a larger share of the gains (73 percent) from full liberalization, than their own liberalization contributes (47 percent) to global gains. They benefit most from agricultural tariff liberalization and the removal of domestic farm support, whereas developing countries benefit most from the liberalization of manufactures trade. Developing countries garner only 27 percent of the global gains from full liberalization while their liberalization contributes 53 percent of this total.

When the global gains are broken down by type of instrument being liberalized, we find that 84 percent of the global gains derive from tariff liberalization, of which 35 percent is associated with agriculture and food tariffs and 48 percent is from manufactures. The remaining 16 percent of the global gains derive primarily from the elimination of domestic support for agriculture. When viewed in total, about half of the global gains available from merchandise trade liberalization following completion of the Uruguay Round are associated with food and agriculture – a sector which accounts for just 10 percent of global GDP. This highlights the critical importance of making progress on the agriculture negotiations in the Doha Development Round.

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1 Introduction

The Doha Development Agenda, which emerged from the November 2001 ministerial conference, launched a broader set of WTO trade negotiations which seek greater balance in addressing the issues of interest to developing countries. Developing countries have indicated their concerns about the constraints to market access in high-income countries and on the world market impacts of large agricultural subsidies in high-income countries. Under the Doha declaration, member governments commit themselves to comprehensive negotiations aimed at: substantial reductions in market access; reductions of, with a view to phasing out all forms of export subsidies; and in domestic support, substantial reduction for supports that distort trade. Substantial gains could be had by developed and developing countries alike from further trade liberalization. An assessment, not only of the potential gains, but also of the sources and distribution of these gains is an important contribution to trade negotiators and stakeholders in the process.

This paper is part of a set of studies, commissioned by the World Bank, and presented at a special meeting of the International Agricultural Research Consortium on the impact of multilateral trade liberalization on the developing countries. As such, our goal is to respond to a specific set of questions posed to the researchers. These questions are aimed at quantifying and analyzing the potential impacts of a set of stylized trade liberalization scenarios on imports, exports and welfare in a post-Uruguay Round environment. Specifically, we consider four different scenarios: only developed countries liberalize, only developing countries liberalize, full multilateral liberalization, and partial multilateral liberalization.

The next section of the paper discusses the data and methodology used in the study. This includes the procedures for projecting the world economy forward to 2008 – the starting point for our trade policy scenarios. The specific scenarios analyzed in the study are described in the third section. Section 4 presents the results of the simulations and our analysis of the likely impacts on exports, imports and welfare. The final section is devoted to our summary and conclusions.

2 Data and Methodology

In keeping with our goal of providing a comprehensive, benchmark assessment of the post-UR gains available to developed and developing countries from agricultural and non-agricultural trade liberalization, we have devoted considerable effort to the construction of the associated data base and scenarios. This involves projecting the global economy to the post-Uruguay Round period (2008) using the dynamic Global Trade Analysis Project (GTAP) applied general equilibrium model (Hertel, 1997; Ianchovichina and McDougall, 2001) and global database (Dimaranan and McDougall, 2002). This projection of the world economy makes use of exogenous macroeconomic forecasts and policy assumptions regarding the Uruguay Round, as well as China/Taiwan accession to the WTO. The trade liberalization simulations are then conducted on the post-Uruguay Round equilibrium data base. In order to facilitate analysis and comparability with other studies, the trade liberalization simulations are conducted as comparative static experiments.²

²The dynamic model is a modular extension of the comparative static model which incorporates international capital mobility (using adaptive expectations) and which tracks the accumulation of wealth and capital stocks. As such, it is particularly useful in making global projections. However, the necessary tools to facilitate the extensive decomposition analysis which is essential to this paper are not yet fully developed in the dynamic model. Hence, the virtue of using the model in its comparative static mode.

The GTAP model of global trade is a relatively standard, multi-region model which includes the explicit treatment of international trade and transport margins, a “global” bank designed to mediate between world savings and investment, and a relatively sophisticated consumer demand system designed to capture differential price and income responsiveness across countries. As documented in Hertel (1997) and on the GTAP web site³, the model includes: demand for goods for final consumption, intermediate use and government consumption; demands for factor inputs; supplies of factors and goods; and international trade in goods. The model employs the simplistic but robust assumptions of perfect competition and constant returns to scale in production activities. Key parameters of the model, and the equations, are set out comprehensively in Hertel (1997) and in the GTAP Version 5 documentation (Dimaranan and MacDougall 2002) available on the web site.

In the rest of this section, we discuss the data and aggregation used in the simulations and the projections to the post-Uruguay Round period using exogenous macroeconomic forecasts and policy assumptions about trade liberalization under the Uruguay Round.

Protection Data

The GTAP database, as documented in Dimaranan and McDougall (2002), is unique in its integration of domestic databases, in the form of regional input-output tables, and international data sets on macroeconomic variables, bilateral trade flows, energy usage, and protection. The resulting data base – in this case Version 5 – provides an internally consistent snapshot of the global economy for the base year 1997.⁴ As such this is ideally suited to analysis of multilateral trade policy reform.

A key feature of the GTAP database is its tracking of bilateral trade and protection. The bilateral trade data flows, sourced primarily from the United Nations’ COMTRADE database, are reconciled to eliminate discrepancies in reported trade between trading partners (Gehlhar, 2002). The protection data set includes *ad valorem* tariff equivalents for agriculture, food and manufactures; agricultural export subsidies; domestic support; and estimated export tax equivalent rates (Francois and Spinanger 2002) of the quotas against textile and clothing exports regulated under the Agreement on Textiles and Clothing (ATC).⁵ The agricultural tariff data are drawn from the Agricultural Trade Policy Database (Gibson, *et al.*, 2002) which is based largely on the data from the Agricultural Market Access Database (AMAD), which covered 50 countries, including all major agricultural trading members of the WTO. These data include applied tariff rates for the countries for which these were available at the time, and bound rates otherwise (Gibson, Wainio and Whitley 2002), an approach that seems likely to result in an upward bias in the estimated applied rates in developing countries (Gibson, Wainio, Whitley and Bohman 2001). Specific tariffs were converted to *ad valorem* rates by dividing by the world unit value of imports. Data on tariffs in manufactured commodities are from UNCTAD’s TRAINS database, extracted using the World Integrated Trade Solutions (WITS) project software of the World Bank and UNCTAD (Rozanski, *et al.*, 2002). Unlike the GTAP version 5 database, which includes MFN applied tariff rates data, the

³ www.gtap.org

⁴For purposes of running the dynamic GTAP mode, the standard database is supplemented with foreign income data from the IMF Balance of Payments Statistics to permit us to track international capital mobility and foreign wealth.

⁵The trade and protection data are provided by contributors to the GTAP database at the level of the GTAP sectoral classification, not at the tariff line.

database used in this study includes preferential tariff rates provided under the Generalized System of Preferences and European Union preferences for imports from the ACP countries.⁶

Tariff rate quotas (TRQs) are not included in the database and are not modeled in this study. Given our emphasis on projections, this may be a significant limitation. We know that the vast majority of the TRQs are currently not binding (Abbott and Morse, 1999), implying that the in-quota tariffs may currently be the ones relevant to decisions about import levels. If, however, many quotas are unfilled because of constraints associated with TRQ administration such as those addressed in the draft agricultural modalities (WTO 2003, p10), then our emphasis on the out-of-quota tariffs may be appropriate. With further growth in global demand and trade, there is also the potential for many of these quotas to become binding in the coming years. Unfortunately, an accurate treatment of this issue requires a highly disaggregated approach and is therefore well beyond the scope of the present study.

