Market and Welfare Implications of Doha Reform Scenarios

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Abstract: This paper examines the market and welfare implications of potential Doha reform scenarios. The first part of the paper describes possible policy outcomes on the basis of existing WTO negotiations and positions—first in the agricultural sectors as identified by the so-called three pillars: market access, domestic support and export subsidies, second in non-agricultural market access (so-called NAMA), and finally the other components of the Doha negotiations. The second part of the paper provides a quantitative assessment—using the World Bank's dynamic global general equilibrium trade model—of the first two components, i.e. the three agricultural pillars and non-agricultural market access, leaving aside the other (important) components for which a quantitative assessment is significantly more difficult. The analysis suggests that an ambitious Doha round would take the global economy some distance towards the maximum potential gain of global free trade—up to one-third. However, because of the binding overhang in tariffs, developing countries risk missing an opportunity to make more significant gains in income and exports.

[†] All three authors are with the World Bank. The findings and views expressed in this paper are solely the responsibility of the authors and should not be interpreted as reflecting the views of the World Bank. This paper is being presented at the 8th Annual Conference on Global Economic Analysis being held in Lübeck, Germany, June 9-11, 2005 (http://www.gtap.agecon.purdue.edu/events/Conferences/2005/default.asp). A version of this paper will appear in *Agricultural Trade Reform and the Doha Development Agenda* edited by Will Martin and Kym Anderson (2005). The authors are grateful for helpful comments from project participants, especially Rod Tyers, and for tariff-cutting data from CEPII staff in Paris (with special thanks to David Laborde).

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Introduction

The aims of this paper are threefold: to summarize, some likely and some more ambitious scenarios that might emerge as part of an eventual Doha agreement, particularly with respect to agriculture; to analyze empirically the market, trade and welfare consequences of such scenarios; and to draw out their implications for developing countries especially.

More specifically, the paper shows what the world economy would look in 2015 without and with a successful conclusion to Doha, how far Doha could take the world towards where it would be in the absence of all distortions to merchandise trade, and what contribution could be made by the various elements of a Doha package. For present purposes we make use of the World Bank's recursive dynamic model known as LINKAGE (see van der Mensbrugghe 2004b), in part because it has formed the basis for the World Bank's standard decade-long projections and trade analysis work.[1] The distinction is made in our results between effects on developing countries as compared with more advanced economies, but in doing so it is necessary to take into account not only the World Bank's country classification based on income level but also the self-nominated one practiced in the WTO (in which even customs territories as advanced as Hong Kong, South Korea, Singapore and Taiwan claim developing country status and so are eligible for Special and Differential Treatment).

[1] See World Bank (2002) and World Bank (2004) for example.

Our analysis suggests there would be little agricultural reform globally under Doha, especially by developing countries, unless WTO Members are willing to make very substantial cuts to their bound rates. Without that, the huge gap between agricultural and manufacturing protection is likely to widen, as is the gap between developed and developing country protection rates, thereby limiting the welfare gains from reform to a small number of countries. We therefore explore the effects of a more ambitious agricultural reform package, and of developing countries participating more fully in the Doha round rather than avoiding reform. In both respects we show how much closer to exploiting the full benefits of trade the world could get if these more-ambitious reform commitments were to be made and implemented over the next decade.

The paper is structured as follows. It begins with an overview of the key elements of a prospective Doha agreement, focusing especially on the agricultural elements. It then describes the model of the global economy to be used to analyze the consequences of such an agreement and of alternative, more-ambitious reforms including a move to complete free trade (which provides a helpful benchmark). The estimates of protection and subsidy rates for each region are a crucial part of the data in the global model, and so they are discussed in some detail before turning to the key results of the simulations. After discussing some qualifications, the paper concludes by highlighting the key messages and drawing out implications for developing countries in particular.

Key elements of a prospective Doha agreement

To what extent are reform commitments likely to emerge from the Doha round? In addressing that question, it needs to be kept in mind from the outset that WTO trade negotiators are focusing on reductions not to the applied tariffs and subsidies but rather to members' legally bound import tariffs, agricultural export subsidies and bound commitments on domestic support to farmers. These bound rates are higher than applied rates in nearly all countries, but especially so in most developing countries. Hence if cuts to bound rates are sufficiently small, or the gap between bound and applied rates sufficiently large, no actual reform need take place from an agreed set of bound rate reductions.

The Doha round was launched in late 2001, but the following Trade Ministerial meeting, in Cancun in September 2003, ended with acrimony and without an agreement on how to proceed. At Cancun developing countries made it abundantly clear that further progress would not be possible without a commitment by developed countries to significantly lower their import barriers and agricultural subsidies (including importantly for cotton, despite its relatively minor role in developed country agriculture – see Sumner 2005). An intense period of consultations in July 2004 ended in the early hours of 1 August with a Decision on how the Doha Work Programme should proceed (WTO 2004). The so-called July Framework agreement that emerged from that Decision reiterates the importance of keeping development at the heart of the Doha agenda, and it particularly stresses agricultural reform as key to that. In its Annexes, the Decision provides guidance as to how a Doha agreement might be structured, with frameworks for establishing modalities for agriculture and for non-agricultural market access, and for negotiations on trade facilitation, as well as providing recommendations for trade in services. We begin by summarizing what emerged with respect to the three agricultural pillars.

Agricultural market access

Jean, Laborde and Martin (2005) examine the consequences of different tariff-cutting formulae, bearing in mind the TRQs described in the paper by de Gorter and Klauga (2005), the prevalence of preferences for developing countries as described in Fontagné and Jean (2005), the need to accommodate sensitive products and special products, and the Special and Differential Treatment outlined in the July Framework as discussed by Josling (2005). For present purposes, tariff cutting is implemented at the 6-digit HS level and involves a detailed comparison of each country's bound tariff, which is what negotiators focus on, with the applied MFN tariff on a given bilateral trade flow, which is what modelers need to deal with. The gap between bound and applied MFN tariffs is the so-called binding overhang, and it can blunt significantly the impact of any negotiated outcome – so much so that in some scenarios countries are not required to change their applied tariffs at all. Once the detailed tariff analysis was conducted, the results were aggregated up to the GTAP and Linkage models' regions and sector levels by the CEPII staff in Paris (with special thanks to David Laborde). Note that the applied tariff cuts vary not only by sector, but also by trading partner – and may involve smaller cuts on imports from those developing countries currently enjoying preferences.

Jean et al. evaluate the consequences for 2001 applied rates of different approaches to liberalization, and particularly different degrees of tops-down progressivity in the bound tariff cuts, as well as different degrees to which developing countries participate in reform. They look first at a proposal similar to the Harbinson progressive reduction formula (see WTO 2003b), with marginal tariff rate reductions of 35% for tariffs below 15 percent, 65% for tariffs above 90

percent and 60% for tariffs within the 15-90 percent bracket.[2] Developing country tariff cuts also follow the progressive-tax-style tiered formula, but for them Harbinson suggested four rather than three brackets, with inflexion points placed at tariff levels of 20, 60 and 120 percent, so as to be consistent with Harbinson's criterion of cutting by an average of 25%, 30%, 40% and 45%, respectively, in those four brackets.

That set of cuts, it turns out, would lead to very little import liberalization, because bound tariffs in many countries exceed applied rates by such large margins. As a result, Jean et al. focus on a set of reforms that involve cuts in applied agricultural protection rates that are at least 10 percentage points greater, namely a 45%, 70% and 75% bound rate cutting rule for developed countries and a 35%, 40%, 50% and 60% cutting rule for developing countries. Consistent with the Framework, least developed countries[3] make no reduction commitments in either of these two cases.

Jean et al. then:

- examine the consequences of including "Sensitive Products" assuming countries would take into account the importance of the commodity, the height of the existing tariff, and the gap between the tariff binding and the applied rate in deciding which products to grant such treatment, comparing situations in which countries are allowed to treat 2

[2] This approach provides cuts in average tariffs -- without the discontinuities created by the proportional cuts involved in the Harbinson formula -- that are more or less comparable with those generated by Harbinson's proportional reductions of 25%, 30% and 60%, because the larger cuts on higher tariffs apply only on the portion of the tariff above 15 or 90 percent, respectively.

[3] The so-called least developed countries (LDCs) is a special classification of 50 developing countries defined by the U.N. (http://www.unctad.org/Templates/WebFlyer.asp?intItemID=2161&lang=1).

percent (in Doha Scenario 2) and 5 percent (in Doha Scenario 3) of tariff lines as sensitive and so subject to just a 15 percent tariff cut;

- examine also the consequences of including "Special Products" for developing countries, by adding another 2 percent (in Doha Scenario 2) and 5 percent (in Doha Scenario 3) of tariff lines as special and so subject to just a 15 percent tariff cut;
- explore a proportional cut formula that brings about the same reduction in average tariffs in industrial countries as a group, and developing countries as a group, as the tiered formulas used; and
- consider the effects of adding a tariff cap of 200 percent, consistent with the suggestion in paragraph 30 of the Framework that the role of a tariff cap be explored.

Agricultural domestic support

Reductions in domestic support have been a particular concern of developing countries. This reflects the fact that the developed countries are the major providers of such assistance, and many developing countries are concerned about the ability of their producers to compete with developed country producers receiving large amounts of domestic support. While the marked asymmetry between industrial and developing countries is a concern, there is evidence, from Hertel and Keeney (2005) and from Hoekman, Ng and Olarreaga (2004), that the benefits to developing countries from reductions in domestic support may be substantially smaller than the potential gains from reductions in market access barriers. None the less, disciplining such support is crucial to ensure that when tariffs are lowered, import protection is not simply replaced by equally trade-distorting domestic measures.

The base from which reductions in domestic support will take place is the commitments on the total bound Aggregate Measure of Support (AMS) agreed under Article 6 of the Uruguay Round Agreement on Agriculture. Key elements of this framework are the distinction between non-distorting Green Box measures and trade-distorting Amber Box measures, together with a Blue Box containing measures tied to specific areas or livestock numbers.

A number of features of this framework will influence the ability of negotiators to achieve substantial reductions in domestic support. One of these features is the *de minimis* provision that allows industrial countries to exclude from measurement up to 5 percent of the value of their agricultural output in commodity-specific support, and another 5 percent as non-commodity-specific support. Another feature is the Market Price Support (MPS), which is based on a comparison of the official domestic price – that need not be closely related to domestic market prices – with the 1986-88 external reference price for each product. This measure may not be associated with actual support and, to the extent it is, it generally double-counts support provided by border price measures. A potentially more serious problem with the MPS is that countries can remove this element from their current AMS – without changing the amount of actual support provided – simply by abolishing the applied administered price used in calculating MPS. Since this does not alter the AMS binding commitments, it allows countries that formerly made extensive use of MPS to create substantial scope in their commitments to expand their actual support.

The July Framework proposes tiered reductions in the total bound AMS, with larger reductions by Members with higher initial AMS levels. In addition, it proposes capping product-specific AMS. *De minimis* levels are to be reduced to an extent to be negotiated. The definition of the “blue box” measures based on specific areas or livestock numbers is to be tightened up by

requiring these numbers to be “fixed and unchanging”, and capped either at historical levels or at 5 percent of the value of production. The Green Box is to be clarified to ensure that the measures it incorporates are at most minimally trade-distorting.

The MPS element of the AMS seems worthy of special attention because it does not measure trade-distorting support, and because of the scope it provides for avoiding disciplines. One option considered by Hart and Beghin (2005) is to redefine it so that it measures actual protection. Under some circumstances, this would impose greater discipline, and would certainly encourage countries to adopt policies that reduce the damaging insulation of their domestic prices from world prices. Another alternative is to ensure that the MPS element is removed from both the current total AMS and the bound AMS. A third and potentially important reform canvassed by Hart and Beghin is to phase out the *de minimis* and Blue Box measures in favor of a (perhaps temporarily) expanded Green Box.

To provide negotiators with some insights into the prospective effects of these changes, we consider the implications of various degrees of cut in the Total Bound AMS on the total distorting assistance that could be provided. How much would actual distorting support need to be reduced under various degrees of reduction in each country’s total *bound* AMS? To answer this question, we assume that countries would take advantage of the loophole allowing them to reduce their current AMS by abolishing the administered domestic price, while retaining its effects in their bound AMS (a change already made by Japan in the case of rice).

A striking feature of the findings is that extraordinarily large reductions in bound AMS are required before any reductions in actual support would occur – an outcome required by paragraph 9 of the Framework. Results for a tiered formula in which all countries with AMS notifications above 20 percent of the value of production cut their bound protection by 75%, and

all others by 60%, are given in Table 1. These results highlight just how deep cuts in bound levels of domestic support must be to bring about reductions in applied rates. Clearly, the offer of an initial reduction of 20% in bound AMS (see Paragraph 7 of Annex A of the July Framework, in WTO (2004)) is likely to have no direct impact.

The very limited actual reductions required from such a large reduction in bound rates are a consequence in part of the high level of the bindings, which is in turn a reflection of the choice of a period of very depressed world prices—1986-88—for the base. A cynical way of thinking about this is that it reflects the ability of WTO Members to avoid disciplines by exploiting the ability to "abolish" their MPS without abolishing the actual support to which it is related. This problem is serious for the AMS, but should be kept in perspective if there are strong reforms of market access and export competition, since reductions in these trade measures will reduce market price support.

Finally, there is the issue of cotton subsidies, addressed by Sumner (2005). Almost no cut is likely to be required under the Framework Agreement, but the US might agree to larger (phased) cuts for cotton as part of complying with the WTO's Dispute Settlement outcome at some future date, following the Appellate Body's upholding of the panel finding against aspects of the United States' cotton policy. In that case, less could be needed in the way of US cuts to non-cotton domestic support.

Agricultural export subsidies

As Hoekman and Messerlin (2005) make clear, farm export subsidies are inconsistent with GATT rules, so for that reason alone they deserve to be eliminated. The empirical analysis summarized in Hertel and Keeney (2005) shows that they are now only a small part of

agricultural support programs – even when implicit subsidies in the form of food aid and export credits are included. A gradual phasing out over the next decade of both explicit and implicit forms of farm export subsidies should therefore be a politically feasible component of a comprehensive Doha agreement. Their elimination in isolation could harm a few food-importing and aid-dependent developing countries, but the poor net buyers of food in those countries can be assisted in far more efficient ways than via these measures.

Non-agricultural market access

Negotiations in the area of non-agricultural tariffs have been lagging those on farm products. There has been a clear indication that developing countries wish to make lesser tariff cuts than developed countries and that least-developed countries expect to not have to make any cut commitments. A Doha round is unlikely to involve all non-agricultural bound tariffs being cut by more than 50 percent, so we assume that degree of cut by developed countries and 33 percent by developing countries other than least-developed ones (from whom no cuts are being demanded). However, since that bound cut may lead to very little reform by developing countries, given their high tariff bindings relative to their applied tariffs, a more ambitious scenario may see them prepared to commit to more reform in order to entice further cuts in developed countries' agricultural and textiles tariffs. Perhaps the most optimistic possibility is that developing countries agree to cut non-agricultural bound tariffs as much as developed countries (that is, by the 50 percent we assume). Especially if that were coupled by more-ambitious cuts in agricultural tariffs, developed countries could well respond with larger commitments themselves not only in trade but also with development aid. Indeed the experience of earlier multilateral trade negotiations has shown that developing countries tended to receive

only to the extent they are willing to give 'concessions' themselves, such is the reciprocal nature of these negotiations.[4]

Services trade

To date WTO members have been very slow in coming forward with Doha proposals to reform services trade. At this stage it seems likely that, as with the Uruguay Round, countries will make few meaningful commitments to open up their services sectors during the Doha round. For that reason, and because services trade is less-adequately represented in trade models than is goods trade, we have chosen to assume there will be no barrier reductions in this sector resulting from the Doha round – despite the fact that, as indicated in Hertel and Keeney (2005) and Winters et al. (2003), gains from services reform could well be enormous, including for developing countries.

Trade facilitation measures

Trade facilitation is a key to enlarging the opportunities for developing countries to benefit from market opening at home and abroad. The poorest of countries especially could well be able to turn any losses from others' trade liberalization into gains with a bit of investment in trade facilitation – as they could with some other domestic reforms that helped to make their internal factor and product markets work more efficiently. While funding agencies are showing an increasing interest in lending for such purposes, it is impossible to know how much influence such moves would have on the Doha outcome. Therefore we do not consider them further here

[4] See Finger (1974, 1976) for results from the Dillon and Kennedy rounds, respectively, and Finger and Schuknecht (2001) for Uruguay Round results.

except indirectly in the sense that the Armington trade elasticities used in the LINKAGE model are set a little above those in the GTAP model in part to capture some elements of trade facilitation such as harmonization of standards that tend to occur over the longer term as countries open up.

The global LINKAGE model for assessing effects of future trade reform

The model used for this analysis is the World Bank's global dynamic computable general equilibrium (CGE) model, known as LINKAGE (van der Mensbrugghe 2004b). It is a relatively straightforward CGE model but with some characteristics that distinguish it from standard comparative static models such as the GTAP model. A key difference is that it is recursive dynamic, so while it starts with 2001 as its base year it can be solved annually through to 2015. The dynamics are driven by exogenous population and labor supply growth, savings-driven capital accumulation, and labor-augmenting technological progress (as assumed for the World Bank's *Global Economic Prospects* exercise in 2004).[5] In any given year, factor stocks are fixed. Producers minimize costs subject to constant returns to scale production technology, consumers maximize utility, and all markets – including for labor – are cleared with flexible prices. There are three types of production structures. Crop sectors reflect the substitution possibility between extensive and intensive farming. Livestock sectors reflect the substitution possibility between ranch versus range feeding. And all other sectors reflect the standard capital/labor substitution (with two types of labor: skilled and unskilled). There is a single representative household per modeled region, allocating income to consumption using the extended linear expenditure system.

[5] In Appendix B the results are compared with those from a comparative static version similar to the GTAP model, to show how key model specifications can affect the results.

Trade is modeled using a nested Armington structure in which aggregate import demand is the outcome of allocating domestic absorption between domestic goods and aggregate imports, and then aggregate import demand is allocated across source countries to determine the bilateral trade flows.

There are six sources of protection in the model. The most important involves the bilateral tariffs. There are also bilateral export subsidies. Domestically, there are subsidies only in agriculture, where they apply to intermediate goods, outputs, and payments to capital and land.

Three closure rules are used. First, government fiscal balances are fixed in any given year.[6] The fiscal objective is met by changing the level of lump sum taxes on households. This implies that losses of tariff revenues are replaced by higher direct taxes on households. Second, the current account balance is fixed. Given that other external financial flows are fixed, this implies that ex ante changes to the trade balance are reflected in ex post changes to the real exchange rate. For example, if import tariffs are reduced, the propensity to import increases. Additional imports are financed by increasing export revenues and this is typically achieved by a real exchange rate depreciation. Finally, investment is savings driven. With fixed public and foreign saving, investment will be driven by two factors: changes in the savings behavior of households, and changes in the unit cost of investment. The latter can play an important role in a dynamic model if imported capital goods are taxed. Because the capital account is exogenous, rates of return across countries can differ over time and across simulations. The model only solves for relative prices. The numéraire, or price anchor, in the model is given by the export

[6] For the sake of simplicity they are fixed in US$ terms at their base year level, minimizing potential sustainability problems; but this implies they decrease as a percentage of GDP for expanding economies.

price index of manufactured exports from high-income countries. This price is fixed at unity in the base year and throughout time.

The newest version of the LINKAGE model, Version 6.0, is based on the latest release of the GTAP dataset, Release 6.0.[7] Compared with Version 5 of the GTAP dataset, Version 6 has a 2001 base year instead of 1997, updated national and trade data and, importantly, a new source for the protection data. The new protection data come from a joint CEPII (Paris)/ITC (Geneva) project. The product of this joint effort, known as MAcMaps, is a tariff level detailed database on bilateral protection that integrates trade preferences, specific tariffs and a partial evaluation of non-tariff barriers (NTBs), for example tariff rate quotas (TRQs).[8] In summary, the new GTAP database has lower tariffs than the previous database (see Appendix Table A-1) because of the inclusion of bilateral trade preferences and of major reforms between 1997 and 2001 such as continued implementation of the Uruguay Round Agreement, especially the elimination of quotas on textile and clothing trade, and China's progress towards WTO accession (which

[7] The Global Trade Analysis Project, otherwise known as GTAP, is an international consortium of trade researchers from universities, research institutions and national and international agencies. It is based at Purdue University. The GTAP Center provides four key resources to the trade community. First and foremost is an integrated and consistent international database for trade policy analysis. The current version is composed of 87 country/region groupings and 57 economic sectors. The second is a publicly available global trade model, also known as the GTAP model. (N.B. The LINKAGE model is distinct from the GTAP model though it uses the same underlying database.) The third is an annual course in applied trade modeling. And finally, GTAP organizes and co-hosts the annual Conference on Global Economic Analysis. More information on the GTAP Center and project can be found at http://www.gtap.agecon.purdue.edu.

[8] More information on the MAcMaps database is available in Bouët et al. (2004) and at http://www.cepii.fr/anglaisgraph/bdd/macmap.htm.

contributed to the ratio of global exports plus imports to GDP rising from 44 to 46 percent over those four years).

The version of the LINKAGE model used for this study is comprised of a 27-region, 25-sector aggregation of the GTAP data set (see Appendix Table A-2). There is a heavy emphasis on agriculture and food, comprising 13 of the 25 sectors, and a focus on the largest commodity exporters and importers.

