

# General equilibrium effects of price distortions on global markets, farm incomes and welfare

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## **Abstract**

Earnings from farming in many developing countries have been depressed by a pro-urban bias in own-country policies as well as by governments of richer countries favoring their farmers with import barriers and subsidies. Both sets of policies, which reduce national and global economic welfare and contribute to global inequality and poverty, have been undergoing reform since the 1980s. Using the LINKAGE model of the global economy and modifications to the pre-release of Version 7 of the GTAP protection database for 2004, this paper seeks to compare the effect of those reforms to date with those that would come from removing remaining agricultural and trade policies. Two sets of results are thus presented: one showing the effects of policy reforms between 1980-84 and 2004, the other showing what the removal of remaining distortions as of 2004 could be. Both sets of results indicate improvements in the real value of agricultural output and exports, the real returns to farm land and unskilled labor, and real net farm incomes in most developing country regions – despite the adverse effect on the international terms of trade for some developing countries that are net food importers or are enjoying preferential access to agricultural markets of high-income countries. Landowners in those high-income countries still offering their farmers price supports could readily afford to compensate them from the benefits of removing remaining agricultural protectionism.

**JEL codes:** C68, D58, F17, Q17

**Key words:** Agricultural markets, price distortions, CGE modeling, economic welfare, policy reform

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# General equilibrium effects of price distortions on global markets, farm incomes and welfare

There has been a great deal of change over the past quarter of a century in policy distortions to agricultural incentives throughout the world: the anti-agricultural and anti-trade biases of policies of many developing countries have been reduced, export subsidies of high-income countries have been cut, and some re-instrumentation toward less inefficient and less trade-distorting forms of support, particularly in Western Europe, has begun. However, applied rates of protection from agricultural import competition have continued to be on an upward trend in both rich and poor countries, notwithstanding the Uruguay Round Agreement on Agriculture that aimed to bind and reduce farm tariffs.

This chapter analyzes the net economic effects of agricultural price and trade policy changes around the world since the early 1980s, and compares those estimates with projections of how global markets, farm incomes and economic welfare as of 2004 would change if remaining policy distortions were removed. That is, this combined retrospective and prospective analysis seeks to assess how far the world has come, and how far it still has to go, in removing the disarray in world agriculture that was so vividly portrayed in D. Gale Johnson's seminal 1973 study of the issue – and which seemed to have worsened by the time he revised that book in the late 1980s (Johnson 1991).

To quantify the impacts both of past reforms and current policies, we amend the distortions in the pre-release of Version 7 of the GTAP global protection database by replacing its applied tariffs with distortion rates that reproduce those estimated, using domestic-to-border price comparisons, by authors of the developing country case studies in the present World Bank project.<sup>1</sup> We likewise generate a set of distortions for the period 1980-84, again aiming to reproduce trend distortion rates in the country case studies. Those two sets of distortion estimates suggest that while average distortions to

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<sup>1</sup> That distortions database is documents in Anderson and Valenzuela (2008) and is based on the methodology described in Anderson et al. (2008a,b).

incentives facing developing country farmers generally were much less in 2004 than in the early 1980s, nonetheless there remains a considerable range of rates across commodities and countries, including a strong anti-trade bias in agricultural policies for many countries. Furthermore, non-agricultural protectionism is still rife in some developing countries, and agricultural price supports in some high-income countries remain high.

Among other things, the present analysis is able to address questions such as the following: To what extent have government trade and domestic agricultural policies reduced their distorting effects on agricultural markets and farm incomes since the early 1980s? Are policies as of 2004 still reducing farmer rewards in developing countries and thereby prolonging inequality across countries in farm household incomes? Are they depressing value added more in primary agriculture than in the rest of the economy of developing countries, and earnings of unskilled workers more than of owners of other factors of production, thereby potentially contributing to inequality and poverty within those developing countries? With farm incomes well below non-farm incomes in most developing countries, and with agriculture there being intensive in the use of unskilled labor, past or prospective rises in agricultural relative to non-agricultural value added and in wages for the unskilled relative to skilled wages and capital earnings would indicate a likely reduction in inequality and poverty.

To provide answers to these and related questions, we use our amended GTAP distortion database in a global computable general equilibrium model (the LINKAGE model) to assess how agricultural markets, factor prices and value added in agriculture versus non-farm sectors would differ if (a) 1980-84 distortion rates were still in place and (b) if all price and trade policies that distort markets for farm and non-farm goods as of 2004 were removed. It is important to include nonagricultural trade policies in the reform experiment because, as shown in the seminal study by Krueger, Schiff and Valdes (1988), they were at least as harmful to developing country farmers as were those countries' agricultural policies.

Results are presented first for the key countries and regions of the world and for the world as a whole, beginning with national economic welfare. We also present results

for numerous individual countries.<sup>2</sup> While no-one anticipates a move to completely free markets globally in the near future, the comparison with the 1980-84 results provides a sense of perspective on what is still in prospect relative to what the world has already been through in terms of policy changes over the past quarter century. The prospective analysis also serves as a benchmark to suggest what is at stake in terms of further reforms either unilaterally or via WTO rounds of multilateral trade negotiations. At the same time, by showing how different the trade patterns of various countries would be without distortion it also provides a better indication of agricultural comparative advantages in different parts of the world than is available by looking at actual trade and self-sufficiency indicators in the current distortion-ridden situation.