This study uses revised agricultural protection data for China that is not included in the GTAP 5 database. Revised tariff and export subsidies data for several agricultural commodities were obtained from a study by Huang, Rozelle and Chang (2003). These estimates are substantially below the statutory tariff rates widely used in earlier studies because they are based on detailed, on-the-ground studies that take into account differences in product quality and the effects of China's state trading regime (see Bhattasali, Li and Martin (2003) and www.worldbank.org/trade).

Data on agricultural export subsidies were based on the country submissions of export subsidy expenditures to the WTO (Elbehri, 2002). Domestic support is based on the OECD PSE data. All OECD domestic support payments (i.e., producer subsidies excluding market support price) were allocated to output subsidies, variable input subsidies, land and livestock capital-based payments, based on broadly accepted procedures (Jensen, 2002; OECD, 2001).⁷ We have not yet been able to distinguish the so-called "amber box" policies constituting the Aggregate Measure of Support (AMS) that is due for reduction under the WTO, so we simply target all domestic support for reductions⁸. To the extent that some agricultural protection is effectively decoupled from production incentives, this will overstate the level of trade-distorting support provided. However, given the uncertainties about the extent to which support can be effectively decoupled, it would seem premature to exclude all support that is currently classified as decoupled.

⁶ A preliminary comparison of the impact of full trade liberalization using the MFN applied rates and the preferential rates data sets indicates that the use of MFN rates overstates global gains from tariff liberalization by 5 percent and developing country gains in particular by around 30 percent.

⁷ The proper allocation and treatment of domestic support to specific commodities remains a topic of some debate (Gehlhar and Nelson, 2000; Frandsen, Jensen, and Yu, 2000). For our most recent treatment, the reader is referred to a forthcoming paper (Dimaranan, Hertel, and Keeney, 2002) where further modifications have been made.

⁸ The amber box component of the AMS differs from the producer support measures used in this database in that the AMS includes some support provided by tariff support of administered domestic prices, and the AMS is based on the difference between domestic administered domestic price and a *fixed* external reference price, rather than the current world price relevant to economic distortions.

Regional and Sectoral Aggregation

The version 5 GTAP database distinguishes 66 regions and 57 sectors in the global economy. In this study, we use a 23-region, 28-sector aggregation of the GTAP 5 database (see table 1). The developed regions -- Australia/New Zealand, Japan, North America, and Western Europe -- account for 76 percent of global gross domestic product in 1997. The 19 regions representing the developing country group include some single countries (e.g. China, Brazil, Zambia) and regional groupings (e.g. Other Latin America, Middle East/ North Africa).

The agriculture and food sectors are aggregated into 15 different sectors. The primary agricultural commodities are separately specified from the processed form of the product as much as possible. This is important if one is to capture the fact that many farm products (e.g., raw sugar, paddy rice and raw milk) are largely non-traded. These commodities require further processing before entering world markets – thereby having implications for manufacturing value-added. In those cases where both raw commodities and processed goods are tradeable, it allows for the frequently substantial differences in factor intensities and technology levels between production of the raw commodity and the processing stage. Nine manufacturing sectors and 5 services sectors complete the sectoral aggregation. The global value-added shares reported in Table 1 indicate the relative size of these sectors in the global economy. Agriculture and food represents 8 percent of total global value-added while manufactures and services contribute 22 and 69 percent, respectively.

Projections to the Post-UR Period

External macroeconomic forecasts are used to simulate economic growth in the global economy from the 1997 base year of the database to the post-UR period (here 2008). Over the period from 1997, growth rates of real GDP; skilled and unskilled labor inputs; investment and capital accumulation; and population, for each region were generated from historical and forecast data in the World Bank's Global Economic Prospects 1999 database. These data were used to infer the rates of technological change overall, and by sector in each regional group. Finally, the estimated changes in these variables were introduced as shocks to the model. The construction of the set of macroeconomic projections data (informally known as the "GTAP baseline") is documented in Walmsley, Dimaranan, McDougall (2002).

This process of projection allows us to capture the effects of differentials in growth rates, and the broad structural changes associated with accumulation of human and physical capital, and with income growth—factors which earlier research has shown can have a large impact on the estimated effects of trade liberalization (Bach, Dimaranan, Hertel and Martin 2000). To obtain a suitable post-Uruguay Round base, we also simulated the implementation of the Uruguay Round over this same period. This includes increased market access and the enlargement and elimination of quotas against developing country exports of textiles and clothing under the Agreement on Textiles and Clothing. Increased market access is simulated with tariff reductions to the post-Uruguay Round tariff rates which were compiled by Francois and Strutt (1999) based on data from the CD-ROM version of the GATT/WTO Integrated Database (IDB). Francois and Strutt assumed that no further tariff reductions will actually occur for the primary agricultural commodities from their original 1995 base year under the Uruguay Round Agreement on Agriculture. The tariffs were reduced gradually, using equal shocks through the Uruguay Round simulation period 1997 to 2005.

The simulations from 1997 to 2007 also incorporate pre-WTO accession tariff reductions implemented by China prior to 2000 using China's tariff data obtained from the World Bank. China and Taiwan's accession to the WTO is also simulated using their estimates of their WTO tariff offers obtained

from the World Bank. The elimination of quotas on exports of textiles and clothing to the USA/Canada and Europe is heavily back-loaded, with most of the liberalization occurring at the end of the Uruguay Round implementation period, in 2005. In the case of China, the quota elimination is simulated for the WTO accession period, from 2002 to 2007.

The regional GDP shares for 1997 and 2008 reported in table 1 reflect the impact of economic growth and the Uruguay Round over the projections period. The developed region accounts for 76 percent of global GDP in 1997 with North America and Western Europe together accounting for 60 percent. More rapid forecast growth rates in economies like China, Taiwan (China), Other NICs, and India, in the developing region result in increased GDP shares for these countries. By 2008, the developed region is projected to account for 73 percent of GDP while the developed region accounts for a slightly larger share at 27 percent.

3 Policy Scenarios

We examine the impact of post-UR trade liberalization from the updated 2008 database which reflects economic growth from the 1997 base year and policy changes under the Uruguay Round. In this section, we first describe the extent of protection remaining after the completion of the Uruguay Round. This is followed by a discussion of the policy simulations that are conducted on the post-UR database.

Post-Uruguay Round Protection

Although the Uruguay Round successfully brought the multilateral trading system under a set of global trade rules or disciplines, very limited liberalization was required in agricultural and services trade. Agriculture in many developed countries continues to be protected by tariffs and TRQs, as well as by export and production subsidies. In many developing countries, tariffs can still be raised since the bound rates have been set well above applied rates, especially for agricultural products. Imports of manufactures by many developed countries are subject to tariff peaks and exports are constrained by tariff escalation even though average tariffs on manufactures in the industrial countries are relatively low. Protection of the textiles and clothing markets in North America and Europe will remain high even after the phase-out of export quotas introduced under the Multi-fibre Arrangement (MFA). The dismantling of barriers to services trade and investment and on government procurement in both developed and developing countries has yet to be done. These factors indicate that substantial gains can be obtained from further liberalization of world trade (Anderson, *et al.*, 2001).