The subsidies and import protection dataset

The main source of protection largely resides in tariffs or border barriers, although some countries – particularly high-income countries – also have significant agricultural production and export subsidies. The average import tariff for agriculture and food is 16.0 percent for high-income countries and 17.7 percent for developing countries, while for manufactures other than textiles and clothing it is 8.3 percent for developing countries and just 1.3 percent for high-income countries (see first column of Appendix Table A-3). The averages of course obscure large variations across countries and commodities. For example, if high-income tariffs on temperate farm products were at a prohibitive 100 percent, but zero on tropical products such as coffee, the import-weighted average agricultural tariff could be quite low. Even at the relatively aggregate level as depicted in Appendix Table A-3, the variations can be quite sharp. For example, India has an average tariff in agriculture and food of 82 percent on imports from East Asia, but only 20 percent on imports from Sub-Saharan Africa. Tariff data are not reliable for assessing the importance of preferences because of composition effects, but for high-income countries it is the case that agricultural tariffs on goods from low-income countries are lower

than on imports from the high- and middle-income countries. In the other sectors there is less evidence of preferences at this level of aggregation. On the contrary, imports of textiles and clothing – and indeed of all merchandise – from low-income countries face a higher average tariff than imports from middle-income or high-income countries.

Welfare impact of current protection policies

The LINKAGE model provides a baseline projection of the world economy first to 2005 (following accession to WTO by China and Taiwan, EU expansion eastwards which added ten more countries to the EU15 in 2004, and the end of textile and clothing quotas) and then to 2015 assuming no other policy changes. Deviations from that baseline in 2015, due to phased partial or total liberalization from 2005, are then examined.

One benchmark against which to measure the benefits of Doha is that which would come from freeing merchandise trade completely over the 2005-2010 period. That leads to global gains by 2015 of $287 billion per year, according to the LINKAGE model. Another benchmark is the reform incorporated in the pre-simulation experiment for the period from 2001 to 2005, due to the final stages of Uruguay Round implementation including the phase-out of the MFA, the accession of China and Taiwan to the WTO, and the eastern enlargement of the EU from 15 to 25 members. The impacts of those reforms on import tariffs are non-trivial, as reported in Appendix Table A-4. Had those three reforms not been implemented, the dynamic gains in 2015 from freeing global merchandise trade would have been $351 billion instead of $287 billion, or an extra $64 billion. Nearly half of that difference is due to the removal of MFA quotas and

hence should be considered part of the Uruguay Round's legacy – assuming safeguards by high-income countries or export taxes by China do not replace textile and clothing quotas from 2005.

Table 2 reports the distribution of the standard economic welfare or real income (equivalent variation) effects of removing all merchandise trade barriers and agricultural subsidies globally. Of the $287 billion gain in income that reform would generate for the global economy in 2015, two-thirds would accrue to the high-income countries. However, as a share of income, developing countries (as self-defined by WTO members) do twice as well, with an average increase of 1.2 percent compared to 0.6 percent for high-income countries. The results vary widely across developing countries, ranging from little impact in the case of Bangladesh and Mexico to 4 or 5 percent increases in parts of East Asia. The second column of numbers in that table show the amount of that welfare gain due to changes in the international terms of trade for each country. For developing countries as a group the terms of trade effect is negative, reducing somewhat the gains from improved efficiency of domestic resource use (especially in China and India). That effect would dissipate over time, however, as developing countries diversify their exports in the course of their industrialization. Other macro effects, including on real exports, imports, exchanges rates and terms of trade, are summarized in Appendix Table A-5.

There are several ways to decompose the real income gains from global trade reform so as to better understand the sources of the gains. One way is to assess the impacts of developing country liberalization versus industrial country liberalization in different economic sectors;

another is to decompose by policy instrument.[9] The latter gave results very similar to those reported in Hertel and Keeney (2005), namely that market access barriers explain almost all the welfare effects of agricultural policies, with domestic support and export subsidy removal playing only a very minor role and in fact harming slightly developing countries as a group (since some food-importing developing countries gain from OECD farm export subsidies). In our case all but about 1 percent of the global welfare gains from full removal of all merchandise trade barriers and agricultural subsidies is due to import tariff cuts, which is also what Hoekman, Ng and Olarreago (2004) estimated from halving all agricultural distortions (in their case using partial equilibrium analysis). Hertel and Keeney's estimate from full liberalization of all merchandise markets was only slightly higher, at 5 percent (see their Table 2.7).

Our results when decomposed by sector are provided in Table 3. They suggest global liberalization of agriculture and food yields 62 percent of the total global gains (similar to Hertel and Keeney's 66 per cent). This is consistent with the high tariffs in agriculture and food (17 percent global average) versus other sectors, but is nonetheless remarkable given the low shares of agriculture in global GDP (4 percent) and global merchandise trade (9 percent). Three-quarters of those gains are accounted for by the farm policies of high-income countries. Notice too that as much of that gain from farm reform is due to South-South agricultural liberalization as would come from developing countries' unrestricted access to high-income country markets. That is almost equally true in manufacturing in aggregate, despite the big gains from textiles and clothing reform ($15 billion from market access in high-income countries compared with

[9] The technique for doing this using Gempack solution software was developed by Harrison, Horridge and Pearson (2000). Bohringer and Rutherford (2004) have since provided a similar technique for models using GAMS.

$9 billion due to South-South textiles trade growth). In other words, reform by developing countries is nearly as important in terms of economic welfare gains to the South as reform by high-income countries. It is clear that reforming agricultural policies in both sets of countries is crucial for developing countries, with high-income reform of textiles only half as important as their agricultural reform.

Trade negotiators often think more in terms of the boost to the value of trade than to the increase in economic welfare. Would freeing global merchandise trade lead to more trade gain for developing countries than for high-income countries, given the latter's high protection rates in agriculture and textiles? Table 4 suggests any imbalance of that sort is not likely to be a major problem. Certainly in those two protected sectors exports would increase more for developing than for high-income countries, but for Other Manufactures the trade growth for the two regions would have the opposite bias. Also, much of the developing countries' trade growth is with other developing countries. Hence for merchandise trade as a whole, developing countries would sell an extra $318 billion to high-income countries under free trade whereas high-income countries would sell an extra $290 billion to developing countries. A small amount of services trade liberalization by developing countries would be sufficient to close that gap, if full reciprocity was sought.

Politicians have an eye also on what happens to their country's volume of output and exports in sectors whose protection is cut, and on earnings of constituents. Contrary to much rhetoric from protectionist groups, the full liberalization results suggest little change in the high-income countries' shares of global output and exports of processed food, beverage and tobacco, and of Other Manufactures. Only for primary agriculture are the changes noticeable: the export share falls by more than one-quarter, from 53 to 38 percent (including intra-EU trade) – but the

output share falls by only one-sixth, from 30 to 25 percent (Table 5). In absolute terms, agricultural and food output in high-income countries would decline only by 0.1 percent per year over the projection period to 2015 following a move to free trade in all merchandise, instead of rising by 1.6 percent per year. The impact of full reform on agricultural and food output and gross exports is shown for each country/region in Appendix Table A-6, where it is clear that exports are enhanced much more than output. As a consequence, the global share of agricultural and food production exported rises, from 9.5 to 13.2 percent.

Also of interest is what happens to exports net of imports by sector. Appendix Table A-7(a) shows that for agricultural products and processed food, while Appendix Table A-7(b) shows it for textiles and clothing and for other manufactures. The baseline data in those tables show the extent to which comparative advantages are projected to change for different countries/regions over the 2001-2015 period in the absence of further trade reform, and how much different that would look if all merchandise trade was freed over the next decade. The expected continued decline in net imports of food and agricultural products by middle-income countries as a group in 2015 would be dramatically reversed, for example, while for low-income countries its net exports of those goods would grow only a little faster – while its net exports of textiles and clothing would increase dramatically. Net exports of other manufactures by developing countries, by contrast, would fall to nearly zero.

What impact would the removal of cotton trade distortions and subsidies (which raise producer prices by more than 50 percent in the US and even more in the EU) have in this context of freeing all merchandise trade and agricultural subsidies? The price of cotton in international markets is estimated to be considerably higher in 2015, including for US exports because its subsidies no longer depress that price. However, the volume of US cotton exports shrinks when

those subsidies are removed, raising the price for other countries' exports. The price rise would not apply equally to all exporters however, because of product differentiation as captured in the Armington elasticities. For Brazil and Australia, the rise is 8 percent, while for Sub-Saharan Africa it averages less than 2 percent (relative to the numéraire which is the average price of exports of manufactures by developed countries). However, cotton exports from Sub-Saharan Africa would be a huge 73 percent larger under this reform scenario. The share of all developing countries in global exports would be 85 percent instead of 56 percent in 2015, vindicating their efforts to ensure cotton receives specific attention in the Doha negotiations (see Sumner 2005 and Baffes 2005).

The relatively small percentage changes in net national economic welfare hide the fact that redistributions of welfare among groups within each country following trade reform can be much larger. This is clear from the impacts on real rewards to labor, capital and land that are reported in Table 6. The results also strongly support the expectation from trade theory that returns to unskilled labor rise substantially in developing countries, and by more than wages of skilled workers, which in turn rise more than earnings of capitalists. This reform therefore would be likely to improve equity and reduce poverty in those countries, given that the vast majority of the poor are unskilled laborers (including as farmers) in those countries. For high-income countries, again consistent with standard trade theory, skilled workers gain more than unskilled workers. Those European and Northeast Asian farmers renting agricultural land would benefit from a large fall in rental costs, more or less offsetting the fall in prices for their output, while owners of land in those countries would lose if uncompensated.

The above results are for full trade liberalization. Smaller changes can be expected to result from partial reforms of the sort being negotiated currently under the Doha Development Agenda. It is to those that attention now turns.

Some prospective overall Doha scenarios: estimating their consequences

The scenarios

What will the Doha package ultimately contain? So as to focus on the agricultural component in particular, we make simplifying assumptions about non-agricultural components, namely: no reform in services, and no new trade facilitation measures. We also assume agricultural export subsidies are eliminated, and that domestic support for agriculture is cut in just four economies: by an average of 28 percent for the U.S., 18 percent for Norway, 16 percent for the EU and 10 percent for Australia (as mentioned earlier in the discussion of Table 1).

More difficult to determine are the likely nature and extent of reductions in market access barriers, so a number of scenarios are considered initially for agricultural and food products in isolation of non-agricultural tariff cuts, before incorporating (as in Scenarios 7 and 8 below) some non-agricultural market access. A total of eight simulations (see the summary list in Table 7) are designed to evaluate the consequences of different approaches to liberalization, and particularly different degrees of tops-down progressivity in the tariff cuts, and different degrees to which developing countries participate in reform. Throughout, we assume (as suggested in the Girard Text –see WTO (2003a)) that in the absence of a bound tariff on a good it is assumed to be double the applied MFN rate. Throughout this section, the WTO usage of the term 'developing countries' applies when allocating Special and Differential Treatment (SDT) in the

form of lesser commitments to reform, which means Hong Kong, Korea, Singapore and Taiwan are all able to enjoy SDT despite their high-income status.

The experiments begin for ***Scenario 1*** with a progressive or tiered reduction formula with marginal agricultural tariff rate reductions of 45, 70 and 75 percent within each of the three bands defined by the Harbinson (WTO 2003b) inflection points of tariff rates of 15% and 90% for developed countries (that is, for low agricultural tariffs the marginal rate of reduction is 45 percent, for medium-level tariffs it is 70 percent, and for the highest tariffs it is 75 percent), and for developing countries the reductions are 35, 40, 50 and 60 percent within each of their four bands (and least-developed-countries are not required to undertake any reduction commitments). These cuts are greater than those proposed in the Harbinson draft because we found its cuts were too light to have much impact (providing only two-thirds of the global welfare gain of Scenario 1, and leading to zero gain in Scenario 2).

Scenarios 2 and 3 examine the consequences of including the "Sensitive Products" allowed for in the Framework, with developed countries allowed to treat 2% (in Scenario 2) and 5% (in Scenario 3) of their HS6 agricultural tariff lines as sensitive and thereby subject to just a 15 percent tariff cut (as a substitute for the TRQ expansion mentioned in the Framework Agreement), and double those proportions of products for both developing and least developed countries, in part to incorporate also their "Special Products" demand.[10]

[10] As described in Jean, Laborde and Martin (2005), "Sensitive Products" are chosen for each country by taking into account the importance of the product, the height of its existing tariff, and the gap between its bound and applied tariffs in that country.

Scenario 4 considers the impact of a proportional cut formula that brings about the same reduction in average agricultural tariffs in developed countries as a group (44 percent), and developing countries as a group (21 percent), as the tiered formulas used in Scenario 1.

Scenario 5 has the same proportional cut formula as Scenario 4 but adds 2% Sensitive Products in developed countries and 4% Sensitive and Special Products in developing countries, thereby reducing the average cut to 16 percent for developed countries and 9 percent for developing countries.

Scenario 6 considers the effects of adding to Scenario 5 a tariff cap of 200% such that any product with a bound tariff in excess of that limit will be subjected to a reduction down to that cap rate, which leads to average cuts in food and agricultural tariffs of 18 percent for both developed and developing countries.

Scenario 7 adds to Scenario 1 the cuts in non-agricultural tariff bindings of 50 percent in developed countries, 33 percent in developing countries, and zero in least-developed countries.

Finally, ***Scenario 8*** makes developing (including least-developed) countries full participants in the round, undertaking the same reductions in bound (but not necessarily applied) tariffs as the developed countries in Scenario 7.

The average tariffs resulting from all these scenarios are summarized, along with the original projected 2005 tariffs prior to reform, in Appendix Table A-8.

Estimated welfare and trade effects of those scenarios as of 2015

The welfare consequences of implementing these various reforms over the 2005-2010 period and allowing the global economy to adjust to 2015 are summarized in Table 8 in dollar terms and in Table 9 as percentage changes in real income in 2015.

Column 1 suggests that agricultural liberalization using the harmonizing formula (Scenario 1) would generate a global gain of $75 billion even without the inclusion of non-agricultural tariff reform. But almost all those benefits accrue to the reforming high-income countries (with whom we include protective Korea and Taiwan) such that developing countries would gain only $9 billion because their bound tariffs are so high as to lead to almost no reform by them. Were the high-income countries allowed to exclude from cuts even just 2% of their "Sensitive Products" (and developing countries 4%), those global gains would shrink to just $18 billion, or to $13 billion if that tolerance was raised to 5% (and 10% for developing countries). In both cases developing countries as a group would be worse off (Scenarios 2 and 3).

Should the tiered formula be replaced by a straightforward proportional cut that brings about the same average agricultural tariff reduction in the high-income group, and in the developing country group, as the tiered formulas used in Scenario 1, the global gains are lower but not by much ($66 billion compared with Scenario 1's $75 billion). And the developing countries' share of that is even larger than in Scenario 1. Even if "Sensitive Products" and "Special Products" were allowed with the harmonized formula, as in Scenario 5, the global gains would be no lower than under the tiered formula – and they could be raised substantially, as in Scenario 6, simply by putting a cap of 200% on tariffs. Together these six scenarios suggest that the complexity of negotiating a tiered formula may simply not be worth the effort, especially if it leads to high-income countries insisting on exceptional treatment for their "Sensitive Products".

The final two scenarios add non-agricultural tariff cuts to the agricultural reforms in the preceding scenarios. In scenario 7, Special and Differential Treatment is provided for developing countries' non-agricultural cuts, as is the case for all the preceding agricultural cut scenarios. Even so, the gain to developing countries by adding these non-farm reforms doubles relative to

Scenario 1 where only agriculture is cut, contributing one-third of the extra boost to global welfare ($7.1 billion out of the $21.6 billion difference between the global gains from Scenarios 1 and 7). In Scenario 8, the developing (including least-developed) countries fully engage in the reform process, foregoing the Special and Differential Treatment provided for in Scenarios 1 and 7. That boosts theirs and global welfare substantially, because that ensures their bound tariff cuts lead to considerably larger cuts to applied tariffs (shown in Appendix Table A-8). Nonetheless, the global average tariff for merchandise hardly changes for just agricultural reform, whereas it falls by almost one-third or 1.5 percentage point once manufacturing is included (Appendix Table A-8(d)).

Retaining Special and Differential Treatment as in Scenario 7 would yield a global gain of $96 billion from Doha merchandise liberalization, which is a sizable one-third of what is on the table (the potential welfare gain from full liberalization of $287 billion, reported in Tables 2 and 3). But for developing countries the gain would be only $16 billion, which is less than one-fifth of that group's potential gain shown in Table 2 of $86 billion. If they forego Special and Differential Treatment, that raises their gain by 42 percent, or an extra $7 billion. Much of those gains go to the largest developing economies, but note that in percentage terms Sub-Saharan Africa also gains substantially if it liberalizes more – contrary to the presumptions of many commentators. By contrast, in Scenario 7 those SSA countries simply are not liberalizing enough to get sufficient efficiency gains to offset the terms of trade losses suffered either as net food importers, or as recipients of tariff preferences that have eroded with the decline in high-income countries' MFN tariffs, or because of the combined export growth from reforming economies with similar export compositions.

The aggregate global welfare consequences of Doha Scenario 7 (agricultural and manufacturing trade liberalization with lesser cuts for developing countries and no reform by least-developed countries) are hardly altered if agricultural domestic and export subsidies are not cut. The welfare effects on reforming countries and their significant trading partners are altered though. Table 10 shows the changes to the national welfare effects for Scenario 7 if first export subsidies are not cut and then if domestic subsidies also remain uncut. Not surprisingly, it is the exclusion of cuts to export subsidies that reduce the welfare gain most for the EU, while for the US it is the exclusion of cuts to domestic support. Recall that these welfare effects are altered because of changes not only in efficiency of resource use but also in terms of trade, with the latter altering because of other countries' as well as own reforms. Unprotected Latin America and Australia and New Zealand gain most from the progressive addition of subsidy cuts to the scenario.

How big would be the consequences of reform for farm output and employment growth over the implementation period post-2004? Tables 11 and 12 show what that annual growth to 2015 would be in the baseline (no policy changes post-2004), what it would be if all distortions to merchandise trade were removed, and what it would be under Doha Scenario 7 (with and without cuts to farm subsidies). If there was completely free trade, farm output would decline (instead of growing slightly) in just the EU and Japan while growing slower in a few other highly protective countries – but, for most countries/regions shown in Table 11, farming activities would expand. The Doha Scenario 7 would involve much less reform than a move to free trade, and so involves a much slower loss of farm output for the EU and Japan – but also less output growth than under free trade for the vast majority of countries that would gain. A comparison of columns 1 and 3 of Table 11 reveals that for most of the protective economies, Doha Scenario 7

would simply slow the growth of farm output a little over the coming decade. This contrasts with the rhetoric suggesting farm protection cuts would cause a major collapse of protected sectors.

The farm employment picture is somewhat different. Typically, economic growth leads to declines in not only the relative importance of agriculture (for reasons explained in Anderson 1987 and Martin and Warr 1993) but also in absolute numbers employed in farming once a country reaches middle-income status. Thus it is not surprising that numerous middle- and high-income countries are projected to lose farm jobs over the next decade in the baseline scenario of Table 12. For the most protected farm sectors, that rate of farm employment decline would more than double if the world were to move to completely free trade; but it would increase only slightly under Doha Scenario 7. For other economies, though, farm employment would grow a little faster under that Doha scenario as compared with the baseline, allowing developing countries to absorb more workers on their farms.[11] A comparison of the final three columns of Table 11 or 12 shows the changes under Doha are only slightly less when subsidies are not cut, which is consistent with the relatively small contribution that cuts to subsidies make to the welfare gain from reform.

The trade consequences of Doha Scenario 7 are summarized in Table 13. The first column shows that by 2015, annual developing country exports would be greater by $41 billion for agricultural products, $25 billion for textiles and clothing, and $12 billion for other manufactures. Their total of $78 billion is somewhat smaller than that for high-income countries ($135 billion), but that difference is less when expressed in percentage terms (2.6 percent, compared with 3.1 percent for high-income countries). This takes the world economy one-fifth

[11] This finding of only small intersectoral labor movements in response to partial trade reform is consistent with econometric evidence of adjustments to past trade reforms (see, e.g., Wacziarg and Wallack 2003).

the way to where it would be if the move was to completely free trade in merchandise (compare the first columns of Tables 5 and 14). It also raises the share of agricultural and food production that is exported globally from 9.5 to 10.0 percent, which is one-seventh of the way towards its share of 13.2 percent under the free merchandise trade scenario. Table 14 shows that even in the protected countries this ratio rises a little or, in the case of Europe, falls only very slightly. This is because of farm resources moving from import-competing to more-competitive farming sub-sectors.

Of more interest to trade negotiators are the changes in bilateral trades: they want to see the extent to which such an exchange of market access would be 'balanced'. Not surprisingly, developing countries expand their exports of agricultural and textile products to high-income countries more than they expand their imports of those products from high-income countries. But the opposite is true of other manufactures, so that for merchandise trade in total the difference is not great: in f.o.b. terms developing countries in 2015 would sell $62 billion more to high-income countries and would buy $54 billion in return under Doha Scenario 7 (see columns 2 and 3 of Table 13). This small gap might be tolerated by high-income countries as a concession to development, but otherwise it could be narrowed by developing countries demanding less Special and Differential Treatment or giving more than they get from high-income countries in terms of opening up services trade.