The paper begins with an examination of the extent of price distortions in 2004 and 1980-84 as we have calibrated them, the emphasis being mainly on import tariffs in the case of non-farm products but, in the case of agriculture, also production and export taxes and subsidies. This is followed by a description of the LINKAGE model of the global economy to be used to analyze the consequences of removing those distortions. The key results of the two sets of simulations are then presented, beginning with the retrospective experiment. The bottom-line results for net farm incomes from both experiments are presented for global liberalization of all merchandise, as well as for reform of just agricultural policies. After comparing these results with earlier ones generated using the GTAP protection database Version 6,<sup>3</sup> the paper concludes by highlighting the main messages.

### **Key distortions in global markets**

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<sup>2</sup> Krueger, Schiff and Valdes (1988), like Jensen, Robinson and Tarp (2002), focus on effects of just own-country policies, the first using partial equilibrium and the second using national general equilibrium models. On the relationship between those two methodologies, see Bautista, Robinson, Wobst and Tarp (2001).

<sup>3</sup> Some of the questions raised here were addressed (but using the GTAP Version 6 protection database) by Anderson, Martin and van der Mensbrugge(2006a) who use the same Linkage model as in the present analysis, and by Anderson and Valenzuela (2007a) using the GTAP-AGR model.

Border measures traditionally have been the main means by which governments distort prices in their domestic markets for products, with the relative prices of the various tradables being affected by trade taxes-cum-subsidies. Product-specific domestic output or farm input subsidies have played a more limited role, in part because of their much greater overt cost to the treasury. In principle services trade and foreign investment distortions also could distort incentives in the agricultural and industrial sectors, but they are ignored here because much controversy still surrounds their measurement and how they should be modeled.<sup>4</sup>

To quantify the impacts both of past reforms and current policies, we use the Altermex procedure (Malcolm 1998) to amend the distortions in the pre-release of Version 7 of the GTAP global protection database.<sup>5</sup> The amendments are mainly for developing countries but, following Anderson and Valenzuela (2007b), we also alter cotton distortions in the United States to better reflect policies there. To simplify the discussion below, European transition economies (in which we include Turkey) are treated as one of the world's developing country regions, the others being Africa, Asia, and Latin America.<sup>6</sup>

The latest pre-release of Version 7 of the GTAP database includes estimates of bilateral tariffs and export subsidies and of domestic supports as of 2004 for more than 100 countries and country groups spanning the world. As with Version 6 of the GTAP dataset (which relates to 2001), the protection data come from a joint CEPII (Paris)/ITC (Geneva) project known as MAcMaps. MAcMaps is a detailed database on bilateral import protection at the HS6 tariff line level that integrates trade preferences, specific and compound tariffs and a partial evaluation of non-tariff barriers such as tariff rate quotas (TRQs).<sup>7</sup> The new Version 7 GTAP database for 2004 has lower tariffs than the previous database for 2001, because of major reforms such as completing the implementation of

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<sup>4</sup> This is reflected in the results emerging from attempts to include services distortions in trade reform modeling, which have led to widely differing results. Compare, for example, Brown, Deardorff and Stern (2003), Francois, van Meijl and van Tongeren (2005), and Hertel and Keeney (2006),

<sup>5</sup> Version 7 is yet to be publicly documented, but see Dimaranan (2006) regarding Version 6 or go to [www.gtap.org](http://www.gtap.org).

<sup>6</sup> We have no new distortion estimates for countries in the Middle East, so in what follows little attention is given to this small and relatively affluent part of the global agricultural economy.

<sup>7</sup> More information on the MAcMaps database is available in Bouët et al. (2004) and at <http://www.cepii.fr/anglaisgraph/bdd/macmap.htm>. For details of its incorporation into the GTAP Version 6 dataset, see Dimaranan (2006).

the Uruguay Round agreements and unilateral reforms including those resulting from WTO accession negotiations by China and other recent acceding countries.

As mentioned above, in the case of agriculture in developing countries the distortion levels in that database have been replaced with an alternative set for numerous developing countries, based on nominal rate of assistance estimates for 2004 that have come from the present World Bank project (Anderson and Valenzuela 2008; Valenzuela and Anderson 2008). The sectoral averages of these amended values are shown in Table 1 for 2004, and also for 1980-84. In the case of amendments to the import tariffs on individual farm products for any particular developing country, the bilateral tariff structure in the GTAP Version 7 database is preserved by simply lowering or raising the bilateral tariffs by the same proportion we amend the average tariff on each product for 2004.<sup>8</sup>

According to this amended dataset, the weighted average applied tariff for agriculture and lightly processed food in 2004 was 21.8 percent for developing countries and 22.3 percent for high-income countries, while for non-farm goods it was 7.5 percent for developing countries and just 1.2 percent for high-income countries. Export subsidies for farm products for a few high-income regions, and export taxes in a few developing countries, were still in place in 2004, but they are generally small in their impact compared with tariffs, as are production subsidies and taxes.<sup>9</sup> In 1980-84, however, developing countries had an average agricultural export tax of 11 percent while high-income countries who had an average farm export subsidy of 21 percent, and the average agricultural import tariff was lower than for developing countries (16 percent) but higher for high-income countries (26 percent) compared with their common 22 percent in 2004. As well, tariffs on non-agricultural imports were more than three times higher in 1980-84 than in 2004 for developing countries (Table 1).

The averages obscure large variations across countries and commodities. Of particular note are the agricultural tariffs. The rise in the average of those tariffs for

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<sup>8</sup> We also preserve that bilateral tariff structure for 1980-84, so as to capture the changes only in average distortions for each product and not changes in the bilateral preferential contributions to those averages.