The trade liberalization simulations are performed from the post-Uruguay Round database. Table 2 reports the average trade-weighted applied tariff rates for agriculture and food and for manufactures estimated to apply after the Uruguay Round used as a base in these simulations.⁹ For both developed and developing countries, the average tariffs for agricultural and food products are higher than those for manufactures, although the difference is far more pronounced for the developed countries. Average tariff rates on agricultural and food products are highest for Japan at 25 percent, where this weighted average is

⁹ The trade-weighted average tariffs for food and agriculture are low compared to other sources since they were calculated from applied and not bound rates and tariffs for processed food products are included in the calculation. Also, the base tariff data are already in the highly aggregated GTAP sectoral classification and not at the tariff-line level.

sharply reduced by the small volumes of imports on highly-protected products like rice, for which the average import protection was over 400 percent. Average farm and food tariff rates in the developing regions range from 3.7 percent in Zambia to 20.4 percent in the Middle East/North Africa region. Substantial (greater than 10 percent) agricultural tariff rates remain throughout most of the Southeast and South Asian countries, Southern Africa, and Uganda. Despite the large commitments on manufacturing tariff bindings by developing countries, average applied tariffs are still significant in the post-UR environment, with the highest appearing in South Asia, followed by Latin America and Thailand. Average applied tariff rates in manufactures are higher than average rates for food and agriculture in Latin America.

Table 3 presents estimated world average applied tariff rates for individual commodity groups in 2008. In terms of agricultural and food commodities, the remaining average tariff rates are highest for paddy rice. Milk, wheat, feedgrains, and processed meat also have average tariffs of more than 15 percent. On the non-food side, wearing apparel and textiles have the highest average post-UR tariffs, with global averages of about 9 and 7 percent, respectively.

Liberalization Simulations

Four policy scenarios are analyzed in the study. Each of the policy scenarios involve the elimination of tariffs on agriculture and food, tariffs on manufactures, agricultural export subsidies, and domestic support. Trade liberalization simulations are done for the following cases:

- (a) developed countries liberalization
- (b) developing countries liberalization
- (c) full, global liberalization
- (d) partial (50 percent), global liberalization

4 Results

In summarizing the simulation results of the four trade liberalization scenarios, there is a multitude of results that could be reported. For purposes of this paper, we focus on the trade and welfare impacts on each region, as well as globally. Although we report the numerical results from our simulations, it is not the absolute values but rather the relative magnitude of impacts between the different scenarios and between the developed and developing countries that should be emphasized. Most of the results are provided in tables that allow for comparison across the four scenarios.

Trade Impacts

Table 4 reports the trade impacts, by commodity, for the four different scenarios. Export volume changes are given in both percentage and absolute volume changes in US\$ billions. Our results suggest that developed country liberalization will increase global trade by 1.6 percent. Exports of processed meat, rice, dairy, oilseeds and other agriculture each rise by more than five percent with the improved market access to the developed country markets. The removal of developed country domestic support for wheat and feedgrains and the elimination of export subsidies on wheat, feedgrains, meat and sugar result in declines in world exports of these commodities. Developed country liberalization also gives a large boost to exports of wearing apparel as the US and European markets open up to exports from the developing countries. Developed country liberalization boosts food and agriculture exports by 4 percent, and contributes about a quarter of the total increased trade volume.

Liberalization by developing countries, mostly involving the removal of tariffs, is estimated to raise world exports by two and half times more than liberalization in the developed countries. Trade in most food and agricultural products increases, with the largest increases coming from beverages and tobacco and other processed foods. In the developing-country case, export subsidies and domestic support are very small, so that elimination of these barriers does not offset the stimulus to trade from reductions in import barriers. The trade impacts on the manufacturing sectors are generally larger than under developed country liberalization in both percentage and volume change terms due to the higher post-UR tariffs in developing countries (Table 3). Our results suggest that developing country liberalization will result in a 3.8 percent increased in global trade.

Full multilateral liberalization contributes to an expansion of export volume by US\$ 456 billion, in 1997 dollars, or a 5.4 percent increase in world trade. Food and agricultural products liberalization contribute 16 percent to this total increase in exports. This comes largely from increased exports of beverages and tobacco, processed meat, other processed food, and other agricultural products. The decline in exports for wheat, feedgrains and livestock products resulting from developed country liberalization dominate the export gains in these commodities coming from developing country liberalization.

For many commodities, the trade impacts of 50 percent liberalization are close to half the trade impacts of full liberalization. However, for some highly protected commodities such as rice, sugar, and meat, the very small initial import shares in many of the most protected economies mean that the initial 50 percent liberalization has a relatively small impact on the world market. In the case of wheat and feedgrains, 50 percent liberalization will actually result in a slightly larger fall in exports than complete liberalization. This is due to the higher impact on developed country exports of a 50 percent cut in domestic support in these countries from initial, subsidy-augmented levels.

Most of the expansion in exports occurs in the liberalizing region as may be seen in Table 5 which reports the changes in exports by region under the four scenarios. Ninety-two percent (1997 US\$124 billion) of the expansion in exports arising from developed country liberalization is accounted for by rising exports from the developed countries. This reflects the fact that the cost of producing for export is falling in the liberalizing region, and the industrial countries account for such a large share of world import demand. Japanese and U.S. exports rise by 3.5 and 2.5 percent, respectively, but the absolute value of the increase in exports is highest for Western Europe at US\$54 billion. Exports of some developing countries, such as India and the MENA region, experience a slight decline under this scenario, despite the direct stimulus to their bilateral trade with the developed countries. Under developing country liberalization, 73 percent of the expansion in exports occurs in the developing countries and 27 percent in the developed countries. Exports expand in all regions. The largest increases occur in India (22 percent) and Brazil (19 percent).

Developed and developing countries account for 46 and 54 percent, respectively, of the estimated increase in global export volume in the full liberalization scenario. The expansion in exports of the developed countries under full liberalization is 75 percent higher than when only the developed countries liberalize. This is consistent with the relatively larger impact of developing country liberalization on world trade. Partial liberalization results in close to half the changes in exports under full liberalization. Exceptions to this are Thailand, India and Other South Asia where export changes are around 40 percent of the changes under full liberalization and Uganda where export changes are 70 percent of those under full liberalization. The relatively smaller expansion of exports from the rice exporters Thailand and South Asia reflects the very small initial levels of rice exports relative to trade after liberalization.

The opening up of developed country markets – particularly for non-agricultural goods – lends a significant boost to the net rate of return on capital, as the price of imported capital goods falls and the rental rate on capital rises. As a consequence, there is a significant capital inflow. This capital inflow is mirrored in the developing country trade balance, which deteriorates, so that we observe a larger increase in imports than exports from the developing countries. As shown in table 6, developing countries account for 20 percent of the total increase in imports. Import volume in China, India, and Brazil grows by around three percent each. Liberalization by developing countries increase intra-developing country imports such that developing countries account for 91 percent of the increase in imports.

Developing countries account for 70 percent of the total increase in imports under full liberalization. This is larger than their share of the increase in exports (54 percent). All the developing countries/regions expand their imports more than they expand their exports. Conversely, North America and Western Europe expand their exports more than their imports.