What about poverty alleviation? In a separate paper we estimate that, under the full merchandise trade liberalization scenario, the number of people in extreme poverty in developing countries (those earning no more than $1/day) would drop by 32 million in 2015 relative to the baseline level of 622 million, a reduction of 5 percent. The majority of the poor by 2015 are

projected to be in Sub-Saharan Africa, and there the reduction would be 6 percent. [12] Under the Doha scenarios, as summarized in Table 16, the poverty impacts are far more modest. The number of poor living on $1/day or less is estimated to fall by 2.5 million in the case of the core Doha Scenario 7 (of which 0.5 million are in Sub-Saharan Africa) and by 6.3 million in the case of Doha Scenario 8 (of which 2.2 million are in Sub-Saharan Africa). This corresponds to the relatively modest ambitions of the merchandise trade reforms as captured in these Doha scenarios. If only agriculture was reformed (Doha Scenario 1) there would be much less poverty alleviation globally and none at all in -Saharan Africa. This shows the importance for poverty of including manufactured products in the Doha negotiations.

Caveats

Results such as those presented above are always dependent on the assumptions, data and parameters underlying them and so are subject to numerous qualifications. One that is particularly important to highlight has to do with the way preferences are treated in the Version 6 GTAP database. In previous versions of that database, only key *reciprocal* preferences were

[12] The approach here has been to take the change in the average per capita consumption of the poor, apply an estimated income-to-poverty elasticity, and assess the impacts on the poverty headcount index. We have done this by calculating the change in the real wage of unskilled workers, deflating it by a food/clothing consumer price index which is more relevant for the poor than the total price index. That real wage grows, over all developing countries, by 3.6 percent, or more than four times greater than the overall average income increase. We are assuming that the change in unskilled wages is fully passed through to households. Also, while the model closure has the loss in tariff revenues replaced by a change in direct household taxation, the poverty calculation assumes – realistically for many developing countries -- that these tax increases only affect skilled workers and high-income households. While these simple calculations are not a substitute for more-detailed individual country case study analysis using detailed household surveys as in, for example, Hertel and Winters (2005), they are able to give a broad region-wide indication of the poverty impact.

included (notably between members within the EU, NAFTA, ASEAN and Australia-New Zealand Closer Economic Relationship), whereas the new Version 6 added *non-reciprocal* tariff preferences provided by developed countries for their imports from developing countries under numerous arrangements such as the Generalized System of Preferences (GSP), the EU's provisions for former colonies under the Africa, Caribbean and Pacific (ACP) program and more recently for Least Developed Countries under the Everything But Arms (EBA) agreement, and likewise the US's Africa Growth and Opportunity Act (AGOA) and Caribbean Basin Initiative (CBI). We have made the assumption that there are no rules of origin (ROOs) or the like which discourage developing countries from taking full advantage of those preferences (even though we know ROOs often lead to underutilization); and we assume perfect competition between traders in the two sets of countries, which determines how rents from those preferences are shared between the exporting and importing countries (even though we know the developed country importers often have more market power than the developing country exporters of standard commodities such that the latter receives a smaller share of the rents than our analysis generates).[13] We therefore overstate the extent of preference erosion that would occur for especially least-developed countries, and so understate their gains from trade reform. If instead those non-reciprocal preferences were excluded from the database, we would overestimate the preference-receiving countries' gains from developed country trade reform. So until we have a

[13] Evidence that the preference margin is often eroded by complex rules of origin, and that the rent is shared between importing and exporting countries with the latter getting less the more trade is concentrated on standard commodities, can be found in Olarreaga and Ozden (2004) and Ozden and Sharma (2004). A recent partial equilibrium study found that in practice export revenue losses from preference erosion are likely to be limited to a small subset of countries, primarily small island economies dependent on exports of sugar, bananas and, to a far lesser extent, textiles (Alexandraki and Lankes 2004).

better way to incorporate these real-world aspects of preference schemes, the reader should simply be aware that the welfare gains would be higher (or losses less) for least-developed countries than indicated above.[14] The difference would not be great for Rest of Sub-Saharan Africa however, according to the results presented in Table 6.9 by Bouët, Fontagné and Jean (2005).

Imports of agricultural products subject to tariff rate quotas (TRQs) are handled less than perfectly in the World Bank's LINKAGE model and the GTAP database, in two respects. First, in the Version 6 GTAP database the treatment of tariffs applied on TRQ commodities depends on the extent to which the quota is filled: if the quota is less than 90 percent filled, the in-quota tariff is assumed to apply on these commodities; if the quota is between 90 and 99 percent filled, the effective tariff is assumed to be the average of the in- and the out-of-quota tariff; and if the quota is more than 99 percent filled, then the out-of-quota tariff is applied. Second, where TRQs are non-binding and hence the in-quota tariff is used, and preferences are provided to developing countries, such a preference may well be illusory. If imports increased, for example, the out-of-quota tariff may kick in. Furthermore, de Gorter and Kliauga (2005) identify cases where the out-of-quota tariff has been applied at the margin even though the quota was not filled. This provides additional reasons to expect that we have overstated the benefits of preferences/costs of preference erosion.

[14] A further complication is that the ACP non-reciprocal preference scheme is to be replaced from 2008 with reciprocal Economic Partnership Agreements (EPAs) between those countries and the EU.

Another important caveat worth stressing is that the above results do not incorporate the fact that trade reform typically boosts factor productivity.[15] If instead we were to assume productivity is positively related to changes in sectoral openness, as specified in World Bank (2002) and Anderson, Martin and van der Mensbrugghe (2005), then the estimated global gains from freeing merchandise trade increase by one-third.[16] More importantly, they increase by two-thirds for developing countries, because the initial protection rates are so much higher there (Table 15). For this reason even more than because of our treatment of preferences, the welfare effects presented in this paper should be taken as very much lower-bound estimates.

The above analysis does not include costs of adjustment to reform, but these are typically far less than commonly assumed.[17] Indeed, the structural changes that take place over time in the normal course of economic growth are shown above to be typically very much larger than the small changes that would accompany gradual and partial trade liberalization. Furthermore, adjustment assistance scheme (financed by foreign aid in the case of low-income countries) are a way to help fund adjustment to tariff and subsidy cuts – and they are just one-off payments, whereas the benefits of reform continue into the future.

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[15] For recent reviews of the literature on the links between trade liberalization , economic growth and poverty alleviation, see for example Winters (2002, 2004), Winters, McCulloch and McKay (2004), Dollar and Kraay (2004), Anderson (2004) and DTI (2004).

[16] The trade-related productivity increase is limited to the manufacturing sectors in this simulation, unlike World Bank (2002) where agricultural productivity was also allowed to responds to changes in openness.

[17] For a review of the empirical literature supporting this view, see Anderson (2004, pp. 560-62).

Lessons and implications

To summarize the above findings, we provide the following as the key messages that emerge from our analysis:

- The potential gains from further global trade reform are large;
- Developing countries could gain disproportionately from further global trade reform;
- Benefits could be as much from South-South as from South-North trade reform;
- Agriculture is where cuts are needed most;
- Large cuts in both agricultural tariffs and domestic support commitments are needed to erase binding overhang;
- A complex tiered formula may be little better than a proportional cut with a cap on farm tariffs;
- Even large cuts in agricultural tariffs do little if "Sensitive Products" are allowed, again unless a cap applies;
- Cotton subsidy cuts would help cotton-exporting developing countries;
- Expanding non-agricultural market access would add substantially to the gains from agricultural reform, and help balance the exchange of "concessions";
- Some poor countries may lose slightly, although that is less likely the more they reform themselves; and
- Farm output and employment would not decline in developing countries under Doha.

Among the numerous policy implications that can be drawn from our analysis, several are worth highlighting. First, with gains of the order of $300 billion per year at stake from implementing the July Framework Agreement, even if no reforms are forthcoming in services,

and even if the counterfactual would be the status quo rather than protectionist backsliding, the political will needs to be found to bring the round to a successful conclusion, and the sooner the better. Multilateral cuts in MFN bindings are helpful also because they can lock in previous unilateral trade liberalizations that otherwise would remain unbound and hence vulnerable to backsliding; and they can be used as an opportunity to multilateralize previously agreed preferential trade agreements and thereby reduce the risk of trade diversion from those bilateral or regional arrangements.

Second, agricultural reforms need to be significant if the Doha agreement is to be pro-development and pro-poor. Outlawing agricultural export subsidies is the obvious first step. That will bring agriculture into line with the basic GATT rule against such measures, and in the process help to limit the extent to which governments encourage agricultural production by other means (since it would raise the cost of surplus disposal). Concurrently, domestic support bindings must be cut very substantially to reduce binding overhang. In so doing, the highest-subsidizing countries, namely the EU, US and Norway, need to reduce their support, not just for the sake of their own economies but also to encourage developing countries to reciprocate by opening their markets as a quid pro quo. An initial installment of a 20 percent cut is nothing more than a start towards getting rid of that overhang. Even more importantly, agricultural tariff bindings must be cut hugely so that some genuine market opening can occur. Exempting even just a few “Sensitive” and “Special Products” is undesirable as it would reduce hugely the gains from reform. If it turns out to be politically impossible not to designate some products as “Sensitive” and “Special”, it would be crucial to impose a cap such that any product with a bound tariff in excess of, say, 100 percent had to reduce it to that cap rate. Should it prove to be too difficult or time-consuming to negotiate a complex tiered formula for cutting farm tariffs, our

results suggest a proportional cut of the same average magnitude plus a cap to bring down the very highest bound tariffs could be nearly as effective in raising welfare.

Third, expanding non-agricultural market access at the same time as reforming agriculture is essential. A balanced exchange of concession is impossible without adding other sectors, and it needs to be more than just textiles and clothing (which also benefit developing countries disproportionately) even though they are the other highly distorted sector. With other merchandise included, the trade expansion would be many times greater for both rich and poor countries.

Fourth, South-South "concessions" also are needed, especially for developing countries, which means reconsidering the extent to which developing countries liberalize. Since developing countries are trading so much more with each other now, they are the major beneficiaries of reforms within their own regions. Even least developed countries should consider reducing their tariff binding overhang at least, since doing that in the context of Doha gives them more scope to demand "concessions" (or compensation for preference erosion or other contributors to terms of trade deterioration) from richer countries than if they hang on to their opportunity not to engage in reform.

In conclusion, the good news in this paper is that there is a great deal to be gained from liberalizing merchandise – and especially agricultural – trade under Doha, with a disproportionately high share of that potential gain available for developing countries (relative to their share of the global economy). Moreover, it is the poorest people in developing countries that appear to be most likely to gain from global trade liberalization, namely farmers and unskilled laborers in developing countries. To realize that potential gain, it is in agriculture that by far the greatest cuts in bound tariffs and subsidies are required. However, the political

sensitivity of farm support programs, coupled with the complexities of the measures introduced in the Uruguay Round Agreement on Agriculture and of the modalities set out in the Doha Framework Agreement of July 2004, ensure the devil will be in the details of the final Doha agreement. It is for that reason that ex ante empirical analysis of the sort provided above is a prerequisite for countries engaged in the Doha round of negotiations.

What emerges from that analysis is that developing countries would not *have* to reform very much under Doha, because of the large gaps between their tariff bindings and applied rates. That is even truer if they exercise their right (as laid out in the July Framework Agreement) to undertake lesser tariff cuts than developed countries. In that case, they gain little in terms of improved efficiency of national resource use. Yet, as Panagariya (2004) and others have warned, for a non-trivial number of low-income countries their terms of trade could deteriorate. For some that is because they would lose tariff preferences on their exports. For others it is because they are net food importers and so would face higher prices for their imports of temperate foods. To realize more of their potential gains from trade, developing and least developed countries would need to forego some of the Special and Differential Treatment they have previously demanded, and perhaps also commit to additional unilateral trade (and complementary domestic) reforms, and to invest more in trade facilitation. High-income countries could encourage them to do so by being willing to open up their own markets more to developing country exports and by providing more targeted aid.

To that end, a new proposal has been put forward to reward developing country commitments to greater trade reform with an expansion of trade-facilitating aid, to be provided by a major expansion of the current Integrated Framework which is operated by a consortium of international agencies for least developed countries (Hoekman 2005a,b). This may well provide

an attractive path for developing countries seeking to trade their way out of poverty, not least because it would help offset the tendency for an expanded aid flow to cause a real exchange rate appreciation (see Commission for Africa 2005, pp. 296-97). As well, it is potentially a far more efficient way for developed countries to assist people in low-income countries than the current systems of tariff preferences.

In conclusion, the July Framework Agreement does not guarantee major gains from the Doha Development Agenda. On the one hand, even if an agreement is ultimately reached, it may be very modest. How modest depends on, among other things, the nature of the agricultural tariff-cutting formula, the size of the cuts, the extent to which exceptions for Sensitive and Special Products are allowed, whether a tariff cap is introduced, and the extent to which developing countries engage in terms of making market access commitments. But what is equally clear, on the other hand, is that major gains are possible, if only the political will to reform protectionist policies – especially in agriculture – can be mustered.

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Table 1: Effects of a tiered formula cut[a] in agricultural domestic support, 2001

	AMS *percent*	Cut in support **binding** *percent*	**Cut in applied support** *percent*
United States	20	75	-28
Norway	114	75	-18
European Union-15	42	75	-16
Australia	11	60	-10
Canada	24	75	0
All other countries		60	0

Note: (a) All countries with Aggregate Measure of Support (AMS) notifications of 20 percent or more of the value of production cut their bound domestic support by 75 percent, and all others by 60 percent

Source: Jensen and Zobbe (2005)

Table 2: Impacts on real income from full liberalization of global merchandise trade, by country/region, 2015

(*Impacts in* 2015 *relative to the baseline, in 2001 dollars*)

	Real income gain ($billion)	**Gain due just to change in terms of trade** ($billion)	***as % of baseline income in 2015***
Australia and New Zealand	6.1	3.5	1.0
EU 25 plus EFTA	65.2	0.5	0.6
United States	16.2	10.7	0.1
Canada	3.8	-0.3	0.4
Japan	54.6	7.5	1.1
Korea and Taiwan	44.6	0.4	3.5
Hong Kong and Singapore	11.2	7.9	2.6
Argentina	4.9	1.2	1.2
Bangladesh	0.1	-1.1	0.2
Brazil	9.9	4.6	1.5
China	5.6	-8.3	0.2
India	3.4	-9.4	0.4
Indonesia	1.9	0.2	0.7
Thailand	7.7	0.7	3.8
Vietnam	3.0	-0.2	5.2
Russia	2.7	-2.7	0.6
Mexico	3.6	-3.6	0.4
South Africa	1.3	0.0	0.9
Turkey	3.3	0.2	1.3
Rest of South Asia	1.0	-0.8	0.5
Rest of East Asia	5.3	-0.9	1.9
Rest of LAC	10.3	0.0	1.2
Rest of ECA	1.0	-1.6	0.3
Middle East and North Africa	14.0	-6.4	1.2
Selected SSA countries	1.0	0.5	1.5
Rest of Sub Saharan Africa	2.5	-2.3	1.1
Rest of the World	3.4	0.1	1.5
High-income countries	**201.6**	**30.3**	**0.6**
Developing countries--WTO definition	**141.5**	**-21.4**	**1.2**
Developing countries	**85.7**	**-29.7**	**0.8**
Middle-income countries	69.5	-16.7	0.8
Low-income countries	16.2	-12.9	0.8
East Asia and Pacific	23.5	-8.5	0.7
South Asia	4.5	-11.2	0.4
Europe and Central Asia	7.0	-4.0	0.7
Middle East and North Africa	14.0	-6.4	1.2
Sub-Saharan Africa	4.8	-1.8	1.1
Latin America and the Caribbean	28.7	2.2	1.0
World total	**287.3**	**0.6**	**0.7**

Source: Authors' World Bank LINKAGE model simulations

Table 3: Regional and sectoral source of gains from full liberalization of global merchandise trade, developing and high-income countries, 2015

(*Change in real income in* 2015 *relative to baseline scenario*)

	Gains by region in $billion			Percent of global gain		
	Devel-oping	*High-income*	*World*	*Devel-oping*	*High-income*	*World*
Developing countries liberalize:						
Agriculture and food	30	19	49	10	6	16
Textile and clothing	9	12	21	3	5	8
Other merchandise	6	52	58	2	19	21
All sectors	45	83	128	15	30	45
High-income countries liberalize:						
Agriculture and food	26	107	133	9	37	46
Textile and clothing	15	2	17	5	1	6
Other merchandise	4	5	9	1	2	3
All sectors	45	114	159	15	40	55
All countries liberalize:						
Agriculture and food	56	126	182	19	43	62
Textile and clothing	24	14	38	8	6	14
Other merchandise	10	57	67	3	21	24
All sectors	90	197	287	30	70	100

Note: (a) Small interaction effects are distributed proportionately and numbers are rounded to sum to 100 percent
Source: Authors' World Bank LINKAGE model simulations

Table 4: Change in bilateral trade flows from full liberalization of global merchandise trade, by sector and region, 2015

(*Change in bilateral trade flows at FOB prices in* 2015 *compared to the baseline, $billion*)

	Importer								
	wlx[a]	*hix*	*lmy*	*eap*	*sas*	*eca*	*mna*	*ssa*	*lac*
Exporter	**Agriculture and food**								
World	313.9	186.3	127.6	38.9	17.1	19.1	16.0	10.5	20.2
High-income	103.7	53.5	50.2	12.2	2.7	10.2	8.6	5.1	10.3
Developing	210.2	132.8	77.4	26.7	14.4	8.9	7.5	5.4	9.9
East Asia & Pac.	37.0	17.6	19.4	8.6	7.7	0.4	0.4	1.2	1.1
South Asia	10.4	2.4	8.0	1.8	3.1	1.8	0.5	0.5	0.3
Eur. & C. Asia	17.6	8.5	9.1	1.5	0.5	1.9	4.9	0.2	0.2
M. East & N. Afr	14.3	10.5	3.8	1.0	0.9	0.8	0.5	0.5	0.2
Sub-Sah. Africa	18.5	11.0	7.5	2.4	1.8	0.2	0.2	2.1	0.8
Lat. Amer. & Car.	103.8	78.5	25.3	8.4	-0.4	3.7	1.0	0.8	7.3
	Textile and clothing								
World	164.3	78.9	85.4	41.3	7.2	5.9	10.6	4.6	14.3
High-income	47.4	7.8	39.6	32.7	2.6	1.0	-3.5	0.7	5.4
Developing	116.8	71.1	45.7	8.6	4.6	4.9	14.1	3.8	8.8
East Asia & Pac.	88.9	55.1	33.9	4.7	3.1	2.9	13.4	2.9	6.3
South Asia	24.7	16.5	8.2	2.4	0.9	1.1	0.2	1.3	2.3
Eur. & C. Asia	-1.3	-1.5	0.2	0.2	0.1	-0.8	0.5	0.0	0.1
M. East & N. Afr	3.4	0.4	3.0	0.6	0.3	1.7	-0.2	0.1	0.5
Sub-Sah. Africa	0.5	0.5	0.0	0.1	0.2	0.0	0.1	-0.5	0.1
Lat. Amer. & Car.	-2.4	-1.8	-0.6	0.0	0.0	0.0	0.0	0.0	-0.8
	Other manufacturing								
World	594.6	226.5	368.1	148.7	59.8	23.4	32.7	17.9	79.3
High-income	312.1	112.3	199.8	81.1	31.2	17.3	12.8	10.0	42.4
Developing	282.5	114.3	168.2	67.6	28.6	6.1	19.8	8.0	36.9
East Asia & Pac.	125.8	41.9	84.0	43.5	6.2	3.2	6.6	4.2	20.0
South Asia	45.4	20.2	25.2	7.8	3.5	1.8	4.9	3.3	3.3
Eur. & C. Asia	30.1	12.1	18.0	7.3	2.9	-0.8	6.5	0.8	1.4
M. East & N. Afr	42.1	19.9	22.2	6.3	11.3	1.5	1.0	0.6	1.6
Sub-Sah. Africa	14.5	8.9	5.6	1.2	4.1	0.1	0.4	-1.6	1.3
Lat. Amer. & Car.	22.2	10.9	11.3	0.4	0.6	0.2	0.4	0.7	8.7
	All merchandise trade								
World	1,072.8	491.8	581.0	229.0	84.1	48.5	59.3	33.0	113.7
High-income	463.2	173.5	289.6	125.9	36.5	28.5	17.9	15.8	58.1
Developing	609.6	318.2	291.4	103.0	47.6	20.0	41.4	17.2	55.6
East Asia & Pac.	251.8	114.6	137.3	56.8	17.0	6.5	20.5	8.2	27.4
South Asia	80.5	39.1	41.4	11.9	7.5	4.7	5.6	5.1	5.8
Eur. & C. Asia	46.3	19.0	27.3	9.0	3.4	0.4	11.8	1.0	1.8
M. East & N. Afr	59.8	30.8	29.1	7.8	12.5	4.0	1.3	1.2	2.3
Sub-Sah. Africa	33.5	20.4	13.1	3.7	6.1	0.3	0.7	0.1	2.2
Lat. Amer. & Car.	123.6	87.7	35.9	8.8	0.3	3.9	1.5	1.6	15.2