<sup>9</sup> Using the GTAP Version 6 database for 2001, Anderson, Martin and Valenzuela (2006) found that agricultural production and export subsidies together contributed just 7 percent of the global welfare cost of agricultural protection.

developing countries since 1980-84 is representative for Africa and Europe's transition economies, but it fell in Latin America and in much of Asia – although the rise in Korea was so dramatic as to cause the Asian average to increase by one-third (Table 1).

The averages on their own are not necessarily good indicators of overall distortions to farmers' incentives, although it certainly helps to see relative rates of assistance to agriculture versus non-agricultural goods (which is why RRAs have been emphasized in the preceding chapters). Also of importance is the composition of each country's trade. Three examples serve to illustrate the point. First, if high-income countries' tariffs on temperate farm products are at a near-prohibitive level but are zero on tropical products such as coffee beans, those countries' import-weighted average agricultural tariff could be quite low even though agricultural value added in those rich countries had been enhanced substantially. A second illustration is the case of a developing country with a strong agricultural comparative advantage in all but one small farming industry, and with high tariffs to stave off import competition for that industry and for all manufacturing industries. Overall agricultural value added would be depressed by that structure of protection, yet the import-weighted average tariff protection for agriculture would be high and possibly above that for manufactures. A third example is where the non-agricultural primary sector receives a similar level of import protection as the farm sector and less than the manufacturing sector, but is much more export-focused than agriculture: trade reform may cause that other primary sector to expand at the expense not only of manufacturing but also of farming. Even though we have used production rather than trade weights to get sectoral averages rates of distortion in Table, and even though the ratio of agricultural to other goods' tariffs for 2004 in that table is well above unity for many of the regions shown, it is not possible to say from those distortion rates alone whether developing country policies have overshot in terms of moving away from an anti-agricultural bias. Equally, it is not possible to know how the benefits of removal of agricultural tariffs in the protective countries would be distributed among the various agricultural-exporting countries. What is needed to address such issues is a global general equilibrium model to estimate the net effects of all sectors' distortions in all countries on the various nations' agricultural markets and net farm incomes, to which we now turn.

## **The LINKAGE model of the global economy**

The model used for this analysis is the World Bank's global computable general equilibrium (CGE) model, known as LINKAGE (van der Mensbrugge 2005). For most of this decade it has formed the basis for the World Bank's standard long-term projections of the world economy and for much of its trade (and more recently migration) policy analysis (e.g., World Bank 2002, 2004, 2005, 2006). It is a relatively straightforward CGE model but with some characteristics that distinguish it from other comparative static models such as the GTAP model (described in Hertel 1997). Factor stocks are fixed, which means in the case of labor that the extent of unemployment (if any) in the baseline remains unchanged. 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 possibilities between extensive and intensive farming; livestock sectors reflect the substitution possibilities between pasture and intensive feeding; and all other sectors reflect standard capital/labor substitution. There are two types of labor, skilled and unskilled, and the total employment of each is assumed fixed (so no change in their unemployment levels). There is a single representative household per modeled region, allocating income to consumption using the extended linear expenditure system. 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.<sup>10</sup>

Government fiscal balances are fixed in US dollar terms, with the fiscal objective being met by changing the level of lump sum taxes on households. This implies that

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<sup>10</sup> The size of the Armington elasticities matters, see Zhang (2006, 2008) and Valenzuela, Anderson and Hertel (2007). The Linkage model assumes larger values than some other models because it is seeking to estimate long-run consequences of liberalization. An example of the difference this can make to the results is detailed in Table 12A.2 in Anderson and Martin (2006).

losses of tariff revenues are replaced by higher direct taxes on households. The current account balance also 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 and additional imports are financed by increasing export revenues. The latter typically is achieved by a depreciation of the real exchange rate. Finally, investment is driven by savings. With fixed public and foreign saving, investment comes from changes in the savings behavior of households and from changes in the unit cost of investment. The model only solves for relative prices, with the numéraire, or price anchor, being the export price index of manufactured exports from high-income countries. This price is fixed at unity in the base year.

A virtue of beginning with the latest GTAP database (pre-release 5 of Version 7) is that it includes bilateral tariffs that capture not only reciprocal but also non-reciprocal preferential trade agreements, the latter providing low-income exporters duty-free access to protected high-income country markets. This allows us to take into account the fact that future reform may cause a decline in the international terms of trade for those developing countries that are enjoying preferential access to agricultural and other markets of high-income countries (in addition to those that are net food importers because their comparative advantage is in other sectors such as labor-intensive manufacturing).

The version of the LINKAGE model used for this study is based on an aggregation involving 24 sectors and 52 regions spanning the world (see Appendix Table A). There is an emphasis on agriculture and food, which comprise half of those 24 sectors. Note that, consistent with the rest of the present project, and with WTO, we include Korea and Taiwan in the ‘developing country’ category.<sup>11</sup>

### **Retrospective analysis: how different would 2004 have been if the agricultural and merchandise trade policy changes globally since 1980-84 had not happened?**

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<sup>11</sup> The more-affluent economies of Hong Kong and Singapore are in our high-income category but, since they have close to free trade policies anyway, their influence on the results is not noticeable.

This section summarizes results from the scenarios in which 1980-84 distortion rates replace those for 2004. We thereby examine simultaneously the effects of high-income country liberalization of agricultural policies and the reduction in the anti-agricultural and anti-farm trade policy biases in developing countries without and with liberalization also of non-agricultural trade policies (to sense the relative contribution of the latter to the overall result for net farm incomes). We begin with global and national economic welfare effects, then look at changes in the terms of trade, adjustments to quantities produced and traded, effects on factor rewards, and then percentage changes to agricultural value added (net farm income) relative to value added in the rest of the economy.