Partial liberalization results in close to half the increase in imports under full liberalization for most countries. Exceptions to this are Australia/New Zealand, Western Europe, Brazil, India, Other South Asia, Other SSA and SACU where the increased imports are only 40 percent of the increase under full liberalization, and Uganda, where this figure is only 31 percent. These small impacts of partial liberalization reflect the low initial exports of some key products, such as rice, in which these countries have a strong comparative advantage.

World Price Effects

The average world price effects, by commodity, for the four scenarios are reported in table 7. All changes are relative to the numeraire in our model, which is the global average return to primary factors of production. Our results suggest that developed country liberalization will raise average world prices of food and agricultural products by 3.9 percent. Average world prices of the commodities that are subsidized in developed countries -- wheat, feedgrains, dairy, meat, oilseeds and sugar – rise the most. Average world prices of most manufactured goods and services experience a slight decline. The average world price of textiles and wearing apparel, however, rise slightly as the US and European markets open up to developing country exports.

Although developing country liberalization will result in a slight rise in average world prices of wheat and feedgrains, overall world price for all agricultural and food products will register a slight decline. Increased trade in manufactured products resulting from developing country liberalization will result in declining average world prices.

The impact of developed country liberalization dominates the world price impacts under full multilateral liberalization. Average world prices of all agricultural and food commodities rise by 3.8 percent. Partial liberalization results in average world price changes that are close to half of the world price changes under full liberalization.

Welfare Effects

Table 8 presents the welfare impacts in terms of the regional percentage change in utility and the change in equivalent variation for the regional household, measured in 1997 US\$ million, under the four scenarios. Equivalent variation (EV) is a money metric measure of changes in welfare used in the GTAP model. The welfare impacts of trade liberalization scenarios can be broken into two pieces: efficiency gains and terms of trade effects (Huff and Hertel, 1996). In table 9, we report these two components of EV for all regions under the four scenarios.

In general, liberalization by the other country group is more beneficial than own group liberalization -- a result that contrasts strongly with the observation by Martin and Winters (1996, chapter 1) that studies of Uruguay Round generally found larger gains to the countries that liberalized their own trade regimes due in part to the lower levels of protection in the wake of the Uruguay Round (smaller efficiency gains) and to the smaller trade elasticities used in this study. Total welfare gains for the developing country group under developed country liberalization are three times greater than the welfare gains under developing country liberalization. The developing countries that benefit relatively more from developed country liberalization are China, Taiwan, Thailand, India, EIT and SACU. As can be seen from Tables 9 and 10, this result is due largely to the improvement in these countries' terms of trade, particularly for their exports of manufactured products, resulting from developed country liberalization. Similarly, North America and Western Europe benefit more from developing country liberalization due to net positive terms of trade effects. Australia, on the other hand, gains more from developed country liberalization since the larger cuts made by the other developed countries result in net positive terms of trade effects for Australia. In terms of percentage changes in regional utility, the welfare impacts of trade liberalization are small, mostly less than one percent in absolute value. This is common in such studies, and such estimated gains will continue to diminish as tariffs fall.¹⁰

Full liberalization generates an annual global welfare gain of 1997 US\$58 billion, substantially below the \$165 billion reported by Anderson et al (2001) using the GTAP model with higher substitution elasticities between domestic and imported goods, and without taking into account tariff preferences. Three-fourths of the total gains accrue to the developed region, which also happens to account for about that percentage of global GDP. In this sense, the gains from full liberalization may be viewed as "evenly distributed". However, the national gains vary widely. While all the developed countries gain from full liberalization the largest percentage gain of 1.13 percent accrues to Australia/New Zealand, and is far greater than the 0.06 percent gain to North America.¹¹ In absolute terms, the largest gains accrue to Western Europe, which is also the largest economic region in our grouping. The developing countries that gain relatively the most from full liberalization are Zambia (0.98%), Brazil (0.82%), Other NICs (0.81%), and Other Southeast Asia (0.46%). The Middle East/North Africa region and the Rest of World lose in all liberalization scenarios due to large terms of trade losses. The developing countries whose terms of trade losses outweigh allocative efficiency gains from full liberalization are the Philippines, Other Sub-Saharan Africa and Uganda.

As is well-known from the welfare economics literature, the initial cuts in tariffs generate the largest gains, and this is borne out in our simulations, where partial, 50 percent, liberalization generates nearly 70 percent of the global welfare gains from full liberalization. This is even more pronounced if one focuses solely on the developing country group where 50 percent liberalization gives 84 percent of the gains from full liberalization. For some countries such as Indonesia, India, and Other South Asia, the welfare gains from partial liberalization are even greater than that from full liberalization as a result of more modest terms of trade losses under partial liberalization.

¹⁰Of course, it should be borne in mind that we have abstracted from barriers to trade in services, investment and the movement of natural persons. These offer the potential for much larger gains, since services are such a large share of economic activity (Table 1). Further, we have ignored any potential gains resulting from greater exploitation of scale economies.

¹¹The gain in utility refers to the gains on the part of the representative regional household in the GTAP model. This includes current private and government consumption as well as future consumption (savings).

Table 10 breaks down the allocative efficiency effects and terms of trade effects by commodity. Developed country liberalization, which includes tariff cuts as well as removal of export and production subsidies, generates large positive allocative efficiency effects for agriculture and food commodities. This is particularly true for wheat, feedgrains, meat and livestock, and milk. Terms of trade effects for food and agriculture are negative as prices of these export commodities fall. Developing country liberalization, on the hand, find relatively greater allocative efficiency gains from the liberalization of their manufacturing sectors where tariffs are still quite high, and export volume greatly exceeds that of agriculture.

Within the food and agriculture sectors, allocative efficiency effects are largest for beverages and tobacco, other processed food and other agriculture. Forty-eight percent of the global welfare gains from full liberalization are generated by the food and agricultural sectors – reflecting the much higher distortions in these sectors in the developed regions. Once again, the allocative efficiency effects of partial liberalization are typically more than half the effects of full liberalization. The terms of trade effects of partial liberalization are quite different, however. This reflects the importance of changing import shares as tariffs are cut.

Table 11 reports the welfare impacts of developed country liberalization, broken down by impact of each instrument and by benefiting region.¹² Developed country liberalization of tariffs on agriculture and food and especially on manufactures benefits the developing countries but the removal of export subsidies and domestic support results in welfare losses for developing countries. In total, fifty-three percent of the welfare gains from developed country liberalization accrue to developed countries.

Developing country liberalization generates substantial benefits for developed countries amounting to US\$26 billion annually, representing 86 percent of total welfare gains from developing country liberalization. Table 12 shows that this welfare gain to developed countries is generated mostly by the tariff cuts of manufactures in the developing countries. This table also shows that tariff cuts in agriculture and food products in the developing countries will contribute 23 percent to the global welfare gain while manufacturing cuts will contribute 79 percent.

Table 13 provides a similar decomposition by instrument for full liberalization. Of the total global gains (US\$58B), US\$42bn or 73 percent goes to developed countries and US\$16bn or 27 percent goes to developing countries. This is nearly equal to their respective shares in global GDP. Developed countries gain mostly from removal of domestic support and also from the removal of tariffs on agriculture and food. The developing countries, on the other hand, derive most of their gains from the liberalization of trade in manufactures in both markets. Not surprisingly, they lose from the higher food prices following developed countries' removal of export subsidies and domestic support. This negative impact is most pronounced in MENA and ROW where there are some significant interactions with their own domestic policies.