Note: (a) Aggregations exclude intra-EU trade

Source: Authors' World Bank LINKAGE model simulations

Table 5: High-income countries' shares of global output and exports[a], by sector, 2015

(*baseline versus full global merchandise trade liberalization, percent*)

	Primary agriculture	Processed food, beverages and tobacco	Textiles and clothing	Other manufacturing
Output				
— baseline	30	60	38	65
— free trade	25	60	35	65
Exports				
— baseline	53	66	37	70
— free trade	38	60	33	68

Note: (a) Including intra-EU trade

Source: Authors' World Bank LINKAGE model simulations

Table 6: Impacts of full global merchandise trade liberalization on real factor prices[a]

(*Percent change in real factor prices relative to the baseline in* 2015)

	Un-skilled wages	Skilled wages	Capital[b] user cost	Land[b] user cost	CPI
Australia and New Zealand	3.1	1.1	-0.3	17.4	1.2
EU 25 plus EFTA	0.0	1.3	0.7	-45.4	-1.3
United States	0.1	0.3	0.0	-11.0	-0.4
Canada	0.7	0.7	0.4	22.8	-0.9
Japan	1.3	2.2	1.1	-67.4	-0.1
Korea and Taiwan	6.5	7.1	3.8	-45.0	-0.7
Hong Kong and Singapore	3.2	1.6	0.3	4.4	1.1
Argentina	2.9	0.5	-0.7	21.3	0.3
Bangladesh	1.8	1.7	-0.2	1.8	-7.2
Brazil	2.7	1.4	1.6	32.4	2.2
China	2.2	2.2	2.8	-0.9	-0.4
India	2.8	4.6	1.8	-2.6	-6.0
Indonesia	3.3	1.5	0.9	1.0	0.5
Thailand	13.2	6.7	4.2	11.4	-0.6
Vietnam	25.3	17.6	11.0	6.8	-2.3
Russia	2.0	2.8	3.5	-2.2	-3.3
Mexico	2.0	1.6	0.5	2.8	-1.4
South Africa	2.8	2.5	1.8	5.7	-1.6
Turkey	1.3	3.4	1.1	-8.1	-0.3
Rest of South Asia	3.7	3.2	0.1	0.1	-2.7
Rest of East Asia	5.8	4.2	5.2	-0.9	-1.6
Rest of LAC	5.7	1.4	-0.4	17.8	-1.2
Rest of ECA	2.3	4.2	2.1	-0.3	-2.6
Middle East and North Africa	4.1	4.1	2.6	2.4	-3.1
Selected SSA countries	6.0	1.6	0.0	4.6	0.4
Rest of Sub Saharan Africa	8.2	6.5	2.2	5.2	-5.0
Rest of the World	4.4	2.7	1.1	6.3	-1.4
High-income countries	**0.6**	**1.1**	**0.5**	**-20.0**	**-0.6**
Developing countries	**3.5**	**3.0**	**1.9**	**0.9**	**-1.7**
Middle-income countries	3.2	2.6	1.9	2.2	-1.1
Low-income countries	4.2	3.9	1.9	-1.0	-4.0
World total	**1.2**	**1.5**	**0.8**	**-0.8**	**-0.8**

Note: a. Nominal factor prices deflated by the consumer price index (CPI).
b. The user cost of capital and land represents the subsidy inclusive rental cost.

Source: Authors' World Bank LINKAGE model simulations.

Table 7: Summary of Doha partial liberalization scenarios considered

Pre-simulation	Amends 2001 protection measures by allowing EU eastward enlargement to 25 members, implementation of WTO accession commitments by China, and implementation of Uruguay Round commitments including abolition of quotas on textiles and clothing by end-2004, followed by normal global growth projection for ten more years to 2015 (baseline simulation)
Scenarios 1-8	All assume agricultural domestic support cuts in four developed country markets and the abolition of agricultural export subsidies, plus:
Scenario 1	Harmonizing formula for agricultural market access with lesser cuts for Developing Countries and none for Least Developed Countries
Scenario 2	Scenario 1 + Sensitive Products (2% for Developed Countries and 4% for Developing Countries)
Scenario 3	Scenario 1 + more Sensitive Products (5% for Developed Countries and 10% for Developing Countries)
Scenario 4	Proportional cut in agricultural tariffs of Developed Countries (with lesser cuts for Developing Countries and none for Least Developed Countries) to get the same cut in the average tariff as in Scenario 1
Scenario 5	Proportional cut as in Scenario 4 + Sensitive Products (2% for Developed Countries and 4% for Developing Countries)
Scenario 6	Scenario 2 + reductions in high tariffs down to a 200% tariff cap
Scenario 7	Scenario 1 plus 50 percent proportional cut in all tariffs on non-agricultural products for Developed, 33 percent for Developing, zero for Least Developed Countries
Scenario 8	Developed countries' Harmonizing formula cuts for agriculture, plus Developed Countries' 50 percent proportional cut in all non-agricultural tariffs, are also each applied in Developing and Least Developed Countries

Source: Authors' assumptions (see text)

Table 8: Dollar change in real income in alternative Doha scenarios, 2015

(*change in real income in* 2015 *in* 2001 *$billion compared to baseline scenario*)

	Scen. 1	Scen. 2	Scen. 3	Scen. 4	Scen. 5	Scen. 6	Scen. 7	Scen. 8
Australia & New Zealand	2.0	1.1	1.1	2.2	1.2	1.2	2.4	2.8
EU 25 plus EFTA	29.5	10.7	9.1	28.2	10.7	10.9	31.4	35.7
United States	3.0	2.3	2.0	3.4	2.5	2.1	4.9	6.6
Canada	1.4	0.5	0.3	1.2	0.4	0.4	0.9	1.0
Japan	18.9	1.8	1.3	15.1	1.4	12.9	23.7	25.4
Korea and Taiwan	10.9	1.7	1.6	7.3	1.7	15.9	15.0	22.6
Hong Kong and Singapore	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	1.5	2.2
Argentina	1.3	1.0	1.0	1.4	1.1	1.0	1.3	1.6
Bangladesh	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1
Brazil	3.3	1.1	0.9	3.2	1.1	1.1	3.6	3.9
China	-0.5	-1.5	-1.6	-0.4	-1.4	-1.1	1.7	1.6
India	0.2	0.2	0.2	0.1	0.2	0.2	2.2	3.5
Indonesia	0.1	0.2	0.2	0.2	0.2	0.0	1.0	1.2
Thailand	0.9	0.6	0.3	1.0	0.8	0.8	2.0	2.7
Vietnam	-0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.5	-0.6
Russia	-0.3	-0.7	-0.8	-0.1	-0.7	-0.7	0.8	1.5
Mexico	-0.2	-0.3	-0.3	-0.2	-0.3	-0.3	-0.9	-0.2
South Africa	0.1	0.3	0.1	0.1	0.2	0.3	0.4	0.7
Turkey	0.6	0.0	0.0	0.5	0.1	0.0	0.7	1.4
Rest of South Asia	0.2	0.1	0.1	0.2	0.1	0.2	0.3	0.7
Rest of East Asia	0.1	0.0	0.0	0.1	0.1	1.0	0.3	0.6
Rest of LAC	3.7	0.5	0.5	3.7	0.5	0.4	3.9	4.0
Rest of ECA	-0.2	-0.3	-0.3	-0.2	-0.2	-0.2	-0.6	-0.7
Middle East & N. Africa	-0.8	-1.2	-1.5	-0.9	-1.2	-1.2	-0.6	0.1
Selected SSA countries	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.2
Rest Sub-Saharan Africa	0.0	-0.3	-0.3	0.0	-0.3	-0.3	-0.1	0.3
Rest of the World	0.4	0.0	0.0	0.3	0.0	0.0	0.6	0.6
High-income countries	**65.6**	**18.1**	**15.2**	**57.2**	**17.8**	**43.2**	**79.9**	**96.4**
WTO Dev. countries	**19.7**	**1.2**	**-0.3**	**16.3**	**1.7**	**16.8**	**32.6**	**47.7**
Developing countries	**9.0**	**-0.4**	**-1.7**	**9.1**	**0.1**	**1.1**	**16.1**	**22.9**
Middle-income countries	8.0	-0.5	-1.9	8.3	0.0	1.0	12.5	17.1
Low-income countries	1.0	0.1	0.1	0.8	0.2	0.0	3.6	5.9
East Asia and Pacific	0.5	-0.8	-1.2	0.9	-0.4	0.6	4.5	5.5
South Asia	0.4	0.3	0.3	0.3	0.3	0.4	2.5	4.2
Europe and Central Asia	0.1	-0.9	-1.1	0.2	-0.9	-0.9	0.8	2.1
Middle East & N. Africa	-0.8	-1.2	-1.5	-0.9	-1.2	-1.2	-0.6	0.1
Sub Saharan Africa	0.3	0.0	-0.2	0.3	-0.2	-0.1	0.4	1.2
Lat. America & the Carib.	8.1	2.3	2.0	8.0	2.5	2.1	7.9	9.2
World total	**74.5**	**17.7**	**13.4**	**66.3**	**17.9**	**44.3**	**96.1**	**119.3**

Source: Authors' World Bank LINKAGE model simulations

Table 9: Percentage change in real income in alternative Doha scenarios, 2015

(*change in real income in* 2015 *in percent compared to baseline scenario*)

	Scen. 1	Scen. 2	Scen. 3	Scen. 4	Scen. 5	Scen. 6	Scen. 7	Scen. 8
Australia & New Zealand	0.35	0.20	0.18	0.38	0.22	0.20	0.42	0.48
EU 25 plus EFTA	0.29	0.11	0.09	0.28	0.11	0.11	0.31	0.36
United States	0.02	0.02	0.01	0.02	0.02	0.01	0.03	0.05
Canada	0.15	0.05	0.03	0.13	0.05	0.05	0.10	0.11
Japan	0.38	0.04	0.03	0.30	0.03	0.26	0.48	0.51
Korea and Taiwan	0.86	0.13	0.13	0.58	0.14	1.26	1.19	1.79
Hong Kong and Singapore	-0.02	-0.03	-0.03	-0.02	-0.04	-0.04	0.35	0.52
Argentina	0.32	0.26	0.25	0.34	0.27	0.26	0.34	0.39
Bangladesh	-0.06	-0.03	-0.02	-0.06	-0.03	-0.04	-0.10	-0.09
Brazil	0.50	0.16	0.13	0.49	0.17	0.17	0.55	0.59
China	-0.02	-0.06	-0.06	-0.01	-0.05	-0.04	0.07	0.06
India	0.02	0.03	0.02	0.02	0.03	0.02	0.25	0.40
Indonesia	0.05	0.07	0.07	0.08	0.09	0.01	0.37	0.44
Thailand	0.43	0.29	0.15	0.49	0.38	0.38	0.99	1.33
Vietnam	-0.20	-0.09	-0.06	-0.22	-0.11	-0.16	-0.83	-0.97
Russia	-0.06	-0.16	-0.17	-0.03	-0.15	-0.15	0.16	0.31
Mexico	-0.02	-0.04	-0.04	-0.02	-0.04	-0.04	-0.11	-0.02
South Africa	0.06	0.17	0.05	0.09	0.11	0.17	0.25	0.49
Turkey	0.25	0.02	-0.01	0.22	0.02	0.02	0.26	0.55
Rest of South Asia	0.13	0.05	0.05	0.11	0.06	0.14	0.17	0.39
Rest of East Asia	0.02	0.01	0.01	0.05	0.04	0.36	0.09	0.22
Rest of LAC	0.44	0.06	0.06	0.43	0.06	0.04	0.46	0.47
Rest of ECA	-0.06	-0.09	-0.09	-0.06	-0.09	-0.08	-0.22	-0.26
Middle East & N. Africa	-0.07	-0.10	-0.13	-0.07	-0.10	-0.10	-0.05	0.01
Selected SSA countries	0.21	-0.02	0.00	0.19	-0.03	-0.05	0.19	0.26
Rest Sub-Saharan Africa	0.02	-0.13	-0.13	0.01	-0.14	-0.14	-0.02	0.13
Rest of the World	0.19	0.00	0.00	0.14	0.00	0.02	0.26	0.28
High-income countries	**0.20**	**0.06**	**0.05**	**0.18**	**0.05**	**0.13**	**0.25**	**0.30**
WTO Dev. countries	**0.17**	**0.01**	**0.00**	**0.14**	**0.01**	**0.14**	**0.27**	**0.40**
Developing countries	**0.09**	**0.00**	**-0.02**	**0.09**	**0.00**	**0.01**	**0.16**	**0.22**
Middle-income countries	0.10	-0.01	-0.02	0.10	0.00	0.01	0.15	0.21
Low-income countries	0.05	0.01	0.01	0.04	0.01	0.00	0.18	0.30
East Asia and Pacific	0.01	-0.02	-0.03	0.03	-0.01	0.02	0.13	0.16
South Asia	0.03	0.03	0.02	0.02	0.03	0.03	0.21	0.36
Europe and Central Asia	0.01	-0.09	-0.11	0.02	-0.09	-0.09	0.08	0.21
Middle East & N. Africa	-0.07	-0.10	-0.13	-0.07	-0.10	-0.10	-0.05	0.01
Sub Saharan Africa	0.06	-0.01	-0.05	0.06	-0.04	-0.02	0.10	0.27
Lat. America & the Carib.	0.29	0.08	0.07	0.29	0.09	0.08	0.29	0.33
World total	**0.18**	**0.04**	**0.03**	**0.16**	**0.04**	**0.10**	**0.23**	**0.28**

Source: Authors' World Bank LINKAGE model simulations

Table 10: Impact of excluding cuts to agricultural export and domestic subsidies[a], 2015

	$ billion			percent		
	Scen. 7	Scen. 7 (MD)	Scen 7. (M)	Scen. 7	Scen. 7 (MD)	Scen 7. (M)
Australia & New Zealand	2.4	1.8	1.6	0.42	0.32	0.27
EU 25 plus EFTA	31.4	25.1	25.5	0.31	0.25	0.25
United States	4.9	5.3	3.3	0.03	0.04	0.02
Canada	0.9	1.0	0.8	0.10	0.11	0.09
Japan	23.7	24.8	25.5	0.48	0.50	0.51
Korea and Taiwan	15.0	15.2	15.6	1.19	1.20	1.23
Hong Kong and Singapore	1.5	1.7	1.9	0.35	0.39	0.43
Argentina	1.3	1.2	0.4	0.34	0.30	0.11
Bangladesh	-0.1	-0.1	-0.1	-0.10	-0.09	-0.09
Brazil	3.6	3.5	3.0	0.55	0.54	0.46
China	1.7	2.6	4.5	0.07	0.10	0.17
India	2.2	2.2	2.1	0.25	0.25	0.23
Indonesia	1.0	0.9	0.9	0.37	0.35	0.34
Thailand	2.0	2.0	1.9	0.99	0.99	0.96
Vietnam	-0.5	-0.5	-0.5	-0.83	-0.81	-0.88
Russia	0.8	2.0	2.1	0.16	0.42	0.44
Mexico	-0.9	-0.8	-0.5	-0.11	-0.09	-0.06
South Africa	0.4	0.3	0.3	0.25	0.22	0.23
Turkey	0.7	0.7	0.8	0.26	0.30	0.32
Rest of South Asia	0.3	0.3	0.2	0.17	0.18	0.12
Rest of East Asia	0.3	0.4	0.5	0.09	0.15	0.17
Rest of LAC	3.9	4.2	3.9	0.46	0.50	0.46
Rest of ECA	-0.6	-0.3	-0.3	-0.22	-0.09	-0.10
Middle East & N. Africa	-0.6	1.0	1.3	-0.05	0.08	0.10
Selected SSA countries	0.1	0.2	0.1	0.19	0.28	0.19
Rest of Sub-Saharan Africa	-0.1	0.5	0.3	-0.02	0.22	0.14
Rest of the World	0.6	0.6	0.6	0.26	0.28	0.27
High-income countries	**79.9**	**74.9**	**74.1**	**0.25**	**0.23**	**0.23**
WTO Dev. Countries	**32.6**	**38.0**	**39.0**	**0.27**	**0.32**	**0.33**
Developing countries	**16.1**	**21.1**	**21.6**	**0.16**	**0.21**	**0.21**
Middle-income countries	12.5	16.9	18.0	0.15	0.21	0.22
Low-income countries	3.6	4.2	3.6	0.18	0.21	0.18
East Asia and Pacific	4.5	5.5	7.3	0.13	0.16	0.21
South Asia	2.5	2.4	2.2	0.21	0.21	0.19
Europe and Central Asia	0.8	2.5	2.6	0.08	0.25	0.26
Middle East & N. Africa	-0.6	1.0	1.3	-0.05	0.08	0.10
Sub Saharan Africa	0.4	1.0	0.8	0.10	0.23	0.18
Lat. America & the Carib.	7.9	8.1	6.8	0.29	0.29	0.25
World total	**96.1**	**96.0**	**95.7**	**0.23**	**0.23**	**0.22**

Note: (a) Scen. 7 (MD) is the same as Scen. 7 except export subsidies are not eliminated. Scen. 7 (M) is the same as 7 (MD) except domestic support is not cut. In other words, Scen. 7 (M) includes only cuts in import tariffs.

Source: Authors' World Bank LINKAGE model simulations

Table 11: Agricultural output growth under different scenarios, 2004-2015

(*annual percent growth rate of agricultural output between* 2004 *and* 2015)

	Baseline	Global	Scen. 7	Scen. 7 (MD)	Scen 7. (M)
Australia & New Zealand	3.5	5.2	4.3	4.1	4.0
EU 25 plus EFTA	1.0	-1.5	-0.3	0.0	0.0
United States	2.2	1.3	1.9	1.8	2.2
Canada	3.5	5.2	4.0	3.8	3.6
Japan	0.5	-4.3	-1.4	-1.4	-1.5
Korea and Taiwan	2.2	0.1	1.5	1.5	1.4
Hong Kong and Singapore	2.8	3.3	2.9	2.9	2.8
Argentina	2.9	5.1	3.5	3.5	3.1
Bangladesh	4.2	4.4	4.2	4.2	4.2
Brazil	3.3	6.1	4.4	4.3	4.0
China	4.3	4.3	4.3	4.3	4.3
India	4.3	4.1	4.4	4.4	4.4
Indonesia	3.0	2.9	3.0	3.0	3.0
Thailand	-0.1	1.3	0.4	0.3	0.3
Vietnam	5.8	6.1	5.9	5.8	5.8
Russia	1.5	1.0	1.4	1.3	1.3
Mexico	3.9	4.1	4.0	4.0	3.9
South Africa	2.5	3.3	2.6	2.4	2.4
Turkey	3.0	2.6	3.0	3.0	3.0
Rest of South Asia	4.8	4.8	4.9	4.9	4.8
Rest of East Asia	3.7	3.5	3.8	3.8	3.7
Rest of LAC	4.4	6.6	5.3	5.3	5.2
Rest of ECA	3.3	3.3	3.3	3.3	3.3
Middle East & N. Africa	4.0	4.0	4.0	4.0	3.9
Selected SSA countries	5.3	5.7	5.4	5.4	5.3
Rest of Sub-Saharan Africa	4.6	4.8	4.8	4.8	4.7
Rest of the World	5.0	6.4	5.5	5.4	5.4
High-income countries	**1.6**	**-0.1**	**0.8**	**0.9**	**1.0**
Developing countries	**3.9**	**4.2**	**4.1**	**4.0**	**4.0**
Middle-income countries	3.7	4.1	3.9	3.9	3.8
Low-income countries	4.4	4.5	4.5	4.5	4.5
East Asia and Pacific	4.0	4.0	4.0	4.0	4.0
South Asia	4.4	4.2	4.4	4.4	4.4
Europe and Central Asia	3.0	2.9	3.1	3.0	3.0
Middle East and N. Africa	4.0	4.0	4.0	4.0	3.9
Sub Saharan Africa	4.5	4.9	4.7	4.7	4.6
Latin America and Carib.	3.8	5.8	4.6	4.6	4.4
World total	**3.2**	**2.9**	**3.0**	**3.1**	**3.1**

Note: Scen. 7 (MD) is the same as Scen. 7 except export subsidies are not eliminated. Scen. 7 (M) is the same as 7 (MD) except domestic support is not cut. In other words, Scen. 7 (M) includes only cuts in import tariffs.

Source: Authors' World Bank LINKAGE model simulations.