### *Global and national economic welfare*

The LINKAGE model and our distortions database provide a baseline projection of the world economy in 2004. This is first compared with a simulation in which all agricultural domestic and border subsidies and taxes plus import tariffs on other merchandise are replaced with the distortion structures of 1980-84, as summarized in Table 1. Our LINKAGE model suggests that without the reforms over the intervening two decades, the world in 2004 would have been worse off by \$233 billion per year. (Keep in mind that a negative sign in this experiment has the same meaning as a positive sign in the next experiment, since both sets of simulations are using 2004 policies as their baseline.) The distribution across regions of that change in economic welfare (or equivalent variation in income), reported in Table 2, suggests two-thirds of those dollars accrued to high-income countries. However, as a share of national income, developing countries gained more, with an average increase of 1.0 percent compared with 0.7 percent for high-income countries. The results vary across developing countries, ranging from slight losses in a few cases to large proportional increases in such cases as China, Mozambique and Nigeria.

The second column of numbers and those in parentheses in Table 2 shows 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 adverse, while

the opposite is the case for high-income countries. Nonetheless, even though that terms of trade change reduced their gains from improved efficiency of domestic resource use, developing country economies have benefited proportionately more than high-income economies from those policy reforms of the past quarter-century.

*Decomposing the contribution to welfare of changes in national terms of trade*

To understand the contribution to welfare of the changes in international terms of trade shown in Table 2, it is necessary to first examine the changes in import and export prices for farm and other products. For developing countries as a group, their terms of trade have worsened because of these reform for two sets of reasons: for non-agricultural goods their export prices have been lowered by 0.4 percent while their import prices have hardly been affected; and for farm products their lowered export prices (0.6 percent) have been compounded by 16 percent higher prices for their agricultural and food imports. The net effect is a deterioration of 1.7 percent in their terms of trade. By contrast, high-income countries enjoyed an improvement of 0.8 percent in their terms of trade as a result of the policy changes, partly from non-farm products but mostly from farm products, where the improvement in their export prices more than offset the higher prices of their imports (Table 3).

The contributions of those four elements to national economic welfare can be seen in Table 4. Overall the terms of trade effect for developing countries diminishes their welfare gains from reform by \$49 billion to bring it down to \$73 billion per year. Of that, two-fifths is from the decline in their agricultural export prices (in part because of less taxation and hence larger volumes of those exports now), another two-fifths from the decline in prices of non-farm exports, and one-fifth from the rise in prices of their food imports (partly because of reduced assistance to farmers in high-income countries). For high-income countries, on the other hand, their reduction in agricultural tariffs and subsidies and the consequent rise in international food prices helps farm exporters more than it hurts import-competing farmers in this group, and the improvement in welfare from lower prices of non-farm imports more than offsets the loss due to lower prices for their non-farm exports.

### *Quantities produced and traded*

The retrospective results suggest that, as a result of the reforms of the past two decades, the developing countries' aggregate shares of global output and exports of textiles and apparel have grown by about 3 percentage points while the shares for other non-farm products have changed by no more than one percentage point. Their shares in agricultural and food markets, however, have changed more: their share of the world's primary agricultural exports has risen from 43 to 55 percent and the output share from 58 to 62 percent, and even their shares of processed foods have risen by one percentage point. The rises have occurred in nearly all agricultural industries, the exceptions being rice and sugar where the growth in protectionism in high-income countries has been greatest.

The share of global production of farm products that is exported (excluding intra-EU trade) is slightly smaller as a result of the reforms, in contrast to the 5 percentage point rise for textiles and clothing and the 3 point rise for other manufactures. Agriculture's 8 percent share in 2004 remains in stark contrast to the 31 percent share for other primary products and to around 25 percent for all other goods, and this 'thinness' is an important contributor to the volatility of international prices for these weather-dependent farm products (first columns of Table 5). The fact that the past two decades of reform has not made agricultural production more traded globally is illuminating. The findings summarized in Anderson (2009) show that the reforms in developing and high-income countries over the past two decades have reduced the anti-trade bias in the agricultural trade of developing countries but increased that bias in high-income countries (thanks in part to the cut in their export subsidies). According to this Linkage Model result, the latter slightly more than offsets the former in terms of their aggregate impact on the global share of farm production that is traded.

The impacts on agricultural and food output and trade for various countries and regions suggest farm trade would have been two-thirds bigger in real value terms had the past two decades of reform not occurred (last row of Table 6). On the export side that is almost entirely due to high-income countries, whose exports would have been more than twice as large had they not lowered their export subsidies and developing countries not

lowered their export taxes. The global value of agricultural and food output, however is virtually unchanged (just 3.6 percent less). This suggests that, in aggregate, the reform-induced output decline of high-income countries (11 percent) more than fully offset the reform-induced output expansion of developing countries (3 percent). Note that the big economies of China and South Asia, as well as Thailand and most of Latin America, all enjoyed increased farm output because of the past quarter-century's reforms. Note also what happens to agricultural imports: in real value terms developing countries as a group would have had to import 50 percent more farm products in 2004 had the reforms not taken place of the past two decades, while high-income countries would have had to import nearly 80 percent more (last column of Table 6). Combined with the export effects, that means the food and agricultural self sufficiency ratio would have been very slightly lower in developing countries and slightly higher in high-income countries (Table 7). The extent of this reform on the tradability of different product is shown in Table 8. Sugar, milk products and cotton would have been exported more from developing to high-income countries had the latter group's assistance to those industries not grown over the past two decades.