It is also interesting to evaluate the extent to which the welfare gains owing to liberalization by a region exceed, or fall short of their share of the global gains. Table 13 shows that developed country liberalization is estimated to contribute 47 percent of the global gains from full liberalization, whereas they enjoy 73 percent of the global benefits from full liberalization. This is simply a reflection of their relatively more open economies. In contrast, the developing countries, with higher initial distortions,

¹²This decomposition follows the approach of Harrison, Horridge and Pearson (1999) which use numerical integration techniques to partition the individual effects of exogenous shocks on endogenous variables.

contribute 53 percent of the global gains when they liberalize, whereas they receive only 27 percent of the ensuing global gains. Table 14 provides the same breakdown for partial liberalization. The main point to note here is that the developing countries now receive a somewhat greater share of the global gains (33% vs. 27% from full liberalization).

5 Conclusions

The purpose of this paper has been to bring the best possible data and analysis to bear on the question of the size and distribution of gains from multilateral trade liberalization in a post-Uruguay Round era. To do this, we used the dynamic GTAP model to project the global economy forward to 2008, based on exogenous projections of endowment growth, technological change and trade policy changes. The latter include both Uruguay Round commitments as well as the WTO accessions of China and Taiwan. Our trade liberalization analysis is comparative static in nature, using the 2008 data base as a starting point. We consider four scenarios: developed countries only liberalize by removing all tariff barriers to merchandise trade as well as domestic support for agriculture, developing countries only liberalize, all countries liberalize, and all countries remove half of their protection (partial liberalization).

We find that developed countries reap larger share of gains (73 percent) from full liberalization, than their own liberalization contributes (47 percent) to global gains. This is a reflection of the relatively smaller trade barriers in the richer countries (especially outside of agriculture). These developed country gains are roughly in proportion to their share in global economic activity. However, the origins of these gains are very different between developed and developing countries. The developed countries benefit most from agricultural tariff liberalization and the removal of domestic farm support, whereas developing countries benefit most from the liberalization of manufactures trade. This is consistent with earlier findings by Hertel and Martin (2000) who argue that the developing countries stand to benefit from continuing to push for tariff cuts in manufacturing – in spite of the fact that the developed countries have largely liberalized this sector.

Simple arithmetic suggests that, if the developed countries gain more than their policy liberalization contributes to the welfare gains from global trade liberalization, then the opposite must be true for the developing countries. This is indeed the case, with developing countries garnering just 27 percent of the global gains from full liberalization while their liberalization contributes 47 percent of this total. This will always be the case, as long as the magnitude of the developing country trade barriers is higher than for the developed countries.

When the global gains are broken down by type of instrument being liberalized, we find that 84 percent of the global gains derive from tariff liberalization, of which 35 percent is associated with agriculture and food tariffs and 48 percent is from manufactures. The remaining 16 percent of the global gains derive primarily from the elimination of domestic support for agriculture, although removal of agricultural export subsidies also contributes a modest amount. Thus, when viewed in total, about half of the global gains available from merchandise trade liberalization following completion of the Uruguay Round are associated with food and agriculture – a sector which accounts for just 10 percent of global GDP. This highlights the critical importance of making progress on the agriculture negotiations in the Doha Development Round.

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Table 1: Regional and Sectoral Aggregation

Regional Aggregation	Global GDP Shares		Sectoral Aggregation	Value-Added Shares
	1997	2008		1997
<u>Developed Countries</u>	<u>76.08</u>	<u>73.42</u>	<u>Agriculture and Food</u>	<u>7.51</u>
Australia/New Zealand	1.58	1.69	Paddy Rice	0.37
Japan	14.68	12.96	Wheat	0.22
North America	30.93	30.23	Feedgrains	0.32
Western Europe	28.89	28.53	Oilseeds	0.24
<u>Developing Countries</u>	<u>23.92</u>	<u>26.58</u>	Raw Sugar	0.12
China	2.95	4.22	Other Agriculture	1.57
Taiwan	1.03	1.23	Livestock Products	1.09
Other NICs	2.30	2.42	Forestry and Fishery	0.62
Indonesia	0.72	0.74	Processed Rice	0.10
Philippines	0.27	0.26	Vegetable Fats and Oils	0.13
Thailand	0.54	0.55	Processed Sugar	0.09
Other Southeast Asia	0.44	0.50	Processed Meat	0.34
India	1.38	1.73	Dairy	0.27
Other South Asia	0.45	0.48	Other Processed Food	1.25
Brazil	2.72	2.55	Beverages and Tobacco	0.77
Chile	0.26	0.27	<u>Manufactures</u>	<u>20.95</u>
Other Latin America	2.48	2.25	Textiles	0.79
Economies in Transition	3.05	3.29	Wearing Apparel	0.64
Middle East/North Africa	3.17	3.51	Wood and Paper	2.45
South African C. Union	0.50	0.52	Mining	1.95
Zambia	0.01	0.01	Plastics, Chem., and Minerals	4.22
Uganda	0.02	0.02	Metal Products	2.56
Other Sub-Saharan	0.66	0.73	Automobiles	1.46
Rest of World	0.94	1.27	Electronics	1.82
			Other Manufactures	5.07
			<u>Services</u>	<u>71.54</u>
			Household Utilities	12.32
			Trade and Transport	21.23
			Construction	6.34
			Business and Finance	16.27
			Government Services	15.38

Table 2. Average Tariff Rates, Post-UR, Agriculture and Food and Manufactures

Regions	Average Post-UR Tariff Rates (trade-weighted)	
	Agriculture and Food	Manufactures
Developed Regions	8.66	1.20
Australia/New Zealand	2.57	4.30
Japan	24.67	0.63
North America	6.69	1.71
Western Europe	5.09	0.86
Developing Regions	11.26	6.67
China	5.47	5.97
Taiwan	8.75	6.60
Other NICs	14.05	2.30
Indonesia	5.60	8.05
Philippines	14.40	5.67
Thailand	16.88	11.24
Other Southeast Asia	14.30	5.67
India	14.69	18.74
Other South Asia	13.29	18.72
Brazil	5.65	12.78
Chile	9.05	10.92
Other Latin America	9.54	10.84
Economies in Transition	8.21	3.06
Middle East/North Africa	20.42	9.17
Southern Africa CU	13.52	5.31
Zambia	3.67	7.30
Uganda	14.92	6.80
Other Sub-Saharan Africa	8.89	7.67
Rest of World	6.44	8.17

Source: Author's simulations

Table 3. World Average Tariff Rates for Agriculture & Food and Manufactures, Post-UR

Agriculture and Food	Average Tariffs	Manufactures	Average Tariffs
Paddy Rice	36.38	Textiles	7.02
Wheat	18.07	Wearing Apparel	8.78
Feedgrains	17.05	Wood & Paper Products	2.07
Oilseeds	10.76	Mining	0.53
Raw Sugar	8.56	P chem Mineral	3.54
Other Agriculture	9.00	Metals	3.19
Meat & Livestock	1.62	Automobiles	3.78
Forestry and Fishery	1.62	Electronics	2.14
Processed Rice	16.36	Other Manufactures	3.30
Fats and Oils	8.82		
Processed Sugar	8.09		
Processed Meat Products	17.31		
Milk	19.35		
Other Processed Foods	6.52		
Beverages and Tobacco	8.92		