Table 12: Agricultural employment growth under different scenarios, 2004-2015

(*annual percent growth rate of agricultural labor employment between* 2004 *and* 2015)

	Baseline	Global	Scen. 7	Scen. 7 (MD)	Scen 7. (M)
Australia & New Zealand	0.4	1.9	1.0	0.8	0.7
EU 25 plus EFTA	-1.8	-3.9	-2.8	-2.5	-2.5
United States	-0.8	-2.1	-1.2	-1.2	-0.7
Canada	0.2	1.9	0.6	0.5	0.3
Japan	-2.7	-6.5	-4.1	-4.1	-4.2
Korea and Taiwan	-1.3	-3.9	-2.1	-2.1	-2.2
Hong Kong and Singapore	0.0	0.2	0.0	0.0	0.0
Argentina	0.9	3.3	1.5	1.5	1.1
Bangladesh	1.1	1.2	1.2	1.2	1.1
Brazil	1.1	4.0	2.2	2.1	1.9
China	0.8	0.7	0.8	0.7	0.7
India	1.0	0.6	1.0	1.0	1.0
Indonesia	-0.7	-0.7	-0.6	-0.7	-0.7
Thailand	-4.6	-3.7	-4.3	-4.4	-4.4
Vietnam	3.9	3.5	4.0	4.0	3.9
Russia	-2.3	-2.7	-2.4	-2.4	-2.5
Mexico	2.0	2.3	2.3	2.3	2.2
South Africa	0.0	0.8	0.1	-0.1	-0.2
Turkey	-0.5	-1.2	-0.5	-0.5	-0.6
Rest of South Asia	2.0	1.9	2.1	2.1	2.0
Rest of East Asia	0.2	-0.1	0.3	0.2	0.2
Rest of LAC	1.9	3.8	2.6	2.6	2.6
Rest of ECA	0.0	-0.1	0.0	0.0	0.0
Middle East & N. Africa	1.5	1.4	1.5	1.5	1.4
Selected SSA countries	3.0	3.3	3.0	3.0	3.0
Rest of Sub-Saharan Africa	2.2	2.5	2.3	2.3	2.2
Rest of the World	2.4	3.5	2.7	2.7	2.7
High-income countries	**-1.5**	**-3.1**	**-2.2**	**-2.1**	**-2.0**
Developing countries	**1.0**	**1.2**	**1.1**	**1.1**	**1.0**
East Asia and Pacific	0.4	0.3	0.4	0.4	0.4
South Asia	1.2	0.9	1.2	1.2	1.2
Europe and Central Asia	-0.5	-0.8	-0.5	-0.6	-0.6
Middle East and N Africa	1.5	1.4	1.5	1.5	1.4
Sub Saharan Africa	2.3	2.6	2.4	2.4	2.3
Latin America and Carib.	1.7	3.4	2.4	2.3	2.2
World total	**0.2**	**0.0**	**0.2**	**0.2**	**0.2**

Note: (a) Scen. 7 (MD) is the same as Scen. 7 except export subsidies are not eliminated. Scen. 7 (M) is the same as 7 (MD) except domestic support is not cut. In other words, Scen. 7 (M) includes only cuts in import tariffs.

Source: Authors' World Bank LINKAGE model simulations

Table 13: Changes in bilateral trade flows from Doha Scenario 7 (agricultural reform plus non-agricultural tariff cuts), 2015

(*Difference in bilateral trade flows at FOB prices in* 2015 *compared to the baseline, $billion*)

	Importer								
	wlx[a]	*Hix*	*lmy*	*eap*	*Sas*	*eca*	*Mna*	*ssa*	*lac*
Exporter	**Agriculture and food**								
World	55.5	46.1	9.4	5.8	0.6	0.6	-0.1	0.2	1.8
High-income	14.9	15.0	-0.1	1.3	0.1	-0.7	-1.2	-0.3	0.5
Developing	40.6	31.1	9.5	4.5	0.5	1.3	1.2	0.5	1.3
East Asia & Pac.	3.9	2.5	1.3	1.1	-0.2	0.1	0.1	0.0	0.1
South Asia	1.3	0.2	1.1	0.3	0.1	0.3	0.2	0.1	0.0
Eur. & C. Asia	2.0	0.9	1.1	0.2	0.0	0.3	0.6	0.0	0.0
M. East & N. Afr	1.8	1.5	0.3	0.1	-0.1	0.0	0.2	0.1	0.0
Sub-Sah. Africa	2.6	1.4	1.2	0.5	0.1	-0.1	0.1	0.4	0.1
Lat. Amer. & Car.	27.7	23.1	4.6	2.3	0.6	0.7	0.0	0.0	1.1
	Textile and clothing								
World	40.6	28.1	12.4	9.5	0.6	0.6	0.5	0.2	0.9
High-income	15.8	5.1	10.6	8.7	0.4	0.4	0.6	0.1	0.4
Developing	24.8	23.0	1.8	0.8	0.2	0.3	-0.1	0.1	0.4
East Asia & Pac.	26.9	25.1	1.8	0.4	0.1	0.5	0.0	0.1	0.5
South Asia	2.5	1.8	0.7	0.3	0.0	0.1	-0.1	0.1	0.2
Eur. & C. Asia	-1.2	-1.0	-0.2	0.0	0.0	-0.3	0.1	0.0	0.0
M. East & N. Afr	-1.1	-1.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Sub-Sah. Africa	-0.2	-0.2	-0.1	0.0	0.0	0.0	0.0	-0.1	0.0
Lat. Amer. & Car.	-2.6	-2.1	-0.5	-0.1	0.0	0.0	0.0	0.0	-0.4
	Other manufacturing								
World	116.7	67.9	48.8	30.5	6.0	3.1	1.2	0.5	6.9
High-income	104.5	60.3	44.2	25.2	4.6	4.3	0.9	0.7	8.3
Developing	12.2	7.6	4.5	5.3	1.4	-1.2	0.2	-0.2	-1.4
East Asia & Pac.	18.5	12.9	5.6	3.9	0.5	0.4	0.0	0.1	0.6
South Asia	3.1	1.2	1.9	0.8	0.1	0.1	0.4	0.2	0.2
Eur. & C. Asia	2.6	1.7	0.9	1.6	0.1	-1.6	0.4	0.0	0.3
M. East & N. Afr	0.7	0.8	-0.1	-0.2	0.3	0.0	-0.3	0.0	0.2
Sub-Sah. Africa	-1.1	-1.6	0.4	-0.1	0.8	0.0	0.0	-0.3	0.1
Lat. Amer. & Car.	-11.2	-7.2	-4.0	-0.5	-0.3	-0.1	-0.2	-0.2	-2.8
	All merchandise trade								
World	212.7	142.1	70.6	45.8	7.1	4.4	1.6	0.9	9.6
High-income	135.1	80.4	54.7	35.2	5.1	3.9	0.3	0.5	9.2
Developing	77.6	61.7	15.9	10.7	2.0	0.4	1.4	0.5	0.4
East Asia & Pac.	49.2	40.5	8.7	5.4	0.5	1.0	0.1	0.2	1.2
South Asia	6.9	3.3	3.6	1.4	0.2	0.6	0.5	0.3	0.4
Eur. & C. Asia	3.4	1.6	1.8	1.8	0.1	-1.6	1.0	0.0	0.3
M. East & N. Afr	1.4	1.2	0.2	-0.1	0.2	-0.1	-0.2	0.1	0.3
Sub-Sah. Africa	1.2	-0.4	1.6	0.4	0.9	-0.1	0.1	0.0	0.2
Lat. Amer. & Car.	13.9	13.8	0.1	1.7	0.2	0.6	-0.2	-0.2	-2.1

Note: (a) Aggregations exclude intra-EU trade

Source: Authors' World Bank LINKAGE model simulations

Table 14: Share of agricultural and food production exported, 2001 and 2015

(*percent export share of agriculture and food production*)

	Base-line **2001**	*Baseline*	*Full global liberaliz'n*	*Scen. 7*
		2015		
Australia & New Zealand	33.3	37.2	42.7	39.5
EU 25 plus EFTA	16.7	17.3	17.6	16.6
EU 25 plus EFTA (excl. intra-EU25)	4.0	5.1	7.7	5.0
United States	6.3	7.9	9.2	8.1
Canada	24.5	29.5	40.0	32.5
Japan	0.9	1.2	2.3	1.5
Korea and Taiwan	4.4	4.8	26.5	8.6
Hong Kong and Singapore	26.0	30.0	47.8	30.8
Argentina	21.6	25.2	32.5	26.9
Bangladesh	1.7	3.6	5.7	3.5
Brazil	15.3	17.3	28.9	21.7
China	3.3	0.9	2.2	1.0
India	3.5	3.0	4.7	3.3
Indonesia	11.9	10.0	12.9	9.9
Thailand	30.2	28.2	34.6	30.1
Vietnam	23.9	26.9	35.3	26.7
Russia	6.1	5.5	6.7	6.0
Mexico	5.6	7.8	13.2	8.5
South Africa	16.0	12.7	18.8	13.5
Turkey	9.6	6.0	12.4	7.0
Rest of South Asia	6.0	6.2	9.9	6.6
Rest of East Asia	16.1	14.6	22.1	14.9
Rest of LAC	13.9	18.1	27.1	20.7
Rest of ECA	2.4	1.7	3.7	1.9
Middle East & N. Africa	5.2	6.7	11.2	7.2
Selected SSA countries	13.2	18.1	25.4	19.2
Rest of Sub-Saharan Africa	11.2	15.8	23.3	16.5
Rest of the World	6.6	7.0	17.7	8.7
High-income countries	**5.8**	**7.5**	**11.6**	**8.2**
Developing countries	**7.5**	**6.9**	**11.6**	**7.8**
Middle-income countries	7.6	6.6	11.4	7.6
Low-income countries	7.3	7.9	12.4	8.4
East Asia and Pacific	7.2	4.1	6.5	4.3
South Asia	3.8	3.6	5.7	3.9
Europe and Central Asia	3.7	2.7	5.0	3.0
Middle East & N. Africa	5.2	6.7	11.2	7.2
Sub Saharan Africa	12.5	15.8	23.1	16.6
Lat. America & the Carib.	12.7	15.9	24.8	18.5
World total	**9.5**	**9.5**	**13.2**	**10.0**
World total (excl. intra-EU25)	6.6	7.2	11.6	8.0

Source: Authors' World Bank LINKAGE model simulations

Table 15: Impacts on real income from full liberalization of global merchandise trade, without and with endogenous productivity growth, 2015

(*change in real income in* 2015 *compared to baseline*)

	Productivity fixed		Endogenous productivity	
	$billion	Percent	$billion	Percent
High-income countries	202	0.6	254	0.8
Developing countries	86	0.8	142	1.4
— Middle income	*70*	*0.8*	*101*	*1.2*
— Low income	*16*	*0.8*	*41*	*2.1*
World total	**287**	**0.7**	**396**	**0.9**

Source: Authors' World Bank LINKAGE model simulations, as reported in more detail in Anderson, Martin and van der Mensbrugghe (2005)

Table 16: Changes in poverty (those earning <$1/day) in alternative Doha scenarios compared with full liberalization, 2015

	Baseline	Full liberalization	Doha alternatives		
			Doha Scenario 1	*Doha Scenario 7*	*Doha Scenario 8*
2015 Headcount (%)					
East Asia & Pacific	0.9	0.8	0.9	0.9	0.9
Latin America & Caribbean	6.9	6.6	6.9	6.9	6.8
South Asia	12.8	12.5	12.8	12.7	12.6
Sub-Saharan Africa	38.4	36.0	38.4	38.3	38.1
All developing countries	**10.2**	**9.7**	**10.2**	**10.2**	**10.1**
	2015 level	**Decrease from baseline in millions**	**Decrease from baseline in millions**		
2015 Headcount					
East Asia & Pacific	19	2.2	0.1	0.3	0.5
Latin America & Caribbean	43	2.1	0.3	0.4	0.5
South Asia	216	5.6	0.2	1.4	3.0
Sub-Saharan Africa	340	21.1	-0.1	0.5	2.2
All developing countries	**622**	**31.9**	**0.5**	**2.5**	**6.3**

Source: Authors' World Bank LINKAGE model simulations as reported in Anderson, Martin and van der Mensbrugghe (2005c)

Appendix A: Details of LINKAGE and GTAP model parameters and results

Table A-1: Detailed applied tariffs (%) by sector for selected importing regions, GTAP6 (2001) vs GTAP5 (1997)

	China		India		Brazil		Middle East & North Africa		Sub-Saharan Africa	
	GTAP6	*GTAP5*	*GTAP6*	*GTAP5*	*GTAP6*	*GTAP5*	*GTAP6*	*GTAP5*	*GTAP6*	*GTAP5*
Merchandise trade	13.6	15.6	28.1	22.0	9.5	14.3	9.8	18.2	12.6	14.7
Agriculture and food	37.6	38.8	50.3	25.9	5.0	12.0	14.1	61.0	18.2	27.5
Agriculture	49.1	42.6	25.7	18.9	2.4	8.3	9.9	40.4	15.2	18.1
Rice	1.0	109.0	0.0	0.0	0.1	14.1	2.6	8.7	24.3	8.6
Wheat	1.0	113.5	0.0	0.0	0.1	6.5	9.4	47.3	10.8	14.0
Other grains	88.6	91.1	0.0	0.0	0.5	6.6	16.5	29.8	8.7	24.3
Oil seeds	101.2	110.4	35.0	0.0	0.0	5.9	6.1	42.9	4.5	18.2
Sugar	18.8	29.8	52.3	20.0	15.2	18.5	9.9	16.3	16.8	27.4
Other crops	17.8	10.8	28.1	25.4	6.0	9.0	11.0	66.8	10.3	18.5
Livestock	5.9	12.3	14.3	19.0	4.5	7.5	5.0	58.8	7.8	5.5
Processed foods	18.7	36.1	76.6	35.1	9.0	16.6	18.6	81.9	20.5	33.7
Processed meats	14.7	17.2	59.3	18.2	4.2	12.2	9.5	105.0	17.8	38.3
Dairy products	20.4	16.9	37.0	27.1	5.8	19.5	10.7	102.3	14.1	25.7
Other foods	19.8	40.3	78.7	35.2	10.0	16.5	22.9	71.8	21.9	34.3
Fossil fuels	4.3	4.5	17.3	15.0	0.1	4.9	2.9	5.3	7.8	6.5
Other natural resources	0.6	1.0	12.4	4.0	3.0	2.0	5.8	6.0	3.7	11.4
Manufacturing excl food	12.8	14.5	28.4	22.1	11.3	15.7	9.6	11.3	12.0	13.7
Textile	20.3	25.1	26.2	33.0	14.7	15.8	17.3	19.4	20.7	19.1
Wearing apparel	22.4	31.7	32.9	30.8	20.1	20.0	55.1	21.8	33.0	30.9
Leather	10.0	12.1	26.6	8.9	10.8	23.2	13.7	20.4	26.6	32.8
Chemicals etc.	13.4	13.4	30.9	25.9	8.5	9.2	6.8	8.9	9.4	10.4
Iron and steel	7.0	9.7	34.6	28.3	11.6	12.4	6.6	9.6	12.7	13.3
Motor vehicles & parts	38.2	34.4	40.4	35.0	20.1	38.6	11.9	15.2	17.5	22.2
Capital goods	11.1	12.5	21.6	20.7	10.8	14.0	6.7	9.5	8.8	9.6
Other manufacturing	10.2	12.8	32.4	24.2	11.8	12.1	7.7	10.9	12.8	17.5

Table A-1: Detailed applied tariffs (%) by sector for selected importing regions, GTAP6 (2001) vs GTAP5 (1997) (continued)

	European Union		Japan		United States		Korea & Taiwan		Can/Aus/Nzl	
	GTAP6	*GTAP5*	*GTAP6*	*GTAP5*	*GTAP6*	*GTAP5*	*GTAP6*	*GTAP5*	*GTAP6*	*GTAP5*
Merchandise trade	3.2	6.0	5.2	9.2	1.8	2.9	7.6	8.8	2.3	3.0
Agriculture and food	13.9	22.4	29.4	50.3	2.4	10.8	55.0	49.4	7.4	15.9
Agriculture	13.2	14.2	48.0	65.6	2.3	13.8	88.3	64.9	1.1	3.4
Rice	92.6	76.0	862.4	409.0	4.4	5.3	874.8	4.4	0.0	0.7
Wheat	10.3	68.2	184.6	249.2	0.2	2.6	3.4	3.8	0.4	43.1
Other grains	21.3	43.1	39.0	20.2	0.0	0.6	258.0	180.3	0.0	8.7
Oil seeds	1.8	2.6	0.2	76.4	3.4	17.7	223.1	66.3	0.0	0.2
Sugar	112.9	77.5	246.5	115.0	25.5	53.1	30.5	7.4	0.5	4.4
Other crops	9.3	9.3	6.2	29.5	1.4	13.9	21.4	36.6	0.3	2.0
Livestock	1.9	10.7	4.3	27.7	0.1	0.8	3.6	6.5	7.1	10.9
Processed foods	14.7	33.4	20.9	43.0	2.5	8.9	22.7	33.5	11.0	22.1
Processed meats	39.9	76.2	47.4	48.8	2.1	4.6	31.8	22.5	23.3	38.8
Dairy products	42.1	89.7	53.7	287.0	18.3	42.5	23.0	39.2	64.3	107.1
Other foods	9.0	23.4	9.8	30.0	2.0	7.9	20.6	35.1	6.1	16.1
Fossil fuels	0.3	0.7	0.3	-0.9	0.1	0.4	4.7	4.7	1.4	0.4
Other natural resources	0.0	0.2	0.1	0.1	0.1	0.3	1.1	1.3	0.0	0.0
Manufacturing excl food	2.5	4.8	1.7	2.4	1.9	2.6	4.0	5.9	2.0	2.3
Textile	4.6	9.5	7.1	8.5	7.9	8.9	8.7	7.5	7.1	9.2
Wearing apparel	5.5	11.9	10.2	12.5	9.9	11.6	12.2	9.4	16.4	20.5
Leather	5.7	8.1	12.6	15.3	12.2	13.0	6.2	5.7	9.3	12.7
Chemicals etc.	2.2	4.8	1.0	2.0	1.7	2.7	5.2	5.5	1.2	1.8
Iron and steel	3.6	3.1	1.0	2.5	0.9	2.5	3.2	5.6	0.9	2.2
Motor vehicles & parts	6.1	7.7	0.0	0.0	1.3	1.3	20.4	16.7	3.2	2.1
Capital goods	1.1	3.5	0.0	0.1	0.6	1.4	2.4	5.6	0.8	1.4
Other manufacturing	2.9	2.8	0.9	1.5	1.1	1.6	4.9	4.7	1.3	1.7

Source: www.gtap.org

Table A-2: Regional and sectoral concordance between the LINKAGE model and the GTAP database

Modeled regions[18]

1	ANZ	**Australia and New Zealand and Canada** (anz, nzl)
2	EUR	**European Union-25 with EFTA** (aut, bel, dnk, fin, fra, deu, gbr, grc, irl, ita, lux, nld, prt, esp, swe, cyp, cze, hun, mlt, pol, svk, svn, est, lva, ltu, che, xef, xer)
3	CAN	**Canada** (can)
4	USA	**United States** (usa)
5	JPN	**Japan** (jpn)
6	HYA	**Korea and Taiwan, China** (kor, twn)
7	HYC	**Hong Kong, China and Singapore** (hkg, sgp)
8	ARG	**Argentina** (arg)
9	BGD	**Bangladesh** (bgd)
10	BRA	**Brazil** (bra)
11	CHN	**China** (chn)
12	IND	**India** (ind)
13	IDN	**Indonesia** (idn)
14	MEX	**Mexico** (mex)
15	RUS	**Russia** (rus)
16	ZAF	**South Africa** (zaf)
17	THA	**Thailand** (tha)
18	TUR	**Turkey** (tur)
19	VNM	**Vietnam** (vnm)
20	XSA	**Rest of South Asia** (lka, xsa)
21	XEA	**Rest of East Asia and Pacific** (mys, phl)
22	RLC	**Rest of Latin America and the Caribbean** (col, per, ven, xap, chl, ury, xsm, xca, xfa, xcb)
23	XEC	**Rest of Europe and Central Asia** (alb, bgr, hrv, rom, xsu)
24	MNA	**Middle East and North Africa** (xme, mar, tun, xnf)
25	SSS	**Selected SSA countries** (bwa, mwi, moz, tza, zmb, zwe, mdg, uga)
26	XSS	**Rest of Sub-Saharan Africa** (xsc, xsd, xss)
27	ROW	**Rest of the World** (xoc, xea, xse, xna)

Post-simulation aggregate regions—by income classification[19]

1	HIY	**High-income** (anz, eur, can, usa, jpn, hya, hyc)
2	HYO	**Quad countries plus ANZ** (anz, eur, can, usa, jpn)
3	OHY	**Other high-income** (hya, hyc)
4	LMY	**Developing** (arg, bgd, bra, chn, ind, idn, mex, rus, tha, tur, vnm, zaf, xsa, xea, rlc, xec, mna, sss, xss, row)
5	LMW	**Developing using WTO classification** (hya, hyc, arg, bgd, bra, chn, ind, idn, mex, rus, tha, tur, vnm, zaf, xsa, xea, rlc, xec, mna, sss, xss, row)
6	MIY	**Middle-income** (arg, bra, chn, mex, rus, tha, tur, zaf, xea, rlc, xec, mna)
7	LIY	**Low-income** (bgd, ind, idn, vnm, xsa, sss, xss, row)
8	LMX	**Developing excl China and India** (arg, bgd, bra, idn, mex, rus, tha, tur, vnm, zaf, xsa, xea, rlc, xec, mna, sss, xss, row)
9	MIX	**Middle-income excl China** (arg, bra, mex, rus, tha, tur, zaf, xea, rlc, xec, mna)
10	LIX	**Low-income excl India** (bgd, idn, vnm, xsa, sss, xss, row)
11	WLT	**World total** (all regions)

[18] The modeled regions are an aggregate of the 87 GTAP regions. The GTAP acronyms are in parenthesis. For details on the countries included in the GTAP aggregate regions see either the GTAP web site or van der Mensbrugghe (2004a).