The net consequences of these impacts on the share of farm production exported by regions are shown in Table 9. For developing countries as a group there is no change for its 9.5 percent share, while for high-income countries the share is reduced by 3 percentage points by their export subsidy cuts and other reforms, to 13 percent (including intra-EU trade).

### ***Effects on product prices***

How do different agricultural and manufacturing goods' average prices in international markets change with liberalization of distortionary agricultural policies and other protection? That depends not only on the changes in the nominal rates of assistance but also on the relative size of each sub-sector and the different degrees of responsiveness of inputs to changes in relative output prices, and on the method used to weigh different countries' price changes. According to the Linkage model with its default elasticities and (Paasche) weighting methods, the average real price in international markets would have

been 13 percent lower for agricultural and food products had policies not changed over the past two decades (Table 10). International prices for farms goods are higher now despite the substantial reduction in the anti-agricultural policy bias in developing countries since the early 1980s: the effect of that is evidently more than offset by the reduction in agricultural tariffs and subsidies in high-income countries.

### *Effects on factor rewards*

The relatively small percentage changes in net national economic welfare, reported in Table 2, 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 11, where factor rewards are expressed in real terms by deflating by the aggregate consumer price index. Those results suggest that reform has raised the food price index by half a point while lowering by one-fifth of a point the overall CPI index. Unskilled workers in developing countries, according to these results, are better off from reform than skilled workers or capital owners; and if they are also agricultural landowners they have gained from increased rewards for that factor too. For high-income countries, consistent with standard trade theory, skilled workers gained at the expense of unskilled workers and agricultural land rents have halved over what they would have been. Those European and Northeast Asian farmers renting agricultural land would have benefited from the large fall in farm rental costs, more or less offsetting the fall in prices for their output, while earnings of landowners in those countries would decline. Their loss is relative to the no-reform baseline, which ignores the fact that such farm landowners have long enjoyed protection-inflated returns, in some cases for decades prior to the 1980s.

### *Effects on sectoral value added*

Of crucial interest in terms of these policies' impact on inequality and poverty is how they have affected value added in agriculture, in other words net farm income. For poverty it matters how much that indicator changes in absolute terms in lower-income

countries (given that three quarters of the world's poor are farmers in developing countries), while for within-country inequality it matters also how much it changes relative to value added in non-farm sectors. These results are reported in Table 12.

The results show that for developing countries as a group, value added in agriculture is 4.9 percent higher than it would have been without reform over the past two decades, compared with just 0.4 percent for non-agriculture. A similar-sized improvement has occurred in high-income countries for non-agriculture, but there net farm incomes would have been 36 percent higher without the global reforms. For East Asia and Latin America the gain to farmers is twice as much, for South Asia and North Africa it is less than half as much, and for Sub-Saharan Africa the gain is just above the developing country average (although farmers in South Africa and Nigeria are made substantially worse off). However, among the countries listed in Africa, net farm incomes would increase substantially only in Mozambique, Zambia and Zimbabwe, and for the continent as a whole they would fall very slightly (by less than 1 percent). Partly that is because non-agricultural primary sectors – in which numerous African countries have a strong comparative advantage – have expanded (raising Africa's self-sufficiency in that sector from 182 to 191 percent), and that in turn has boosted non-tradables production and employment. Net farm incomes are estimated to have fallen also in Bangladesh and Vietnam, but there it is textiles and clothing that expand.

### **Prospective effects of removing 2004 price-distorting policies globally**

In the light of the above assessment of partial reform over the past two decades, we turn now to examining what could result from removing the remaining policies as of 2004. In this case the scenarios involve full global liberalization of both agricultural policies and non-agricultural goods trade policies.

#### ***Global and national economic welfare***

Beginning with the baseline projection of the world economy in 2004, all agricultural subsidies/taxes plus import tariffs on other merchandise, as summarized in Table 1,<sup>12</sup> are removed globally. Our LINKAGE model suggests that would lead to a global gain of \$168 billion per year (Table 13). That compares with the above estimate of \$233 billion per year from the partial reform since the early 1980s (Table 2), suggesting that in a global economic welfare sense, by 2004 the world had moved three-fifths of the way towards global free trade in goods. As a share of national income, developing countries would gain nearly twice as much as high-income gains by completing that reform process (an average increase of 0.9 percent compared with 0.5 percent for high-income countries). The results vary widely across developing countries, ranging from slight losses in the case of some South Asian and Sub-Saharan African countries that would suffer exceptionally large adverse terms of trade changes (and thus be worthy candidates for ‘Aid-for-Trade’ assistance as envisaged as part of the WTO’s Doha Development Agenda) to 8 percent increases in the case of Ecuador (whose main export item, bananas is currently heavily discriminated in the EU market where former colonies and least developed countries enjoy preferential duty-free access).

The second column of numbers and those in parentheses in Table 13 shows 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 slightly negative, and conversely for high-income countries.