Source: Authors' simulations

Table 4. Exports by Commodity, Percentage Changes and Volume Changes in 1997 US\$ billions

Commodities	Developed Lib.		Developing Lib.		Full Liberalization		Partial Liberalization	
	Percent	Volume	Percent	Volume	Percent	Volume	Percent	Volume
wheat	-6.36	-1.64	4.47	1.15	-2.71	-0.70	-2.92	-0.75
feedgrains	-3.68	-0.80	3.30	0.71	-0.98	-0.21	-1.57	-0.34
oilseeds	6.06	1.39	2.49	0.57	8.63	1.99	4.70	1.08
othagr	6.27	7.90	5.29	6.67	11.85	14.93	5.40	6.81
meatlstk	-4.09	-1.72	0.16	0.07	-3.60	-1.51	-1.63	-0.69
forfish	0.19	0.06	1.91	0.59	2.18	0.67	1.09	0.34
rice	14.77	1.78	6.90	0.83	21.59	2.60	6.92	0.83
fatsoils	1.00	0.43	8.58	3.73	9.75	4.24	4.36	1.90
sugar	-3.93	-0.74	5.93	1.12	1.76	0.33	0.37	0.07
procmeat	15.75	10.27	6.07	3.96	21.67	14.13	7.54	4.92
procdairy	8.20	3.09	5.45	2.05	12.17	4.59	2.12	0.80
othprfood	1.99	3.23	6.27	10.18	8.43	13.69	3.84	6.24
bevtobac	4.64	3.73	17.11	13.76	22.35	17.98	9.16	7.36
All Agr& Food	3.88	26.78	6.58	45.36	10.45	72.08	4.11	28.33
textiles	2.71	6.46	7.73	18.44	10.81	25.78	4.80	11.45
wearapp	11.50	21.08	11.54	21.17	23.77	43.58	10.34	18.96
woodpaper	0.70	2.15	2.60	7.92	3.31	10.10	1.56	4.77
mining	0.11	0.74	0.62	4.04	0.74	4.81	0.35	2.30
pchemineral	1.35	14.83	3.86	42.43	5.25	57.61	2.47	27.17
metals	1.00	5.48	5.22	28.63	6.23	34.13	2.91	15.94
autos	2.22	13.14	7.93	46.93	10.17	60.22	4.33	25.63
electronics	0.61	5.43	2.36	21.18	2.96	26.53	1.43	12.85
othmnfcs	1.62	27.39	4.28	72.31	5.93	100.05	2.78	46.99
houseutils	0.34	0.40	-0.12	-0.14	0.18	0.21	0.08	0.09
tradetrans	1.01	6.60	2.05	13.37	3.06	19.98	1.38	9.05
construction	0.25	0.12	0.06	0.03	0.28	0.13	0.15	0.07
busfinance	0.08	0.35	-0.02	-0.09	0.03	0.14	0.01	0.03
govservice	0.18	0.22	-0.41	-0.51	-0.26	-0.32	-0.10	-0.12
All Mnfg&Svces	1.36	103.46	3.57	270.80	4.96	376.83	2.27	172.43
Total	1.57	129.97	3.81	315.46	5.41	448.33	2.42	200.39

Source: Authors' simulations

Table 5. Exports by Region, Percentage Changes and Volume Changes (in 1997 US\$ billions)

Regions	Developed Lib.		Developing Lib.		Full Liberalization		Partial Lib.	
	Percent	Volume	Percent	Volume	Percent	Volume	Percent	Volume
AusNZL	2.14	2.75	1.36	1.75	3.41	4.40	1.79	2.31
Japan	3.54	20.32	4.14	23.75	7.75	44.42	3.46	19.83
NAmerica	2.50	44.06	1.72	30.33	4.23	74.52	1.99	35.14
WEurope	1.81	56.89	1.09	34.20	2.92	91.71	1.29	40.36
All Developed	2.21	124.09	1.61	90.05	3.84	215.22	1.74	97.69
<i>% of Global Total</i>		<i>92.08</i>		<i>27.53</i>		<i>46.30</i>		<i>47.02</i>
China	0.61	2.71	8.08	35.78	8.83	39.09	3.96	17.53
Taiwan	0.59	1.06	9.71	90.05	10.32	18.50	4.69	8.41
OthNICs	0.31	1.62	3.46	35.78	3.79	20.06	1.79	9.48
Indonesia	0.96	0.81	5.76	17.41	6.84	5.82	2.91	2.48
Philippines	0.98	0.59	9.00	18.31	10.13	6.06	4.59	2.74
Thailand	0.47	0.44	8.76	4.90	9.26	8.79	3.70	3.52
OthSEA	0.63	1.00	6.18	5.38	6.89	10.91	3.11	4.92
India	-0.35	-0.31	21.78	8.31	21.60	19.12	8.77	7.76
OthSoAsia	0.15	0.06	16.39	9.79	16.92	7.14	6.58	2.78
Brazil	0.06	0.06	19.30	19.27	19.28	19.25	8.13	8.12
Chile	0.25	0.07	6.03	6.92	6.31	1.91	2.82	0.85
OthLatAm	0.56	1.04	13.77	19.27	14.33	26.58	6.23	11.56
EIT	-0.10	-0.40	4.57	1.83	4.47	17.34	2.12	8.22
MENA	-0.18	-0.73	8.64	25.54	8.40	33.57	3.78	15.10
SoAfrCU	0.06	0.03	6.66	17.74	6.67	3.21	2.98	1.43
Zambia	-0.01	0.00	2.29	34.53	2.28	0.04	0.99	0.02
Uganda	0.30	0.01	1.76	3.20	2.15	0.04	1.50	0.03
OthSSA	-0.10	-0.09	4.02	0.04	3.93	3.60	1.81	1.66
ROW	5.39	2.92	11.57	0.03	16.24	8.79	6.49	3.51
All Developing	0.37	10.90	7.97	237.77	8.37	249.63	3.69	110.08
<i>% of Global Total</i>		<i>8.09</i>		<i>72.70</i>		<i>53.70</i>		<i>52.98</i>
Global Total	1.57	134.76	3.81	327.08	5.41	464.85	2.42	207.77

Source: Authors' simulations

Table 6. Imports by Region, Percentage Changes and Volume Changes (in 1997 US\$ billions)