[19] Regional aggregations containing Europe have a counterpart that excludes intra-European trade. These are respectively EUX, HIX, HYX, and WLX.

Table A-2: Regional and sectoral concordance between the LINKAGE model and the GTAP database (continued)

Post-simulation aggregate regions—by regional classification[20]		
1	EAP	**East Asia and Pacific** (chn, idn, tha, vnm, xea)
2	SAS	**South Asia** (bgd, ind, xsa)
3	ECA	**Europe and Central Asia** (rus, tur, xec)
4	MNA	**Middle East and North Africa** (mna)
5	SSA	**Sub-Saharan Africa** (zaf, sss, xss)
6	LAC	**Latin America and the Caribbean** (arg, bra, mex, rlc)
Modeled sectors		
1	RIC	**Rice** (pdr, pcr)
2	WHT	**Wheat** (wht)
3	GRO	**Other cereals** (gro)
4	OSD	**Oil seeds** (osd)
5	SUG	**Sugar** (c_b, sgr)
6	V_F	**Vegetables and fruits** (v_f)
7	PFB	**Plant-based fibers** (pfb)
8	OCR	**Other crops** (ocr)
9	LVS	**Livestock** (ctl, oap, rmk, wol)
10	FFL	**Fossil fuels** (coa, oil, gas, p_c)
11	ONR	**Other natural resources** (frs, omn)
12	PMT	**Processed meats** (cmt, omt)
13	MIL	**Dairy products** (mil)
14	VOL	**Vegetable oils and fats** (vol)
15	OFD	**Other food, beverages and tobacco** (fsh, ofd, b_t)
16	TEX	**Textiles** (tex)
17	WAP	**Wearing apparel** (wap)
18	LEA	**Leather** (lea)
19	CRP	**Chemicals, rubber and plastics** (crp)
20	I_S	**Iron and steel** (i_s)
21	MVH	**Motor vehicle and parts** (mvh)
22	CGD	**Capital goods** (otn, ele, ome)
23	OMF	**Other manufacturing** (lum, ppp, nmm, nfm, fmp, omf)
24	CNS	**Construction** (cns)
25	SVC	**Utilities and services** (ely, gdt, wtr, trd, otp, wtp, atp, cmn, ofi, isr, obs, ros, osg, dwe)
Post-simulation aggregate sectors		
1	AGR	**Agriculture** (ric, wht, gro, osd, sug, v_f, pfb, ocr, lvs)
2	PFD	**Processed food** (pmt, mil, vol, ofd)
3	AGF	**Agriculture and food** (ric, wht, gro, osd, sug, v_f, pfb, ocr, lvs, pmt, mil, vol, ofd)
4	TWP	**Textile and wearing apparel** (tex, wap, lea)
5	OMX	**Other manufacturing** (ffl, onr, crp, i_s, mvh, cgd, omf)
6	NTR	**Non-tradeables** (cns, svc)
7	MRT	**Merchandise trade** (All sectors except non-tradeables)
8	IND	**Industrial sectors** (Merchandise trade excluding agriculture)
9	INX	**Industrial sectors excl processed foods** (Merchandise trade excluding agriculture and food)
10	MNF	**Manufacturing** (Industrial sectors excluding natural resources—ffl and onr)
11	MNX	**Manufacturing excl process foods** (Manufacturing sectors excluding processed foods)
12	TOT	**All goods and non-factor services** (all sectors)

Sources: van der Mensbrugghe (2004b) and www.gtap.org

[20] The ROW region is not included in a regional aggregate, which therefore will not sum to the LMY total. Note that most of the EU-accession countries are still classified as developing countries by World Bank definitions, but not included in the ECA definition above.

Table A-3: Average applied tariffs[a], 2001
(a) *agriculture and food sectors, percent*

	Exporting region										
	WLX	**HIX**	**LMY**	**MIY**	**LIY**	**EAP**	**SAS**	**ECA**	**MNA**	**SSA**	**LAC**
Importing region											
World total	**16.7**	**17.8**	**15.6**	**16.5**	**12.4**	**20.2**	**11.4**	**8.9**	**8.8**	**11.8**	**16.2**
High-income	**16.0**	**17.9**	**14.3**	**15.9**	**8.7**	**18.2**	**8.9**	**7.9**	**8.8**	**11.4**	**14.4**
Austr. & New Zeal.	2.6	2.7	2.2	2.7	0.7	1.8	0.5	2.7	2.0	1.7	4.1
Europe	13.9	10.7	14.8	16.1	10.8	15.5	10.2	8.5	9.9	10.2	19.5
United States	2.4	2.6	2.3	2.4	1.7	2.4	1.0	4.2	2.1	3.9	2.1
Canada	9.0	10.4	3.1	3.5	0.7	2.7	0.9	4.7	2.5	1.5	3.7
Japan	29.4	37.0	18.0	21.1	5.7	21.3	5.1	7.4	10.5	27.2	13.1
Korea and Taiwan	55.0	40.9	80.8	88.9	40.2	80.5	50.7	10.4	14.8	64.6	121.7
Hong Kong & Sgp.	0.1	0.2	0.0	0.1	0.0	0.0	0.2	0.1	0.1	0.0	0.2
Developing countries	**17.7**	**17.6**	**17.7**	**17.5**	**18.4**	**24.9**	**13.5**	**10.1**	**8.8**	**12.7**	**19.3**
Middle-income	**16.5**	**17.6**	**15.2**	**15.5**	**14.0**	**17.5**	**10.4**	**10.1**	**7.7**	**11.0**	**18.6**
Argentina	7.1	11.5	5.4	5.2	12.5	13.0	10.8	12.3	10.8	12.7	4.3
Brazil	5.0	12.5	2.5	1.9	11.9	11.1	15.7	11.3	8.6	10.6	1.3
China	37.6	33.3	43.3	49.9	17.4	15.1	13.1	15.1	14.3	25.5	78.0
Mexico	11.6	10.9	17.0	17.2	15.5	15.8	10.4	23.1	16.6	22.0	17.4
Russia	13.5	15.3	12.0	12.6	7.6	12.4	7.2	0.8	7.8	7.6	28.0
South Africa	8.8	12.3	7.1	10.6	4.0	10.4	3.7	9.5	10.3	2.4	12.3
Thailand	29.7	23.4	37.1	32.5	42.0	40.4	46.4	32.0	27.9	17.3	33.9
Turkey	16.7	12.6	24.0	18.4	38.9	22.0	96.4	13.4	15.1	6.9	25.2
Rest of East Asia	13.7	10.7	17.8	19.5	14.2	22.8	5.0	143.3	5.1	22.2	7.7
Rest of LAC	11.0	13.8	8.2	8.0	11.9	13.5	11.2	13.1	9.8	9.7	7.8
Rest of ECA	16.0	20.4	11.9	12.3	7.3	12.3	6.5	11.2	14.6	10.9	13.3
Mid. East & N. Afr.	14.1	18.2	10.1	10.7	7.6	13.0	6.4	19.0	6.5	10.6	10.8
Low-income	**22.2**	**17.8**	**26.2**	**26.8**	**25.3**	**36.6**	**19.4**	**11.6**	**16.9**	**14.1**	**27.6**
Bangladesh	12.7	11.4	13.3	13.6	13.0	23.7	13.4	3.0	6.5	2.4	15.3
India	50.3	32.0	57.6	60.4	53.9	81.8	43.1	22.1	28.6	20.5	47.9
Indonesia	5.0	3.6	7.2	8.1	5.4	9.7	5.4	3.9	2.5	2.1	3.4
Vietnam	37.1	42.5	28.5	26.5	34.5	26.8	22.5	26.5	37.9	11.8	33.9
Rest of South Asia	21.3	12.8	26.2	31.0	21.5	41.1	18.5	16.5	10.8	23.2	19.0
Selected SSA ctrys.	11.9	12.9	11.6	10.9	13.0	16.2	12.7	12.2	19.8	10.8	7.5
Rest of SSA	21.4	22.1	20.5	23.3	16.5	29.7	23.8	19.5	19.0	14.7	16.7
Rest of the World	12.1	12.0	12.2	11.8	15.3	10.3	3.0	0.6	16.7	20.1	24.9
Memo items:											
East Asia and Pacific	26.3	22.8	31.0	35.0	21.1	20.0	13.9	21.2	13.8	17.4	57.8
South Asia	33.9	21.0	39.9	43.6	35.4	65.9	22.2	10.9	17.4	19.7	35.1
Eur. & Central Asia	14.8	16.6	13.1	13.0	13.7	14.4	19.8	5.8	12.8	8.5	24.0
Mid. East & N. Africa	14.1	18.2	10.1	10.7	7.6	13.0	6.4	19.0	6.5	10.6	10.8
Sub Saharan Africa	18.2	20.5	16.3	18.8	12.8	25.0	19.0	18.4	18.2	11.5	14.1
Latin America	10.3	12.3	7.5	7.2	12.7	13.4	11.2	14.0	11.2	11.8	6.8

Table A-3: Average applied tariffs[a], 2001 (continued)
(b) *textile and clothing sectors, percent*

	Exporting region										
	WLX	**HIX**	**LMY**	**MIY**	**LIY**	**EAP**	**SAS**	**ECA**	**MNA**	**SSA**	**LAC**
Importing region											
World total	**10.2**	**12.0**	**9.3**	**9.0**	**10.0**	**11.7**	**8.7**	**4.0**	**4.3**	**6.1**	**6.1**
High-income	**7.5**	**8.1**	**7.3**	**7.0**	**8.2**	**9.1**	**7.2**	**2.4**	**2.5**	**4.8**	**5.7**
Austr. & New Zeal.	13.9	9.8	15.8	16.4	13.9	16.4	12.9	13.5	11.6	10.4	9.5
Europe	5.2	8.8	4.7	4.4	5.4	9.1	4.2	0.9	0.7	0.3	2.4
United States	9.8	8.9	10.1	9.5	11.7	12.6	10.6	11.4	7.3	11.2	6.0
Canada	9.0	5.2	13.6	12.9	15.3	14.0	14.8	14.9	9.4	13.9	8.5
Japan	9.7	11.2	9.3	9.5	7.3	9.5	4.7	7.5	7.1	3.5	9.3
Korea and Taiwan	9.2	8.7	9.5	9.9	8.5	10.1	7.8	8.2	8.0	4.5	5.9
Hong Kong & Sgp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Developing countries	**17.0**	**15.4**	**19.6**	**20.3**	**18.0**	**25.6**	**14.8**	**14.1**	**14.7**	**10.0**	**8.3**
Middle-income	**16.8**	**15.2**	**19.9**	**20.8**	**17.3**	**27.8**	**13.8**	**14.0**	**14.0**	**13.8**	**8.1**
Argentina	11.1	18.8	8.7	7.1	19.9	20.6	19.9	18.5	18.3	17.3	1.7
Brazil	14.7	17.9	11.6	10.3	16.5	19.7	16.3	18.1	18.9	13.4	3.0
China	19.4	19.9	14.8	14.9	14.8	18.1	11.4	16.3	18.0	13.6	9.2
Mexico	7.8	4.6	25.2	23.8	29.7	30.2	28.5	25.2	25.7	17.2	15.0
Russia	15.8	16.2	15.5	15.2	17.8	21.5	17.8	3.4	16.2	9.8	15.7
South Africa	22.3	18.2	24.7	29.1	18.8	30.6	26.8	22.1	26.7	9.1	13.0
Thailand	17.4	17.0	18.1	19.3	14.9	19.2	14.1	22.5	28.2	11.0	9.2
Turkey	3.8	1.8	8.9	9.5	8.1	11.9	7.4	5.2	6.5	5.7	9.5
Rest of East Asia	8.7	8.2	9.4	9.5	9.2	9.9	10.9	10.0	12.2	1.7	1.5
Rest of LAC	12.9	14.3	11.3	11.0	12.9	13.2	12.6	15.5	17.3	13.4	8.6
Rest of ECA	9.3	8.3	12.8	12.8	13.0	17.3	12.1	6.1	22.7	12.6	11.0
Mid. East & N. Afr.	27.1	20.8	33.8	40.7	20.8	49.6	12.9	32.8	10.8	28.4	22.2
Low-income	**17.9**	**17.2**	**18.7**	**18.1**	**19.8**	**20.2**	**17.4**	**18.9**	**18.8**	**8.0**	**17.6**
Bangladesh	29.9	31.2	29.1	33.8	21.4	32.8	20.4	35.3	6.1	0.0	0.0
India	26.6	27.3	25.7	27.0	23.2	26.3	21.5	25.1	26.3	27.9	26.1
Indonesia	8.0	8.0	7.9	8.0	7.4	8.1	7.7	9.9	8.7	5.2	4.0
Vietnam	29.1	30.7	23.4	24.2	20.7	24.0	21.5	0.0	49.2	3.2	13.6
Rest of South Asia	6.9	6.0	8.0	8.6	7.1	8.1	7.3	9.6	9.8	6.1	7.7
Selected SSA ctrys.	12.6	13.2	12.4	13.4	11.2	16.1	19.3	14.0	18.2	6.3	13.2
Rest of SSA	26.4	25.1	26.9	25.9	28.3	32.3	23.3	31.7	21.8	7.7	32.5
Rest of the World	5.6	6.1	5.2	4.8	7.6	5.1	4.6	2.1	7.7	0.0	11.5
Memo items:											
East Asia and Pacific	17.8	18.7	13.6	13.8	13.3	14.8	11.5	15.1	17.5	8.8	7.4
South Asia	20.1	19.3	20.8	23.9	16.0	23.4	15.0	17.0	16.8	23.1	22.8
Eur. & Central Asia	10.7	9.0	13.9	13.9	13.6	19.5	13.9	4.7	19.7	7.7	13.4
Mid. East & N. Africa	27.1	20.8	33.8	40.7	20.8	49.6	12.9	32.8	10.8	28.4	22.2
Sub Saharan Africa	23.7	22.0	24.5	24.9	23.8	30.6	23.5	27.1	21.7	7.5	18.4
Latin America	11.3	10.3	12.9	12.1	17.3	16.7	16.7	17.7	19.3	14.3	7.7

Table A-3: Average applied tariffs[a], 2001 (continued)
(c) *other manufacturing sectors, percent*

	Exporting region										
	WLX	**HIX**	**LMY**	**MIY**	**LIY**	**EAP**	**SAS**	**ECA**	**MNA**	**SSA**	**LAC**
Importing region											
World total	**3.5**	**4.1**	**2.5**	**2.4**	**2.9**	**2.8**	**4.1**	**2.3**	**2.4**	**2.4**	**1.8**
High-income	**1.3**	**1.6**	**0.8**	**0.9**	**0.8**	**1.1**	**0.7**	**1.0**	**0.9**	**0.4**	**0.3**
Austr. & New Zeal.	4.2	4.4	3.6	3.4	3.9	3.7	3.2	4.2	2.1	8.7	2.9
Europe	1.8	2.7	0.8	0.9	0.4	1.3	0.3	1.0	0.2	0.2	0.4
United States	0.9	1.0	0.6	0.6	0.3	1.3	0.6	0.6	0.2	0.0	0.2
Canada	0.5	0.4	0.7	0.7	1.0	1.3	1.3	0.7	0.1	0.2	0.2
Japan	0.4	0.5	0.2	0.2	0.5	0.2	0.3	0.5	0.1	0.3	0.3
Korea and Taiwan	3.8	3.8	3.8	3.9	3.5	3.1	4.5	2.7	5.5	3.7	2.4
Hong Kong & Sgp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Developing countries	**8.3**	**8.7**	**7.3**	**7.2**	**8.1**	**10.6**	**9.3**	**4.0**	**6.3**	**6.8**	**6.9**
Middle-income	**7.3**	**7.8**	**5.7**	**5.6**	**6.4**	**9.3**	**7.0**	**3.3**	**3.2**	**3.1**	**6.4**
Argentina	10.2	12.7	6.9	6.8	8.1	15.7	10.5	6.6	8.9	4.6	5.1
Brazil	9.7	11.1	6.4	7.2	2.5	13.3	8.7	5.3	2.3	1.2	7.5
China	11.3	12.1	8.3	8.4	7.9	12.4	8.0	6.1	5.8	2.3	6.1
Mexico	4.3	3.5	11.2	11.1	13.1	12.8	12.6	11.1	6.3	9.8	10.1
Russia	7.8	10.0	2.8	2.5	8.9	12.1	8.9	0.9	9.7	7.8	7.6
South Africa	5.4	6.1	3.1	4.7	1.1	6.2	6.0	6.4	1.5	0.2	6.2
Thailand	8.3	9.5	5.8	5.4	7.5	8.5	5.2	6.7	1.1	4.8	7.5
Turkey	1.2	0.7	2.4	2.3	4.3	4.2	4.9	3.6	0.5	0.6	2.6
Rest of East Asia	3.6	3.7	3.3	3.2	3.9	3.6	3.9	4.3	2.4	3.6	2.4
Rest of LAC	8.4	9.4	6.5	6.5	9.5	10.8	10.6	5.2	6.9	8.0	5.8
Rest of ECA	3.2	4.8	1.7	1.6	3.4	6.1	4.8	1.3	4.7	2.2	2.8
Mid. East & N. Afr.	7.2	7.6	6.2	6.0	7.6	9.3	6.5	7.3	3.4	6.4	8.5
Low-income	**14.5**	**14.7**	**14.2**	**14.5**	**12.7**	**14.3**	**14.2**	**16.8**	**16.2**	**10.7**	**13.8**
Bangladesh	16.2	15.4	17.4	17.6	17.2	17.5	16.7	11.8	23.5	12.8	13.8
India	25.6	27.8	22.7	23.0	20.3	22.1	28.1	28.6	22.7	30.6	16.0
Indonesia	4.4	4.7	3.6	3.8	2.0	5.0	3.0	1.1	1.8	0.9	2.1
Vietnam	12.3	10.5	16.0	16.8	9.1	18.0	5.6	7.3	2.1	1.3	7.4
Rest of South Asia	14.3	13.9	14.8	15.0	13.8	14.3	13.2	12.7	15.5	16.3	15.3
Selected SSA ctrys.	7.7	8.6	7.1	7.2	6.5	10.9	9.5	7.9	7.9	6.4	8.2
Rest of SSA	13.9	14.6	12.5	12.9	11.5	18.6	16.2	16.6	12.4	6.4	16.7
Rest of the World	9.1	10.8	5.2	4.6	10.9	5.0	12.5	3.7	1.5	2.4	6.8
Memo items:											
East Asia and Pacific	8.6	9.2	6.7	6.8	6.6	9.0	5.9	5.9	3.2	2.5	5.5
South Asia	22.2	23.7	20.3	20.8	17.9	19.8	17.3	25.1	20.1	29.7	15.9
Eur. & Central Asia	4.1	5.4	2.1	2.0	5.9	7.6	6.7	1.4	1.9	2.8	4.1
Mid. East & N. Africa	7.2	7.6	6.2	6.0	7.6	9.3	6.5	7.3	3.4	6.4	8.5
Sub Saharan Africa	10.5	11.2	9.1	9.9	7.5	14.2	14.0	15.2	8.3	5.2	12.0
Latin America	7.1	7.1	7.3	7.3	6.5	12.3	10.4	5.8	4.1	3.3	6.4

Table A-3: Average applied tariffs[a], 2001 (continued)
(d) *total merchandise trade, percent*