### ***Regional and sectoral distribution of welfare effects***

One way to way to decompose the real income gains from full removal of price distortions globally, so as to better understand the sources for each region, is to assess the impacts of developing country liberalization versus high-income country liberalization in different economic sectors. These results are provided in Table 14. They suggest global liberalization of agriculture and food markets would contribute 60 percent of the total

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<sup>12</sup> The only other policy change is the removal of export taxes on non-farm products in Argentina This is done because they were introduced at the same time (end-2001) and for the same reason (for the government to gain popular support from the urban poor) as were the country’s export taxes on farm products.

global gains from merchandise reform. This is similar to the 63 per cent found for 2015 by Anderson, Martin and van der Mensbrugghe (2006b) using the earlier Version 6 of the GTAP database anchored on 2001 estimates of distortions. This robust result is remarkable given the low shares of agriculture and food in global GDP and global merchandise trade (less than 9 percent). For developing countries, the importance of agricultural policies is even greater at 83 percent (compared with just 5 percent for high-income countries – see row 7 of Table 14).

Three-fifths of those global gains from removing agricultural policies are accounted for by the farm policies of high-income countries (columns 3 and 6 of Table 14). Those policies also account for just over half of the overall gains from trade reform to developing countries, while developing country farm policies are responsible for 30 percent that region's gains (columns 1 and 3 of Table 14). That is, if only high-income countries were to liberalize their agricultural markets – as some countries have suggested in the WTO's on-going Doha trade negotiations – that would provide less than two-thirds of the potential gains to developing countries from global farm policy reform.

### *Quantities produced and traded*

The full liberalization results suggest there would be little change in the developing countries' aggregate shares of global output and exports of non-farm products other than for textiles and apparel. Their shares in agricultural and processed food markets, however, change noticeable: the export share rises from 54 to 64 percent and the output share rises from 46 to 50 percent. More significantly, the rises occur in nearly all agricultural and food industries. As a result, the share of global production of farm products that is exported rises dramatically for many industries and, for the sector as a whole, increases from 8 to 13 percent excluding intra-EU trade (Table 15). That 'thickening' of international food markets would have a substantial dampening effect on the instability of prices and quantities traded in those markets.

The impact of full trade reform on agricultural and food output and trade is shown for each country/region in Table 16, where it is clear that global farm trade is enhanced by more than one-third whereas the global value of output is virtually unchanged,

dropping just 2.6 percent. This suggests that, in aggregate, the pro-agricultural policies of high-income countries are not quite fully offset by the policies of developing countries – whereas the anti-trade biases in policies of both groups of countries reinforce each other. The increase in exports of those goods from developing countries would be a huge \$163 billion per year. Certainly Latin America accounts for nearly half of that increase, but all developing regions' exports expand. This means their share of production exported would be much higher. Table 17 shows it would increase for almost all developing countries, rising in aggregate for the group from 10 to 17 percent.

Also of interest is what happens to agricultural imports: developing countries as a group would see them growing less than farm exports (Table 16). That means their food and agricultural self sufficiency ratios would rise, although in aggregate only slightly. For high-income countries that ratio would fall five percentage points (slightly less if Eastern Europe is included), while in East Asia and Africa it would rise two to three points, for South Asia it would be unchanged, and for Latin America it would jump from 112 to 126 percent (Table 18).

As already mentioned, such reform also raises substantially the share of agricultural and food production that is exported globally, thereby 'thickening' international markets, which would dampen international food price fluctuations and thereby reduce concerns about vulnerability to import dependence. The extent of this global public good aspect of agricultural trade reform can be sensed for different products from the results reported in Tables 19. Highly protected sugar and milk, as well as grains and oilseeds, are especially noteworthy. Also noteworthy from that table is the extent to which the developing country shares of output exported rise for certain products. The share of their grain production that is exported would double, and for meat it would more than double while for sugar it would rise nearly four-fold. Cotton (plant-based fibers) too would become more of the domain of developing countries.

### ***Effects on product and factor prices***

How do different agricultural prices in international markets change with liberalization of distortionary agricultural policies and other protection? The average real international

prices of agricultural and lightly processed food products would be only 1.3 percent higher in the absence of all merchandise trade distortions, or 2.0 percent if just agricultural policies were liberalized (Table 20). The net effects of present distortions are especially dampening the international prices of beef, milk, rice and cotton. But they are propping up the prices of some other products, because of export taxes still in place in some developing countries, most notably Argentina.

The redistributions of welfare among groups within each country following trade reform can be much larger than the aggregate change, because of the impacts on real rewards to labor, capital and land. Those effects are reported in Table 21, where factor rewards are deflated by the overall consumer price index. It happens that food prices would fall more than that overall CPI index. Consistent with trade theory, those results suggest unskilled workers in developing countries – the majority of whom work on farms – would benefit most from reform, followed by skilled workers, then capital owners. Returns to immobile agricultural land also rise in developing countries, but by less than for more-mobile factors. Insofar as unskilled workers spend a higher share of their income on food than the average citizen, these results understate the extent of their gain. These results suggest both inequality and poverty could be alleviated by such reform.

### *Effects on sectoral value added*

Of crucial interest in terms of these policies' impact on inequality and poverty is how they affect value added in agriculture, in other words net farm income. These results for full global reform are reported in the first four columns of Table 22.

The results show that for developing countries as a group, value added in agriculture rises by 5.6 percent, compared with 1.9 percent for non-agriculture, following full global reform of all merchandise trade. Latin America is where net farm income expands most, averaging 37 percent but exceeding 100 percent for Argentina and Ecuador and 40-50 percent for Brazil and Colombia. In East Asia it also expands considerably, and more than non-agricultural value added – including in China. However, among the countries listed in Africa, net farm incomes would increase substantially only in Mozambique, Zambia and Zimbabwe, and for the continent as a whole they would fall

very slightly (by less than 1 percent). Partly that is because non-agricultural primary sectors – in which numerous African countries have a strong comparative advantage – would expand (raising Africa’s self-sufficiency in that sector from 180 to 189 percent – see Table 18), and that in turn would boost production and employment of non-tradable goods and services. Net farm incomes are estimated to fall also in South Asia (by 7 percent), but there it is textiles and clothing that would expand (raising self-sufficiency from 144 to 153 percent) and, in India where the skilled/unskilled wage differential rises, also skill-intensive goods and services production.