Regions	Developed Lib.		Developing Lib.		Full Liberalization		Partial Lib.	
	Percent	Volume	Percent	Volume	Percent	Volume	Percent	Volume
AusNZL	8.64	10.60	0.76	0.94	9.42	11.57	3.81	4.68
Japan	4.90	25.37	1.99	10.29	6.86	35.50	3.08	15.93
NAmerica	2.50	42.54	0.01	0.10	2.56	43.62	1.19	20.28
WEurope	0.90	28.47	0.53	16.72	1.47	46.42	0.61	19.12
All Developed	1.95	107.08	0.51	28.02	2.49	137.19	1.09	60.02
<i>% of Global Total</i>		79.46		8.57		29.51		28.89
China	2.89	12.78	10.32	45.60	58.70	58.70	6.25	27.61
Taiwan	1.47	2.40	11.73	19.23	21.75	21.75	6.12	10.03
OthNICs	0.72	3.93	5.13	27.85	31.78	31.78	2.82	15.32
Indonesia	1.43	0.95	8.61	5.71	6.72	6.72	4.60	3.05
Philippines	0.68	0.45	9.10	5.97	6.55	6.55	4.61	3.02
Thailand	0.96	0.89	13.33	12.27	13.25	13.25	6.21	5.71
OthSEA	0.86	1.23	8.96	12.77	14.25	14.25	4.50	6.42
India	2.81	2.32	24.91	20.60	23.30	23.30	11.87	9.81
OthSoAsia	0.75	0.31	22.21	9.29	9.79	9.79	9.88	4.13
Brazil	3.13	3.07	24.30	23.88	26.98	26.98	11.33	11.14
Chile	-0.11	-0.03	10.65	3.13	3.09	3.09	4.96	1.46
OthLatAm	0.83	1.51	17.22	31.42	32.89	32.89	7.91	14.44
EIT	0.70	2.91	3.94	16.46	19.02	19.02	2.07	8.62
MENA	-0.72	-3.05	9.93	42.34	38.28	38.28	4.04	17.21
SoAfrCU	1.97	1.00	6.47	3.28	4.17	4.17	3.48	1.76
Zambia	-0.45	-0.01	8.16	0.11	0.10	0.10	3.47	0.05
Uganda	-0.32	-0.01	2.94	0.05	0.04	0.04	0.80	0.01
OthSSA	-0.26	-0.22	5.13	4.40	4.05	4.05	1.95	1.67
ROW	-1.78	-2.67	9.84	14.77	12.57	12.57	4.12	6.19
All Developing	0.90	27.73	9.70	299.07	10.62	327.25	4.79	147.66
<i>% of Global Total</i>		20.58		91.44		70.40		71.07
Global Total	1.57	134.76	3.81	327.08	5.41	464.85	2.42	207.77

Source: Authors' simulations

Table 7. World Prices by Commodity, Percentage Changes

Commodities	Developed Lib.	Developing Lib.	Full Liberalization	Partial Liberalization
Wheat	23.04	1.62	25.20	12.56
feedgrains	19.72	3.06	23.96	11.80
oilseeds	6.91	0.82	7.54	3.31
othagr	-2.34	-0.11	-2.54	-2.32
meatlstk	8.29	0.34	8.39	3.41
forfish	0.46	0.12	0.60	0.43
rice	4.98	0.54	5.52	2.28
fatsoils	2.70	-1.40	1.20	0.66
sugar	6.67	-0.64	5.91	2.79
procmeat	6.45	0.21	6.65	2.78
procdairy	11.91	0.69	13.09	5.78
othprfood	2.09	-0.81	1.26	0.67
bevtobac	-0.37	-0.24	-0.57	-0.23
All Agr& Food	3.89	-0.07	3.80	1.59
textiles	0.47	-1.21	-0.72	-0.25
wearapp	1.39	-2.46	-1.17	-0.38
woodpaper	-0.16	-0.23	-0.34	-0.03
mining	-0.06	-0.26	-0.29	-0.04
pchemineral	-0.21	-0.40	-0.56	-0.15
metals	0.02	-0.52	-0.45	-0.09
autos	-0.32	-0.58	-0.80	-0.22
electronics	0.20	-0.93	-0.67	-0.19
othmnfcs	-0.01	-0.47	-0.42	-0.06
houseutils	-0.24	-0.15	-0.33	-0.04
tradetrans	0.10	-0.11	0.03	0.14
construction	-0.22	-0.26	-0.44	-0.07
busfinance	-0.09	0.02	-0.02	0.13
govservice	0.03	-0.33	-0.25	0.00
All Mnfg&Svces	0.01	-0.49	-0.43	-0.08
Total	0.32	-0.46	-0.09	0.06

Source: Authors' simulations

Table 8. Welfare Impacts: Percentage Changes in Utility and Equivalent Variation in 1997 US\$ millions

Regions	Developed Lib.		Developing Lib.		Full Liberalization		Partial Lib.	
	Utility	Welfare	Utility	Welfare	Utility	Welfare	Utility	Welfare
AusNZL	0.91	4890	0.21	1113	1.13	6103	0.41	2211
Japan	0.16	6311	0.16	6317	0.32	12242	0.17	6743
NAmerica	0.01	550	0.05	4432	0.06	5778	0.03	3120
WEurope	0.03	2853	0.16	14172	0.20	18202	0.16	14684
All Developed		14605		26034		42325		26759
<i>% of Global Total</i>		53		86		73		67
China	0.53	6991	-0.16	-2122	0.32	4185	0.23	3026
Taiwan	0.34	1382	0.04	173	0.37	1511	0.28	1160
OthNICs	0.26	1959	0.57	4270	0.81	6007	0.43	3219
Indonesia	0.05	108	0.09	198	0.10	235	0.12	287
Philippines	0.01	8	-0.79	-628	-0.79	-626	-0.29	-228
Thailand	0.48	804	0.19	309	0.66	1107	0.58	964
OthSEA	0.36	564	0.37	585	0.73	1153	0.49	766
India	0.38	2229	-0.07	-389	0.28	1656	0.28	1658
OthSoAsia	0.15	227	0.33	506	0.46	705	0.46	714
Brazil	0.34	2721	0.51	4067	0.82	6607	0.42	3403
Chile	0.01	5	0.21	181	0.21	177	0.15	127
OthLatAm	0.24	1676	0.34	2331	0.57	3935	0.30	2096
EIT	0.11	1170	-0.18	-1856	-0.05	-512	-0.04	-365
MENA	-0.38	-4142	-0.21	-2249	-0.59	-6490	-0.22	-2429
SoAfrCU	0.30	490	-0.11	-180	0.17	282	0.08	125
Zambia	-0.05	-2	1.06	47	0.98	43	0.46	20
Uganda	-0.12	-10	0.13	11	-0.01	-1	-0.20	-17
OthSSA	-0.16	-370	0.01	25	-0.16	-388	-0.13	-304
ROW	-0.98	-3089	-0.39	-1207	-1.22	-3824	-0.34	-1060
All Developing		12721		4070		15761		13162
<i>% of Global Total</i>		47		14		27		33
Global Total		27326		30104		58086		39921

Source: Authors' simulations

Table 9. Allocative Efficiency and Terms of Trade Effects, by Region (in 1997 US\$ millions)

Regions	Developed Lib.		Developing Lib.		Full Liberalization		Partial Lib.	
	A.E.	TOT	A.E.	TOT	A.E.	TOT	A.E.	TOT
AusNZL	437	4435	81	987	497	5551	349	1828
Japan	5887	565	960	5242	6777	5586	3760	3085
NAmerica	3388	-3508	-30	3352	3480	599	2694	-282
WEurope	18685	-15927	-119	13327	19154	-2031	14081	184
All Developed	28397	-14435	892	22908	29908	9705	20884	4815
China	-43	6889	2174	-4691	1777	1871	1606	1191
Taiwan	154	1318	1115	-1178	1199	165	926	176
OthNICs	60	1793	1577	2438	1617	4051	1019	2052
Indonesia	86	163	575	-561	625	-438	399	-125
Philippines	22	-37	332	-786	336	-818	237	-396
Thailand	106	700	1368	-1110	1446	-398	1024	-116
OthSEA	147	504	1243	-890	1351	-337	903	-211
India	336	1964	2938	-3619	3020	-1592	2092	-563
OthSoAsia	64	159	1469	-946	1505	-796	997	-288
Brazil	842	1871	5088	-1076	5737	798	3165	193
Chile	-13	16	214	-63	200	-56	143	-37
OthLatAm	263	1412	3301	-1054	3497	333	2129	-96
EIT	-924	2019	816	-2346	177	-394	346	-556
MENA	-1100	-3034	4070	-5063	3303	-8492	2333	-4196
SoAfrCU	29	439	389	-495	428	-87	263	-110
Zambia	0	-1	12	16	11	13	7	4
Uganda	0	-10	3	4	3	-8	2	-22
OthSSA	-111	-253	448	-628	353	-939	232	-642
ROW	-706	-1764	2442	-1173	1944	-2886	1292	-1143
All Developing	-788	14148	29574	-23221	28529	-10010	19115	-4885
Total	27609	-286	30467	-314	58439	-305	39998	-69