	Exporting region										
	WLX	**HIX**	**LMY**	**MIY**	**LIY**	**EAP**	**SAS**	**ECA**	**MNA**	**SSA**	**LAC**
Importing region											
World total	**5.2**	**5.4**	**4.9**	**4.7**	**6.3**	**5.8**	**7.2**	**3.1**	**2.8**	**4.4**	**4.9**
High-income	**2.9**	**2.8**	**3.1**	**3.0**	**4.1**	**3.8**	**5.0**	**1.8**	**1.3**	**2.7**	**3.0**
Austr. & New Zeal.	4.8	4.4	5.7	5.8	5.2	6.1	7.4	4.7	2.3	7.9	3.7
Europe	3.2	3.2	3.2	3.1	4.0	3.9	3.5	1.5	0.8	2.7	7.5
United States	1.8	1.4	2.3	2.0	5.0	3.5	6.3	3.1	0.8	1.0	1.1
Canada	1.4	1.2	3.1	2.5	8.0	4.3	10.3	4.2	0.7	1.3	1.0
Japan	5.2	6.9	3.5	3.8	2.1	4.4	2.9	2.4	0.3	5.3	4.9
Korea and Taiwan	7.6	6.5	10.0	10.4	7.3	10.1	13.7	4.2	5.6	9.0	28.5
Hong Kong & Sgp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Developing countries	**9.9**	**9.9**	**10.1**	**9.7**	**12.1**	**14.8**	**11.7**	**4.9**	**6.8**	**8.1**	**10.3**
Middle-income	**8.9**	**9.1**	**8.4**	**8.2**	**9.8**	**13.2**	**9.6**	**4.4**	**4.1**	**4.8**	**9.7**
Argentina	10.0	12.8	6.9	6.7	11.7	16.4	13.4	7.4	9.6	5.3	4.7
Brazil	9.5	11.2	6.1	6.4	3.9	13.9	9.8	5.9	2.5	1.6	5.9
China	13.6	13.9	12.7	13.5	9.8	13.0	9.4	6.5	6.1	4.0	31.9
Mexico	5.1	4.2	13.0	12.5	17.3	14.9	17.6	12.6	7.7	11.3	11.3
Russia	9.7	11.2	7.3	7.0	10.5	16.8	11.4	1.1	9.4	7.7	25.3
South Africa	6.6	6.7	6.5	8.7	3.7	12.2	13.0	8.9	2.2	1.3	8.6
Thailand	10.2	10.6	9.4	7.7	16.4	11.1	13.7	9.0	1.5	8.9	20.3
Turkey	2.5	1.5	4.5	3.6	15.0	7.9	19.4	4.2	1.2	1.9	10.2
Rest of East Asia	4.6	4.2	5.8	5.5	6.6	6.6	5.4	8.5	2.5	9.8	4.5
Rest of LAC	9.1	10.3	7.4	7.2	11.0	11.8	11.6	5.7	7.8	8.5	6.4
Rest of ECA	5.0	6.6	3.2	3.1	6.0	10.2	6.8	2.1	9.2	7.1	9.8
Mid. East & N. Afr.	9.8	9.5	10.6	10.5	11.1	20.5	8.3	10.7	4.3	8.1	10.2
Low-income	**15.9**	**15.2**	**16.9**	**16.6**	**17.6**	**19.3**	**16.3**	**16.4**	**16.3**	**11.4**	**18.0**
Bangladesh	18.4	17.5	19.4	21.1	16.9	24.2	16.6	7.1	19.1	5.9	15.1
India	28.1	28.0	28.2	27.1	33.4	34.7	33.4	28.3	22.9	29.3	22.6
Indonesia	4.8	4.9	4.5	4.7	3.6	6.0	4.4	1.6	1.8	1.3	2.6
Vietnam	16.7	16.1	18.0	18.3	16.1	19.3	12.4	7.5	3.4	6.3	23.0
Rest of South Asia	14.6	12.7	16.3	16.6	15.5	18.9	13.9	13.1	15.2	20.6	17.2
Selected SSA ctrys.	8.7	9.2	8.4	8.2	8.9	13.6	12.4	8.2	8.9	7.2	7.9
Rest of SSA	16.2	16.1	16.4	16.7	15.9	25.2	19.5	17.2	13.9	8.6	16.9
Rest of the World	9.1	10.5	6.5	6.0	11.0	6.0	8.5	3.2	1.7	4.8	11.8
Memo items:											
East Asia and Pacific	10.5	10.6	10.1	10.2	9.9	10.6	8.5	6.6	3.5	4.8	25.2
South Asia	23.5	23.2	23.9	23.9	24.0	29.1	18.5	23.2	20.0	27.5	21.6
Eur. & Central Asia	6.0	6.9	4.7	4.4	10.5	12.9	12.5	2.0	4.0	5.1	18.9
Mid. East & N. Africa	9.8	9.5	10.6	10.5	11.1	20.5	8.3	10.7	4.3	8.1	10.2
Sub Saharan Africa	12.6	12.5	12.6	13.3	11.4	21.0	17.7	15.9	9.9	6.8	12.9
Latin America	7.7	7.7	7.9	7.7	9.4	13.4	12.7	6.4	4.8	4.1	6.6

Note: (a) Intra-European trade is excluded from all calculations

Source: Authors' World Bank LINKAGE model based on an aggregation of the GTAP Release 6.0 database

Table A-4: Impacts of pre-simulation shocks on sectoral tariffs[a] between 2001 and 2005

(*percent*)

	Base year (2001) tariffs					2005 tariffs after pre-sim shocks				
	agf	*agr*	*pfd*	*twp*	*omx*	*agf*	*agr*	*pfd*	*twp*	*omx*
Australia and New Zealand	2.6	0.3	3.3	13.9	4.2	2.6	0.3	3.3	13.9	4.1
EU 25 plus EFTA	13.9	13.2	14.7	5.2	1.8	13.9	13.2	14.7	5.1	1.7
United States	2.4	2.3	2.5	9.8	0.9	2.4	2.3	2.5	9.6	0.9
Canada	9.0	1.2	14.1	9.0	0.5	9.0	1.2	14.1	8.7	0.5
Japan	29.4	48.0	20.9	9.7	0.4	29.3	48.0	20.8	9.0	0.4
Korea and Taiwan	55.0	88.3	22.7	9.2	3.8	53.0	84.5	22.4	9.2	3.6
Hong Kong and Singapore	0.1	0.0	0.2	0.0	0.0	0.1	0.0	0.2	0.0	0.0
Argentina	7.1	5.6	7.8	11.1	10.2	7.1	5.6	7.8	11.1	10.1
Bangladesh	12.7	7.4	21.2	29.9	16.2	12.7	7.4	21.2	29.9	16.2
Brazil	5.0	2.4	9.0	14.7	9.7	5.0	2.4	9.0	14.7	9.7
China	37.6	49.1	18.7	19.4	11.3	10.3	9.9	11.0	9.6	5.5
India	50.3	25.7	76.6	26.6	25.6	49.9	25.7	75.6	26.5	24.2
Indonesia	5.0	4.3	6.3	8.0	4.4	5.0	4.3	6.2	8.0	4.3
Thailand	29.7	13.9	39.4	17.4	8.3	16.7	12.7	19.2	16.4	7.6
Vietnam	37.1	13.1	44.8	29.1	12.3	37.1	13.1	44.8	29.1	12.3
Russia	13.5	14.6	12.8	15.8	7.8	13.5	14.6	12.8	15.8	7.8
Mexico	11.6	10.8	12.3	7.8	4.3	10.3	10.8	9.7	7.8	4.3
South Africa	8.8	6.0	10.9	22.3	5.4	8.6	5.9	10.6	21.9	5.4
Turkey	16.7	16.4	17.2	3.8	1.2	16.6	16.4	17.0	3.8	1.2
Rest of South Asia	21.3	14.3	32.5	6.9	14.3	21.1	14.2	32.0	6.6	14.3
Rest of East Asia	13.7	18.8	9.4	8.7	3.6	13.4	18.6	9.0	8.7	3.5
Rest of LAC	11.0	9.3	12.0	12.9	8.4	10.8	9.2	11.8	12.9	8.4
Rest of ECA	16.0	10.4	20.1	9.3	3.2	15.7	10.4	19.5	9.3	3.2
Middle East & North Africa	14.1	9.9	18.6	27.1	7.2	13.1	8.2	18.3	23.9	7.2
Selected SSA countries	11.9	10.3	13.1	12.6	7.7	11.8	10.2	13.0	12.5	7.5
Rest of Sub Saharan Africa	21.4	18.0	23.8	26.4	13.9	21.2	18.0	23.6	26.2	14.0
Rest of the World	12.1	1.9	19.2	5.6	9.1	11.8	1.9	18.7	5.6	8.9

Note: (a) Tariffs are weighted by base year bilateral trade flows

Source: Authors' LINKAGE model based on an aggregation of the GTAP Release 6.0 database, and scenarios from CEPII

Table A-5: Impacts on selected macro indicators from full liberalization of global merchandise trade, 2015

(*Impacts in* 2015 *relative to the baseline, in percent*)

	Real income	Real GDP	Real con-sump-tion	Real invest-ment	Real exports	Real imports	Real ex-change rate[a]	Terms of trade[b]
Australia and New Zealand	1.1	0.4	1.0	2.1	8.4	11.3	2.6	2.4
EU 25 plus EFTA	0.7	0.2	0.6	0.2	2.9	3.4	-0.8	0.5
United States	0.1	0.0	0.1	0.2	5.5	5.3	-0.3	0.9
Canada	0.4	0.2	0.3	0.2	2.5	2.8	-0.2	0.1
Japan	1.1	0.4	0.8	0.7	10.1	12.8	1.3	1.3
Korea and Taiwan	3.9	3.2	3.1	3.8	15.9	16.5	4.3	-0.8
Hong Kong and Singapore	2.6	0.2	2.5	2.3	-3.3	-1.1	2.3	2.2
Argentina	1.2	0.9	1.2	2.6	19.8	24.5	1.6	2.5
Bangladesh	0.2	2.6	0.2	2.5	51.5	37.7	-6.3	-5.5
Brazil	1.6	0.8	1.5	3.0	28.5	31.9	4.4	4.2
China	0.2	0.7	0.2	-0.1	17.2	19.4	1.6	-0.1
India	0.5	2.3	0.6	1.8	63.7	57.2	-4.2	-5.1
Indonesia	0.7	0.7	0.8	1.7	10.5	13.7	2.0	0.3
Thailand	4.0	3.5	3.9	6.8	22.3	26.4	7.0	0.8
Vietnam	6.2	10.2	6.2	3.6	55.5	42.4	11.3	-1.3
Russia	0.6	0.6	0.5	-0.5	12.9	14.2	-0.8	-1.0
Mexico	0.4	0.9	0.4	1.2	13.3	13.0	-0.5	-1.1
South Africa	1.0	0.7	0.9	1.9	14.3	18.0	0.8	0.4
Turkey	1.4	0.9	1.3	1.6	11.6	13.3	0.9	1.1
Rest of South Asia	0.6	1.6	0.6	3.3	30.0	28.8	-1.0	-0.8
Rest of East Asia	2.0	1.9	1.8	1.7	7.5	8.1	3.2	-0.6
Rest of LAC	1.3	1.8	1.2	3.1	20.5	18.0	0.7	-1.0
Rest of ECA	0.3	0.6	0.3	0.5	17.7	15.9	-0.4	-0.5
Middle East & North Africa	1.4	1.6	1.3	1.9	16.2	15.0	0.1	-0.9
Selected SSA countries	1.5	0.9	1.6	3.5	15.5	17.8	3.1	2.7
Rest of Sub Saharan Africa	1.2	2.7	1.2	4.4	30.3	25.1	-0.1	-1.9
Rest of the World	1.6	1.6	1.5	1.6	39.4	33.2	1.2	0.2

Note: (a) The change in the real exchange rate is relative to the numéraire, i.e. the export price index of OECD manufactured exports
(b) The terms of trade index measures the price of exports relative to the price of imports using base year trade volumes as weights

Source: Authors' World Bank LINKAGE model simulations

Table A-6: Impacts of full global merchandise trade liberalization on agricultural and food gross exports and output, by country/region, 2015

(*Changes in* 2015 *relative to baseline*)

	$billion (in 2001 dollars)		Percent change relative to baseline	
	Exports	*Output*	*Exports*	*Output*
Australia and New Zealand	18.0	27.9	38.0	20.5
EU 25 plus EFTA	21.7	-185.8	-10.8	-12.3
United States	18.4	30.7	11.6	0.0
Canada	14.6	7.2	40.2	4.8
Japan	2.8	-91.7	60.4	-18.4
Korea and Taiwan	33.2	-0.4	600.2	20.2
Hong Kong and Singapore	7.0	7.4	115.2	35.4
Argentina	10.4	12.2	44.2	11.5
Bangladesh	0.8	-2.5	60.9	0.8
Brazil	38.0	66.4	120.6	34.0
China	15.1	-9.9	145.6	-0.9
India	5.1	-23.8	53.2	-3.7
Indonesia	3.6	4.5	32.2	2.4
Thailand	5.6	5.3	29.2	4.7
Vietnam	1.2	-2.1	13.9	-13.3
Russia	0.7	-7.8	15.4	-5.4
Mexico	11.9	6.2	66.0	2.2
South Africa	2.4	1.4	55.9	4.9
Turkey	4.3	-0.1	109.4	0.5
Rest of South Asia	2.9	-1.5	57.1	-1.8
Rest of East Asia	9.4	7.4	61.7	6.8
Rest of LAC	36.0	37.0	68.1	11.7
Rest of ECA	9.2	-22.2	106.0	-1.6
Middle East and North Africa	13.2	-7.8	64.1	-1.2
Selected SSA countries	4.5	5.3	50.0	9.2
Rest of Sub Saharan Africa	9.5	-4.1	45.4	-0.6
Rest of the World	8.2	2.9	168.3	4.4
High-income countries	**115.8**	**-204.7**	**15.7**	**-5.3**
Developing countries	**191.9**	**66.8**	**67.4**	**2.2**
East Asia and Pacific	34.8	5.2	54.4	0.1
South Asia	8.9	-27.8	55.1	-3.0
Europe and Central Asia	14.2	-30.0	79.7	-1.9
Sub Saharan Africa	13.2	-7.8	64.1	-1.2
Latin America and the Caribbean	16.4	2.6	47.7	2.1
World total	**96.3**	**121.8**	**75.7**	**13.8**

Source: Authors' World Bank LINKAGE model simulations

Table A-7: Impacts of full global merchandise trade liberalization on exports net of imports, by country/region, 2015

(a) *agriculture and food*

(*Net trade in $billion*[a])

	All agriculture and food			Primary agricultural products			Processed food		
	Baseline		*Reform*[b]	*Baseline*		*Reform*[b]	*Baseline*		*Reform*[b]
	2001	2015	2015	2001	2015	2015	2001	2015	2015
Aust. & N. Zeal.	21.2	35.1	53.6	9.4	17.6	24.2	11.8	17.5	29.3
EU 25 plus EFTA	-13.9	-14.1	-106.5	-23.8	-25.4	-59.7	9.9	11.3	-46.8
Canada	8.3	29.1	22.7	12.8	31.7	-2.0	-4.5	-2.6	24.6
United States	7.6	17.1	20.1	4.3	11.3	14.8	3.3	5.8	5.4
Japan	-37.7	-46.3	-78.6	-11.3	-11.0	-21.5	-26.3	-35.4	-57.1
Korea and Taiwan	-10.5	-16.8	4.4	-6.5	-11.5	-13.5	-4.0	-5.3	17.9
HKG & SGP	-8.1	-11.5	-5.8	-3.2	-5.0	-5.2	-4.9	-6.5	-0.6
Argentina	11.7	20.0	31.4	5.7	11.1	21.8	6.1	8.9	9.6
Bangladesh	-1.3	-1.3	-0.8	-1.0	-1.4	-0.6	-0.3	0.1	-0.2
Brazil	12.7	22.5	61.2	6.4	12.5	19.7	6.3	10.0	41.5
China	2.9	-61.0	-67.5	-0.9	-50.2	-50.9	3.9	-10.8	-16.6
India	2.7	1.8	-5.0	1.8	-1.4	-3.0	0.9	3.2	-2.1
Indonesia	3.2	2.9	4.9	0.0	-2.8	-3.3	3.3	5.8	8.2
Thailand	8.2	6.6	7.5	3.4	2.1	4.5	4.7	4.5	3.0
Vietnam	1.6	3.9	2.0	1.2	2.4	3.9	0.4	1.5	-1.8
Russia	-6.2	-13.4	-16.6	-3.1	-7.8	-8.6	-3.1	-5.6	-8.0
Mexico	-2.3	3.0	7.5	-1.0	4.8	6.4	-1.3	-1.8	1.1
South Africa	2.2	1.4	3.4	1.5	1.1	2.5	0.7	0.3	0.9
Turkey	1.4	-0.7	0.0	1.0	-1.1	-2.1	0.4	0.4	2.0
Rest of S. Asia	0.1	0.4	0.1	0.5	0.9	1.8	-0.4	-0.5	-1.7
Rest of East Asia	1.6	0.9	4.5	-1.4	-3.9	-4.7	2.9	4.7	9.3
Rest of LAC	10.3	30.8	59.9	7.4	21.8	53.0	2.9	9.0	6.9
Rest of ECA	0.5	-4.5	-3.5	1.2	-2.0	2.5	-0.7	-2.5	-6.0
M. East & N. Afr.	-18.8	-22.2	-23.8	-9.3	-11.4	-8.4	-9.5	-10.8	-15.5
Sel. SSA	2.1	6.0	9.6	2.1	5.8	6.5	0.0	0.2	3.1
Rest Sub Sah. Afr.	1.6	11.4	13.8	3.2	12.0	17.0	-1.6	-0.7	-3.2
Rest of the World	-1.1	-1.1	1.7	-0.4	-0.2	5.0	-0.7	-0.9	-3.3
High- income	**-33.1**	**-7.5**	**-90.1**	**-18.3**	**7.7**	**-62.9**	**-14.8**	**-15.2**	**-27.2**
Developing	**33.1**	**7.5**	**90.1**	**18.3**	**-7.7**	**62.9**	**14.8**	**15.2**	**27.2**
Middle-income	24.2	-16.6	63.9	10.9	-23.0	35.7	13.3	6.4	28.2
Low-income	8.9	24.1	26.3	7.4	15.3	27.2	1.5	8.8	-1.0
East Asia and Pac.	17.5	-46.7	-48.6	2.3	-52.4	-50.5	15.2	5.7	2.0
South Asia	1.5	0.9	-5.7	1.4	-1.9	-1.8	0.1	2.9	-3.9
Europe & C. Asia	-4.3	-18.6	-20.2	-0.9	-10.9	-8.2	-3.4	-7.7	-12.0
M. East & N. Afr.	-18.8	-22.2	-23.8	-9.3	-11.4	-8.4	-9.5	-10.8	-15.5
Sub Saharan Afr.	5.9	18.8	26.8	6.8	18.9	26.0	-0.9	-0.1	0.8
Lat. Am. & Carr.	32.4	76.4	160.0	18.4	50.2	100.9	13.9	26.1	59.1

Table A-7: Impacts of full global merchandise trade liberalization on exports net of imports, by country/region, 2015 (continued)

(b) *non-food manufacturing*

(*Net trade in $billion*[a])

	Textiles and clothing			Other manufacturing			All merchandise trade		
	Baseline		*Reform*[b]	*Baseline*		*Reform*[b]	*Baseline*		*Reform*[b]
	2001	2015	2015	2001	2015	2015	2001	2015	2015
Aust. & N. Zeal.	-3.3	-5.4	-7.3	-14.8	-23.1	-35.8	3.1	6.6	10.5
EU 25 plus EFTA	-37.7	-91.4	-101.4	72.9	76.5	127.5	21.4	-29.0	-80.3
United States	-79.7	-118.4	-145.1	-328.9	-315.6	-287.8	-400.3	-404.9	-410.2
Japan	-4.9	-8.9	-11.3	26.5	23.4	20.8	29.1	31.6	29.6
Korea and Taiwan	-19.4	-19.7	-22.4	160.7	196.2	234.9	103.6	130.2	134.0
HKG & SGP	24.7	53.4	62.4	44.3	54.4	36.6	58.6	91.0	103.4
Argentina	-11.3	-22.2	-19.0	-66.0	-100.8	-99.7	-85.4	-134.6	-124.6
Brazil	0.2	-0.8	-2.2	-4.4	-7.8	-16.6	7.6	11.5	12.6
China	4.1	6.3	6.1	-4.5	-7.3	-7.9	-1.7	-2.3	-2.6
India	2.3	3.0	-0.5	-12.6	-19.8	-49.4	2.3	5.8	11.3
Indonesia	71.8	151.5	183.9	55.9	89.0	70.1	130.6	179.5	186.5
Thailand	13.4	27.5	41.6	-12.1	-27.2	-37.6	4.0	2.1	-1.0
Vietnam	9.7	15.0	18.6	20.7	24.3	20.6	33.6	42.3	44.1
Russia	6.4	10.4	10.8	1.9	-4.4	-0.9	16.5	12.6	17.4
South Africa	3.0	13.0	21.5	-6.7	-12.7	-14.3	-2.1	4.2	9.3
Turkey	-4.3	-7.4	-9.2	50.5	69.0	72.9	40.1	48.3	47.1
Rest of S. Asia	3.7	-2.9	-9.8	23.0	21.7	25.1	24.4	21.8	22.8
Rest of East Asia	-0.3	-0.2	-1.4	8.7	8.4	8.0	10.6	9.6	10.0
Rest of LAC	8.7	4.2	3.1	-14.5	-16.3	-14.7	-4.4	-12.8	-11.6
Rest of ECA	9.2	17.7	21.3	-9.4	-19.0	-22.3	-0.1	-0.8	-1.0
M. East & N. Afr.	3.3	3.1	5.8	35.0	35.4	33.2	39.8	39.3	43.5
Sel. SSA	0.9	-8.1	-12.8	-30.1	-48.7	-70.8	-18.9	-25.9	-23.7
Rest Sub Sah. Afr.	2.1	-3.1	-7.4	-15.7	-11.1	-10.0	-13.1	-18.7	-20.9
Rest of the World	-3.9	-15.8	-23.0	31.6	39.1	48.6	9.0	1.2	1.7
High- income	0.1	-0.5	-1.0	-1.6	-3.9	-6.5	0.6	1.6	2.1
Developing	-1.8	-3.7	-6.1	-2.0	-9.3	-9.8	-2.3	-1.7	-2.1
Middle-income	2.9	3.2	4.8	-8.3	-10.5	-14.3	-6.5	-8.3	-7.8
Low-income	-131.6	-212.6	-244.0	-105.3	-89.0	-3.5	-270.0	-309.1	-337.6
East Asia and Pac.	131.6	212.6	244.0	105.3	89.0	3.5	270.0	309.1	337.6
South Asia	91.0	134.0	137.2	129.3	154.6	95.6	244.4	272.0	296.6
Europe & C. Asia	40.6	78.5	106.9	-24.0	-65.6	-92.1	25.6	37.1	41.0
M. East & N. Afr.	94.1	193.0	240.6	106.8	131.6	108.7	218.4	277.9	300.7
Sub Saharan Afr.	26.7	51.5	69.0	-26.1	-53.5	-67.8	2.1	-1.0	-4.6
Lat. Am. & Carr.	6.6	-6.3	-13.5	20.2	41.6	48.2	22.6	16.7	14.5