***Comparison with previous results based on Version 6 GTAP protection data***

Results from global CGE models can differ for myriad reasons, even when the same model is used (van der Mensbrugge 2006; Valenzuela, Anderson and Hertel 2007). The current full liberalization results in this section use the same model and same prospective global reform experiment as in Anderson, Martin and van der Mensbrugge (2006a), and differ in just two important respects (Valenzuela and Anderson 2008). One is that the present results refer to the world economy with its distortions as of 2004 whereas the earlier exercise took 2001 as its base, projected the world forward to 2005 to include some key policy reforms over those four years, and then projected another decade to 2015 by which time developing countries are a larger share of the modeled global economy. The other difference is the use in the present exercise of the new 2004 agricultural distortions database for developing countries. As can be seen in the first column of Appendix Table A, the estimates of assistance via trade taxes for agricultural and lightly processed food are somewhat lower for the developing country regions in the new 2004 data set based on price comparisons than is the case in the GTAP one based predominantly on import tariffs. In particular, some agricultural export taxes are included in the revised distortions to incentives, particularly in Argentina where they average 21 percent for agricultural products. With these differences, modeling a move to global free trade would generate less import growth and more export growth in farm products for developing countries, but to differing degrees in different regions.

In these new results, the developing countries' share of global agricultural and food output rises from 46 to 50 percent, and of exports from 54 to 64 percent (compared with rises from 54 to 56 percent and from 51 to 55 percent, respectively, in the Anderson, Martin and van der Mensbrugghe (2006a) study). The overall value of agricultural output in developing countries rises 7 percent in these new results compared with just 2 percent previously. A major part of that difference is due to the simulated removal of Argentina's export taxes, which causes Argentina's farm output to jump.

Those Argentinean export taxes are also partly responsible for a smaller set of impacts of liberalization on international prices of farm products. For primary agricultural prices in aggregate, the impact reported in Table 20 above, of 0.9 percent, compares with an average of 5.5 percent in Anderson, Martin and van der Mensbrugghe 2006a, Table 15).

These differences affect the new economic welfare results for South Asia and Sub-Saharan Africa especially. Previously both regions were estimated to gain from global reform, whereas the new estimates suggest they may lose slightly (0.1 percent). South Asian farmers lose less in the current results than previously, however, because the new distortion estimates involve a lower level of agricultural protection in India's baseline data.

## Conclusions

By way of summing up, several key findings from this study are worth emphasizing, beginning with those from the retrospective experiment of comparing what 2004 would have been had the agricultural price and trade policy reforms over the past quarter century not taken place:

- without those policy reforms, the world in 2004 would have been worse off by \$233 billion per year;
- even though it depressed their terms of trade, developing economies benefited proportionately more than high-income economies (1.0 percent compared with 0.7 percent of national income) from those policy reforms;
- the developing countries' share of the world's primary agricultural exports rose from 43 to 55 percent, and its farm output share from 58 to 62 percent, because of those reforms, with rises in nearly all agricultural industries except rice and sugar where the growth in protectionism in high-income countries has been greatest;
- the share of global farm production exported (excluding intra-EU trade) in 2004 was slightly smaller as a result of those reforms since 1980-84, because of less farm export subsidies, so agriculture's 8 percent share in 2004 remains in stark contrast to the 31 percent share for other primary products and the 25 percent for all other goods – a 'thinness' that is an important contributor to the volatility of international prices for weather-dependent farm products;
- the average real price in international markets would have been 13 percent lower for agricultural and food products had policies not changed over the past quarter century;
- for developing countries as a group, value added in agriculture is 4.9 percent higher than it would have been without those reform, more than ten times the proportional gain of just 0.4 percent for non-agriculture;

The findings from the second experiment, aimed at understanding the effects of the policies remaining in place as of 2004 are equally stark:

- their global welfare cost is \$168 billion per year which, when compared with the estimated gain of \$233 billion annually from the partial reform since the early 1980s, suggests that in a global welfare sense the world had moved three-fifths of the way towards global free trade in goods between the early 1980s and the mid 2000s;
- as a share of national income, developing countries would gain nearly twice as much as high-income countries by completing that reform process (an average increase of 0.9 percent compared with 0.5 percent for high-income countries, but as high as 8 percent for banana-exporting Ecuador);
- of those prospective welfare gains from global liberalization, 60 percent would come from agriculture and food policy reform – a striking result given that the shares of agriculture and food in global GDP and global merchandise trade are less than 9 percent;
- the contribution of agricultural policy reform to the prospective welfare gain for developing countries is even greater, at 83 percent;
- but if only high-income countries were to liberalize their agricultural markets – as some countries have suggested in the WTO’s on-going Doha trade negotiations – that would provide less than two-thirds of the potential gains to developing countries from global agricultural policy reform;
- with full goods trade liberalization, the share of global production of farm products that is exported would rise from 8 to 13 percent excluding intra-EU trade, thereby ‘thickening’ international food markets and reducing instability of prices and quantities traded in those markets;
- unskilled workers in developing countries – the majority of whom work on farms – would benefit most from reform, followed by skilled workers and then capital owners; and
- net farm incomes in developing countries would rise by 5.6 percent, compared with 1.9 percent for non-agricultural value added, which is even more than the estimated gain from the partial reforms of the past quarter century.