Source: Authors' simulations

Table 10. Allocative Efficiency and Terms of Trade Effects, by Commodity (in 1997 US\$ millions)

Commodities	Developed Lib.		Developing Lib.		Full Liberalization		Partial Lib.	
	A.E.	TOT	A.E.	TOT	A.E.	TOT	A.E.	TOT
paddyrice	641	-31	13	-1	670	-2	311	267
wheat	2758	-1440	-372	30	2954	-43	2418	-6914
feedgrains	2543	-449	-144	68	2959	-21	2435	-8227
oilseeds	1558	-241	209	7	1729	48	1504	1618
rawsugar	-19	5	1	-1	-15	4	-17	13
othagr	704	-112	1025	-2	1511	-5	979	13677
meatlstk	2886	-655	83	54	3193	207	2573	-5201
forfish	-9	6	61	11	52	-1	40	189
procrice	272	-91	214	3	513	6	340	24
fatsoils	57	142	477	-53	506	5	368	-2285
procsgr	631	-287	45	-1	787	36	560	-8341
procmeat	3809	-72	653	26	4749	236	3060	-10209
procdairy	3112	-326	-110	45	3650	-22	2042	-27160
othprfood	746	188	1348	-43	2053	-25	1266	-9991
bevtobac	243	-1	2084	-2	2216	13	1440	1794
All Agr& Food	19932	-3365	5585	141	27526	437	19320	-60746
textiles	1094	57	1816	-88	2633	-23	1724	-58
wearapp	2512	176	2522	-170	4673	-310	2998	-8024
woodpaper	2	390	549	-7	523	-107	386	2013
mining	-75	-49	161	23	91	-138	104	-4788
pchemineral	1735	152	4230	-18	5771	-157	3753	9206
metals	-77	-15	1687	-41	1523	-45	1185	1349
autos	1656	29	5760	-35	7141	-87	4589	3957
electronics	144	499	1816	-86	1910	-392	1182	-2558
othmnfcs	621	403	6567	-15	6695	38	4346	17030
houseutils	27	42	34	5	84	7	206	2031
tradetrans	-74	950	302	-112	288	268	274	25085
construction	-84	36	-86	-1	-178	5	-42	1063
busfinance	274	330	-394	89	-87	176	74	13528
govservice	-78	80	-81	0	-154	24	-101	844
All Mnfg&Svces	7677	3079	24882	-456	30912	-742	20678	60678
Total	27609	-286	30467	-314	58439	-305	39998	-69

Source: Authors' simulations

Table 11. Welfare Impacts of Full Liberalization by Developed Countries, 2007
(in 1997 US\$ millions and as percent of total)

Liberalizing Region Benefiting Region	Agr&Food Tariffs	Manuf Tariffs	Export Subsidies	Domestic Support	Total
Developed					
Developed	6988	-12104	6141	13579	14605
(% of total)	25.6	-44.3	22.5	49.7	53.4
Developing	5925	17720	-5548	-5375	12721
(% of total)	21.7	64.8	-20.3	-19.7	46.6
Total	12913	5616	593	8204	27326
(% of total)	47.3	20.6	2.2	30.0	100.0

Source: Authors' simulations

Table 12. Welfare Impacts of Full Liberalization by Developing Countries, 2007
(in 1997 US\$ millions and as percent of total)

Liberalizing Region Benefiting Region	Agr&Food Tariffs	Manuf Tariffs	Export Subsidies	Domestic Support	Total
Developing					
Developed	6172	19761	-281	382	26034
(% of total)	20.5	65.6	-0.9	1.3	86.5
Developing	719	4126	-145	-630	4070
(% of total)	2.4	13.7	-0.5	-2.1	13.5
Total	6891	23887	-426	-248	30104
(% of total)	22.9	79.3	-1.4	-0.8	100.0

Source: Authors' simulations

Table 13. Welfare Impacts of Full Global Liberalization, 2007
(in 1997 US\$ millions and as percent of total)

Liberalizing Region Benefiting Region	AgrFood Tariffs	Manuf Tariffs	Export Subsidies	Domestic Support	Total
<i>(in 1997 US\$ million)</i>					
Developed					
Developed	6912	-12169	6435	13898	15076
Developing	5930	16970	-5439	-5269	12192
Total	12841	4802	996	8629	27268
Developing					
Developed	7051	19753	-98	543	27249
Developing	642	3574	-47	-599	3569
Total	7693	23327	-145	-56	30818
All Regions					
Developed	13963	7585	6337	14441	42325
Developing	6571	20544	-5486	-5868	15761
Total	20534	28129	850	8573	58086
<i>(percent of total)</i>					
Developed					
Developed	11.9	-20.9	11.1	23.9	26.0
Developing	10.2	29.2	-9.4	-9.1	21.0
Total	22.1	8.3	1.7	14.9	46.9
Developing					
Developed	12.1	34.0	-0.2	0.9	46.9
Developing	1.1	6.2	-0.1	-1.0	6.1
Total	13.2	40.2	-0.3	-0.1	53.1
All Regions					
Developed	24.0	13.1	10.9	24.9	72.9
Developing	11.3	35.4	-9.4	-10.1	27.1
Total	35.4	48.4	1.5	14.8	100.0

Source: Authors' simulations

Table 14. Welfare Impacts of Partial Liberalization, 2007
(in 1997 US\$ millions and as percent of total)

Liberalizing Region Benefiting Region	AgrFood Tariffs	Manuf Tariffs	Export Subsidies	Domestic Support	Total
<i>(in 1997 US\$ million)</i>					
Developed					
Developed	5239	-4860	3782	10566	14728
Developing	2622	8316	-2849	-2774	5315
Total	7861	3456	933	7792	20043
Developing					
Developed	2722	9167	-96	237	12030
Developing	2022	6109	-13	-271	7847
Total	4744	15276	-109	-34	19878
All Regions					
Developed	7961	4307	3687	10803	26759
Developing	4644	14425	-2862	-3045	13162
Total	12606	18732	824	7758	39921
<i>(percent of total)</i>					
Developed					
Developed	13.1	-12.2	9.5	26.5	36.9
Developing	6.6	20.8	-7.1	-6.9	13.3
Total	19.7	8.7	2.3	19.5	50.2
Developing					
Developed	6.8	23.0	-0.2	0.6	30.1
Developing	5.1	15.3	0.0	-0.7	19.7
Total	11.9	38.3	-0.3	-0.1	49.8
All Regions					
Developed	19.9	10.8	9.2	27.1	67.0
Developing	11.6	36.1	-7.2	-7.6	33.0
Total	31.6	46.9	2.1	19.4	100.0

Source: Authors' simulations