Notes: (a) Net trade is measured at FOB prices, actual net trade would reflect CIF/FOB margins
(b) The 'Reform' column refers to the net trade levels after full global merchandise trade liberalization

Source: Authors' World Bank LINKAGE model simulations

Table A-8: Average applied tariffs for all goods, by country/region, 2001, 2015 baseline, and 2015 under different scenarios

(a) Agricultural and food tariffs (%)

	Baseline		Scen. 1	Scen. 2	Scen. 3	Scen. 4	Scen. 5	Scen. 6	Scen. 7	Scen. 8
	2001	**2015**	**2015**							
Australia & New Zealand	2.6	2.6	1.7	2.3	2.3	1.3	2.1	2.3	1.7	1.7
EU 25 plus EFTA	13.9	13.9	7.2	11.2	12.0	7.0	10.8	11.1	7.0	7.0
United States	2.4	2.4	1.7	2.2	2.3	1.4	2.1	2.2	1.7	1.7
Canada	9.0	9.0	4.9	8.1	8.8	5.2	8.1	8.1	4.9	4.9
Japan	29.4	29.3	15.2	25.5	26.6	16.7	25.4	21.7	14.7	14.7
Korea and Taiwan	55.0	53.0	28.4	45.3	45.8	32.4	45.1	29.8	27.9	18.7
Hong Kong and Singapore	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Argentina	7.1	7.1	6.9	7.1	7.1	6.7	7.0	7.1	6.9	6.1
Bangladesh	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	11.9
Brazil	5.0	5.0	4.9	5.0	5.0	4.9	5.0	5.0	4.9	4.4
China	37.6	10.3	8.2	9.1	9.3	7.9	9.0	9.1	7.9	6.9
India	50.3	49.9	45.5	47.9	48.3	45.0	47.9	47.9	45.5	37.4
Indonesia	5.0	5.0	4.9	5.0	5.0	4.8	5.0	5.0	4.9	4.5
Thailand	29.7	16.7	13.9	15.1	15.4	13.2	14.8	15.1	13.5	11.0
Vietnam	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1
Russia	13.5	13.5	8.8	10.9	11.2	7.8	10.6	10.9	8.7	6.5
Mexico	11.6	10.3	8.6	10.0	10.0	8.3	9.9	10.0	8.6	6.5
South Africa	8.8	8.6	8.1	8.5	8.5	7.9	8.4	8.5	8.1	6.6
Turkey	16.7	16.6	13.8	15.8	16.0	13.8	15.7	15.8	13.8	10.6
Rest of South Asia	21.3	21.1	20.9	21.1	21.1	20.7	21.1	21.1	20.9	16.5
Rest of East Asia	13.7	13.4	12.7	13.2	13.3	12.8	13.2	10.3	12.7	11.2
Rest of LAC	11.0	10.8	9.8	10.3	10.4	9.5	10.3	10.3	9.8	8.9
Rest of ECA	16.0	15.7	14.3	14.9	15.1	14.0	14.8	14.9	14.3	12.9
Middle East & North Africa	14.1	13.1	11.6	12.6	12.7	11.6	12.6	12.6	11.5	10.4
Selected SSA countries	11.9	11.8	11.6	11.8	11.8	11.6	11.7	11.8	11.5	11.0
Rest of Sub Saharan Africa	21.4	21.2	19.6	20.8	20.8	19.7	20.8	20.8	19.6	16.1
Rest of the World	12.1	11.8	11.5	11.7	11.8	11.6	11.7	11.5	11.5	9.4
High-income countries	**16.0**	**15.9**	**8.4**	**13.5**	**14.1**	**8.9**	**13.3**	**11.5**	**8.2**	**7.5**
Developing countries	**17.7**	**14.2**	**12.5**	**13.4**	**13.5**	**12.3**	**13.4**	**13.3**	**12.4**	**10.6**
Dev. countries (WTO defn.)	20.0	16.9	13.1	15.5	15.7	13.3	15.4	13.9	13.0	10.7
Middle-income countries	16.5	12.1	10.4	11.4	11.5	10.1	11.3	11.2	10.3	8.9
Low-income countries	22.2	22.0	20.7	21.5	21.6	20.7	21.5	21.5	20.7	17.5
World total	**16.7**	**15.2**	**10.0**	**13.5**	**13.9**	**10.3**	**13.3**	**12.2**	**9.9**	**8.8**

(b) Textile and clothing tariffs (%)										
	Baseline		Scen. 1	Scen. 2	Scen. 3	Scen. 4	Scen. 5	Scen. 6	Scen. 7	Scen. 8
	2001	**2015**	**2015**							
Australia & New Zealand	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	12.9	12.9
EU 25 plus EFTA	5.2	5.1	5.1	5.1	5.1	5.1	5.1	5.1	3.0	3.0
United States	9.8	9.6	9.6	9.6	9.6	9.6	9.6	9.6	4.9	4.9
Canada	9.0	8.7	8.7	8.7	8.7	8.7	8.7	8.7	4.9	4.9
Japan	9.7	9.0	9.0	9.0	9.0	9.0	9.0	9.0	5.2	5.2
Korea and Taiwan	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	8.1	7.0
Hong Kong and Singapore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Argentina	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	9.7
Bangladesh	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9
Brazil	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	13.3
China	19.4	9.6	9.6	9.6	9.6	9.6	9.6	9.6	6.5	4.9
India	26.6	26.5	26.5	26.5	26.5	26.5	26.5	26.5	20.4	17.0
Indonesia	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Thailand	17.4	16.4	16.3	16.3	16.3	16.3	16.3	16.3	15.2	12.3
Vietnam	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
Russia	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	10.6	8.0
Mexico	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	6.4	5.2
South Africa	22.3	21.9	21.9	21.9	21.9	21.9	21.9	21.9	17.4	13.2
Turkey	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
Rest of South Asia	6.9	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.2	5.5
Rest of East Asia	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	7.9	7.0
Rest of LAC	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.5	12.0
Rest of ECA	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	8.8	8.3
Middle East & North Africa	27.1	23.9	23.9	23.9	23.9	23.9	23.9	23.9	22.2	20.0
Selected SSA countries	12.6	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.4	12.2
Rest of Sub Saharan Africa	26.4	26.2	26.2	26.2	26.2	26.2	26.2	26.2	25.9	24.6
Rest of the World	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.2	4.7
High-income countries	**7.5**	**7.3**	**7.3**	**7.3**	**7.3**	**7.3**	**7.3**	**7.3**	**4.1**	**4.1**
Developing countries	**17.0**	**14.3**	**14.3**	**14.3**	**14.3**	**14.3**	**14.3**	**14.3**	**12.7**	**11.3**
Dev. countries (WTO defn.)	13.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	10.1	9.0
Middle-income countries	16.8	13.6	13.6	13.6	13.6	13.6	13.6	13.6	11.7	10.3
Low-income countries	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.2	16.5
World total	**10.2**	**9.3**	**9.3**	**9.3**	**9.3**	**9.3**	**9.3**	**9.3**	**6.6**	**6.2**

(c) Other merchandise tariffs (%)										
	Baseline		Scen. 1	Scen. 2	Scen. 3	Scen. 4	Scen. 5	Scen. 6	Scen. 7	Scen. 8
	2001	**2015**	**2015**							
Australia & New Zealand	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	3.4	3.4
EU 25 plus EFTA	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	0.9	0.9
United States	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.4	0.4
Canada	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.3
Japan	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
Korea and Taiwan	3.8	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.0	2.6
Hong Kong and Singapore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Argentina	10.2	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.0	9.4
Bangladesh	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.1
Brazil	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.4	8.6
China	11.3	5.5	5.5	5.5	5.5	5.5	5.5	5.5	3.8	2.9
India	25.6	24.2	24.2	24.2	24.2	24.2	24.2	24.2	20.6	17.7
Indonesia	4.4	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.2
Thailand	8.3	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.3	6.8
Vietnam	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3
Russia	7.8	7.8	7.7	7.7	7.7	7.7	7.7	7.7	5.2	3.9
Mexico	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.2	4.0
South Africa	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.1	4.2
Turkey	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1
Rest of South Asia	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	13.9
Rest of East Asia	3.6	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.2	3.0
Rest of LAC	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	7.5	6.9
Rest of ECA	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.1	3.0
Middle East & North Africa	7.2	7.1	7.1	7.1	7.1	7.1	7.1	7.1	6.9	6.7
Selected SSA countries	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.5	7.2
Rest of Sub Saharan Africa	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.8	13.7
Rest of the World	9.1	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.7
High-income countries	**1.3**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**0.8**	**0.8**
Developing countries	**8.3**	**7.1**	**7.1**	**7.1**	**7.1**	**7.1**	**7.1**	**7.1**	**6.4**	**5.9**
Dev. countries (WTO defn.)	6.7	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.2	4.7
Middle-income countries	7.3	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.3	4.8
Low-income countries	14.5	14.1	14.1	14.1	14.1	14.1	14.1	14.1	13.1	12.3
World total	**3.5**	**3.1**	**3.1**	**3.1**	**3.1**	**3.1**	**3.1**	**3.1**	**2.6**	**2.4**

(d) All merchandise trade tariffs (%)										
	Baseline		Scen. 1	Scen. 2	Scen. 3	Scen. 4	Scen. 5	Scen. 6	Scen. 7	Scen. 8
	2001	**2015**	**2015**							
Australia & New Zealand	4.8	4.8	4.7	4.7	4.8	4.7	4.7	4.7	4.0	4.0
EU 25 plus EFTA	3.2	3.1	2.5	2.9	3.0	2.5	2.9	2.9	1.7	1.7
United States	1.8	1.8	1.7	1.7	1.8	1.7	1.7	1.7	0.9	0.9
Canada	1.4	1.4	1.1	1.3	1.4	1.2	1.3	1.3	0.8	0.8
Japan	5.2	5.1	3.2	4.6	4.8	3.4	4.6	4.1	2.7	2.7
Korea and Taiwan	7.6	7.3	5.6	6.8	6.8	5.9	6.7	5.7	5.0	3.9
Hong Kong and Singapore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Argentina	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.9	9.2
Bangladesh	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.3
Brazil	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.2	8.5
China	13.6	6.2	6.0	6.1	6.1	6.0	6.1	6.1	4.3	3.3
India	28.1	26.8	26.4	26.6	26.6	26.3	26.6	26.6	23.1	19.6
Indonesia	4.8	4.7	4.6	4.7	4.7	4.6	4.7	4.7	4.6	4.5
Thailand	10.2	8.6	8.4	8.5	8.5	8.3	8.4	8.5	8.0	7.3
Vietnam	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7
Russia	9.7	9.7	8.8	9.2	9.3	8.6	9.1	9.2	6.5	4.8
Mexico	5.1	5.0	4.8	4.9	4.9	4.8	4.9	4.9	4.7	4.3
South Africa	6.6	6.6	6.5	6.6	6.6	6.5	6.5	6.6	6.0	4.9
Turkey	2.5	2.4	2.2	2.4	2.4	2.2	2.4	2.4	2.2	2.0
Rest of South Asia	14.6	14.5	14.4	14.5	14.5	14.4	14.5	14.5	14.4	13.3
Rest of East Asia	4.6	4.5	4.4	4.5	4.5	4.4	4.5	4.2	4.1	3.7
Rest of LAC	9.1	9.1	9.0	9.0	9.1	9.0	9.0	9.0	8.3	7.7
Rest of ECA	5.0	4.9	4.8	4.9	4.9	4.8	4.8	4.9	4.7	4.4
Middle East & North Africa	9.8	9.3	9.1	9.3	9.3	9.1	9.3	9.3	8.8	8.3
Selected SSA countries	8.7	8.7	8.6	8.6	8.6	8.6	8.6	8.6	8.5	8.2
Rest of Sub Saharan Africa	16.2	16.1	15.8	16.0	16.0	15.8	16.0	16.0	15.7	15.0
Rest of the World	9.1	8.9	8.8	8.9	8.9	8.8	8.9	8.8	8.8	8.3
High-income countries	**2.9**	**2.9**	**2.3**	**2.7**	**2.7**	**2.4**	**2.7**	**2.5**	**1.6**	**1.6**
Developing countries	**9.9**	**8.4**	**8.2**	**8.3**	**8.3**	**8.2**	**8.3**	**8.3**	**7.5**	**6.8**
Dev. countries (WTO defn.)	8.5	7.3	6.9	7.2	7.2	7.0	7.2	7.0	6.3	5.6
Middle-income countries	8.9	7.2	7.0	7.1	7.1	7.0	7.1	7.1	6.3	5.6
Low-income countries	15.9	15.5	15.3	15.5	15.5	15.3	15.5	15.4	14.6	13.4
World total	**5.2**	**4.7**	**4.2**	**4.5**	**4.5**	**4.2**	**4.5**	**4.4**	**3.5**	**3.2**

Source: Authors' World Bank LINKAGE model aggregations of HS6 tariff changes provided by CEPII

Appendix B: Comparison of LINKAGE model results with those from the GTAP-AGR model

Using the same GTAP Version 6.0 2001 database, our analysis using the LINKAGE model provides considerably larger welfare gains from full trade liberalization than generated by Hertel and Keeney (2005) using a variant on the standard GTAP model called GTAP-AGR. To understand the reasons behind this difference, for this Appendix we altered the LINKAGE model so that it mimics the comparative static GTAP-AGR model as of 2001, and then we also altered assumptions about elasticities and factor mobility to make them similar to those used by Hertel and Keeney.

Obtaining a comparative static version of the LINKAGE model involves only a few modifications to the recursive dynamic version. Specifically, the 'new' elasticities of substitution in production are imposed to mimic the long-term properties of the dynamic model, capital is assumed to be perfectly mobile, and adjustment costs are ignored. But the big difference between the comparative static and dynamic version results is the change in the structure of the global economy by 2015, due to growth in factor stocks and changes in the relative weights of countries and sectors in the global economy over those 14 years.

Table B-2 reports what the LINKAGE model says is the welfare cost of global trade barriers and agricultural subsidies in 2001 under differing assumptions, as compared with their cost in 2015. First, by scaling the 2015 dynamic results back to 2001 by assuming the percentage effect on income in each region is the same in 2001 as in 2015 reduces the real global cost from $278 billion to $150 billion – simply because each regional economy is smaller. Second, when the dynamic effects themselves are removed, the global comparative static cost shrinks to $121 billion. Third, if the long-run Armington elasticities[21] used in the LINKAGE model (which we believe are more

[21] These elasticities represent the top-level Armington elasticity, i.e. between domestic demand and aggregate import demand. The second-level Armington elasticity, i.e. across trading partners, is set at twice the top-level elasticity.

appropriate for the long-run analysis being undertaken in the current study) are replaced be the medium-term ones used in Hertel and Keeney's GTAP-AGR model,[22] the real global cost shrinks further to $82 billion. In short, those three differences between the two models almost fully explain the different aggregate results, since that $82 billion is very close to Hertel and Keeney's $84 billion comparative static estimate of the gains from freeing merchandise trade globally. One other difference between the LINKAGE and GTAP models has to do with agricultural land: GTAP assumes a fixed supply of farm land and limited land mobility between farm sectors whereas the LINKAGE model assumes farm land supply in the long run is somewhat responsive to farm product prices and that there is complete mobility of that land among farming enterprises in the long run.[23] The final column of Table B-2 shows that replacing those two assumptions with the ones adopted in the GTAP-AGR model does almost nothing to the global cost of trade-distorting policies, although the distribution of those costs is somewhat different.

[22] The new GTAP elasticities are the outcome of significant econometric work and are higher than the standard Armington elasticities used in previous releases of GTAP. While recognizing the extensive work behind the new elasticities, the controversy underlying these key parameters continues. The new GTAP elasticities reflect a move towards mid-range Armington elasticities, but are still much lower than those used by some, notably Tarr and Rutherford and their associates. The LINKAGE model elasticities are above those in GTAP-AGR but still in the mid-range, and are the outcome of literature surveys, best guesses and adjustments that have been undertaken over a 15-year period since the inception of the LINKAGE model and its predecessors. The difference between these elasticities averages about one-third, and is shown for each good in Appendix Table B-1.

[23] In the standard LINKAGE model, an upward-sloping supply function is implemented for land, with supply elasticities higher for land-abundant countries than for land-scarce countries. There is also perfect land mobility across farm enterprises. In the final simulation the supply elasticity is set to 0 and the land transformation elasticity is set to 1.

Table B-1: Global average top-level Armington elasticities in the GTAP-AGR and LINKAGE models, by product[a]

	GTAP elasticities	LINKAGE elasticities	Percent difference
	(1)	(2)	((2) – (1))/(1)
Rice	3.20	4.45	39
Wheat	4.45	5.85	31
Other grains	1.30	4.93	279
Oil seeds	2.45	4.75	94
Sugar	2.70	5.91	119
Plant-based fibers	2.50	3.94	58
Vegetables and fruits	1.85	3.94	113
Other crops	3.25	3.94	21
Livestock	2.09	3.94	89
Other natural resources	1.21	2.80	131
Fossil fuels	5.70	4.93	-14
Processed meats	4.17	3.94	-6
Vegetable oils and fats	3.30	3.94	19
Dairy products	3.65	3.94	8
Other food, beverages and tobacco	1.74	3.94	126
Textile	3.75	3.94	5
Wearing clothing	3.70	3.94	6
Leather	4.05	4.93	22
Chemicals rubber and plastics	3.30	3.94	19
Iron and steel	2.95	3.94	34
Motor vehicles and parts	2.80	4.93	76
Capital goods	4.21	3.94	-6
Other manufacturing	3.52	3.94	12
Construction	1.90	1.50	-21
Utilities and services	1.92	2.09	9
Agriculture	2.64	4.63	75
Processed foods	3.22	3.94	23
Textile and wearing clothing	3.83	4.27	11
Other manufacturing	3.38	4.06	20
Merchandise trade	3.12	4.29	37
Total	**3.03**	**4.09**	**35**

Note: (a)For convergence the Armington elasticity for rice in Japan has been set at 2 in all simulations

Sources: van der Mensbrugghe (2004b) and Keeney and Hertel (2005)

Table B-2: Impacts on real incomes of full liberalization of global merchandise trade, by country/region[a], base case in 2015 versus comparative static cases in 2001

(*Change in real income, $billion*)

	2015	2001			
	Base case	Scaled dynamics	Comparative static	GTAP elasticities	GTAP elas+fixed land
Australia and New Zealand	6.1	3.5	2.2	1.8	1.7
EU 25 plus EFTA	65.2	45.3	44.0	32.9	30.2
United States	16.2	9.8	4.1	4.5	5.2
Canada	3.8	2.5	2.1	1.0	0.8
Japan	54.6	28.0	30.8	25.1	25.3
Korea and Taiwan	44.6	14.3	16.1	8.9	9.1
Hong Kong and Singapore	11.2	5.6	4.3	3.7	3.6
Argentina	4.9	2.9	1.7	1.1	0.8
Bangladesh	0.1	0.1	-0.2	-0.3	-0.4
Brazil	9.9	6.1	4.7	5.0	2.2
China	5.6	1.9	0.6	-0.5	-2.5
India	3.4	1.7	-0.8	-1.5	-0.8
Indonesia	1.9	1.0	0.2	0.1	-0.1
Thailand	7.7	3.7	2.1	1.4	0.9
Vietnam	3.0	1.6	1.1	0.7	0.7
Russia	2.7	1.4	2.0	1.6	1.4
Mexico	3.6	2.3	-0.4	-1.5	-1.5
South Africa	1.3	0.8	0.7	0.5	0.4
Turkey	3.3	1.7	1.3	0.9	0.9
Rest of South Asia	1.0	0.5	-0.2	-0.3	-0.3
Rest of East Asia	5.3	2.7	2.9	2.0	1.7
Rest of LAC	10.3	6.6	2.0	-0.6	-2.1
Rest of ECA	1.0	0.3	0.6	-0.2	-0.4
Middle East and North Africa	14.0	8.1	3.8	2.2	1.6
Selected SSA countries	1.0	0.6	0.3	0.4	0.3
Rest of Sub Saharan Africa	2.5	1.4	-0.2	-0.6	-0.8
Rest of the World	3.4	1.6	1.4	0.4	0.0
High-income countries	**201.6**	**109.8**	**103.7**	**77.9**	**75.8**
Developing countries	**85.7**	**43.9**	**23.7**	**10.6**	**2.0**
East Asia and Pacific	23.5	9.4	6.9	3.7	0.6
South Asia	4.5	2.2	-1.2	-2.1	-1.5
Europe and Central Asia	7.0	3.5	3.9	2.3	1.9
Middle East and North Africa	14.0	8.1	3.8	2.2	1.6
Sub Saharan Africa	4.8	2.8	0.7	0.2	-0.1
Latin America and the Caribbean	28.7	17.9	8.1	4.0	-0.5
World total	**287.3**	**156.4**	**127.4**	**88.5**	**77.8**

Note: (a) The scaled dynamic results refer to the impact of global merchandise trade reform with limited reductions in some key agricultural sectors in Japan (rice and sugar) and Korea and Taiwan (rice, oil seeds and other grains). The percentage change in real income in each region in 2015 resulting from the dynamic simulation is scaled to the 2001 level of income for that region

Source: Authors' World Bank LINKAGE model simulations