Together, those last two findings suggest both inequality and poverty could be alleviated by such reform, given that three-quarters of the world's poor are farmers in developing countries (Chen and Ravallion 2007). To get a more precise sense of whether that is so, and to explore the extent to which it is own-country as distinct from rest-of world's policies that are doing the harm, requires country case studies using national economy-wide models that are enhanced with detailed earning and spending information of numerous types of urban and rural households. One set of such studies for a dozen or so countries across three continents is forthcoming in Anderson, Cockburn and Martin (2009).

As for farmers in high-income countries, removal of agricultural price-supporting policies there would undoubtedly lead to painful reductions in income and wealth if not compensated, but compensation by the gainers in the rest of their societies could readily afford to compensate them from the benefits of freeing trade. The distortion estimates in Table 1 show that all high-income countries have lowered the price supports for their farmers since the 1980s. In some countries that has been partly replaced by assistance that is somewhat decoupled from production (not shown in that table). If that trend continues at the pace of the past quarter century, and if there is no growth of agricultural protection in developing countries, then before the middle of this century we may have removed most of the disarray in world food markets that so worried D. Gale Johnson through much of his academic life. However, if the WTO's Doha Development Agenda collapses, and governments thereby find it more difficult to ward off agricultural protection lobbies, there is the possibility of the recent progress being reversed in high-income countries and of emerging economies – even those as poor as India – following the same agricultural protection path this century as that Anderson, Hayami and Others (1986) show was taken by high-income countries last century.

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Table 1: Structure of price distortions in global goods markets,<sup>a</sup> 1980-84 and 2004  
(percent)

	1980-84				2004			
	Primary Agriculture	Agriculture and Lightly Processed Food		Other goods	Primary Agriculture	Agriculture and Lightly Processed Food		Other goods
	Domestic Support	Export Subsidy	Tariff	Tariff	Domestic Support	Export Subsidy	Tariff	Tariff
<b>Africa</b>	<b>-0.3</b>	<b>-2.5</b>	<b>17.0</b>	<b>12.6</b>	<b>-0.8</b>	<b>0.1</b>	<b>20.4</b>	<b>11.2</b>
Egypt	0.4	-6.6	5.8	22.5	0.0	0.0	5.0	13.5
Madagascar	0.0	-4.4	3.4	13.9	0.0	-4.4	3.4	2.7
Mozambique	0.2	-53.8	5.5	29.7	0.2	0.0	14.5	10.9
Nigeria	2.6	22.5	22.2	0.1	0.1	0.0	76.1	17.2
Senegal	0.0	-6.7	5.7	8.7	0.0	-1.1	6.2	8.9
South Africa	0.0	5.6	18.1	5.8	0.0	0.0	10.2	6.5
Uganda	-0.9	-14.1	16.1	50.1	0.0	-2.6	9.2	5.5
Tanzania	5.5	-29.4	7.9	97.5	-0.3	0.0	11.8	13.7
Zambia	-0.8	-21.4	6.0	26.0	-0.8	0.0	7.0	9.0
Zimbabwe	-4.1	-31.0	7.0	49.0	-3.2	0.0	8.9	15.4
Rest of Africa	-1.2	-4.2	19.0	13.4	-1.2	0.3	19.0	13.4
<b>East and South Asia</b>	<b>-2.4</b>	<b>-16.7</b>	<b>19.5</b>	<b>34.6</b>	<b>2.4</b>	<b>0.6</b>	<b>29.6</b>	<b>8.1</b>
China	-8.5	-38.7	6.9	46.1	0.0	0.2	6.5	7.1
Korea	2.8	0.0	106.7	7.6	0.0	0.0	319.4	5.9
Taiwan	-0.4	21.7	98.0	5.7	-0.4	0.0	84.2	3.9
Indonesia	0.2	-3.1	27.9	28.0	0.0	-1.6	7.3	4.9
Malaysia	4.8	-0.2	3.1	5.2	0.0	-0.2	5.0	5.9
Philippines	-4.7	-0.1	18.3	14.0	-4.7	0.0	7.1	3.4
Thailand	-0.2	-0.7	29.8	19.1	-0.2	0.0	26.2	12.9
Vietnam	-3.6	-0.5	21.5	18.5	-3.6	-0.5	21.5	18.5
Bangladesh	-1.0	-2.2	10.6	26.7	-1.0	0.0	9.9	22.5
India	4.9	-8.8	8.9	86.2	10.1	2.5	2.9	20.8
Pakistan	0.7	-2.7	15.0	53.3	0.0	-0.2	19.4	18.5
Sri Lanka	1.1	-14.1	22.1	53.1	0.6	-0.3	23.8	5.8
Rest of East and South Asia	-0.7	0.0	4.3	2.7	-0.7	0.0	4.3	2.7
<b>Latin America</b>	<b>3.8</b>	<b>-9.6</b>	<b>9.8</b>	<b>15.7</b>	<b>-0.2</b>	<b>-1.4</b>	<b>7.2</b>	<b>6.7</b>
Argentina	0.0	-20.9	0.0	15.8	0.0	-14.8	0.0	5.8
Brazil	5.0	-17.1	3.2	33.4	0.0	0.0	4.8	8.9
Chile	-3.0	0.0	4.8	6.2	0.0	0.0	2.4	1.8
Colombia	-0.6	1.0	21.7	22.8	0.0	0.0	21.6	9.8
Ecuador	0.0	-13.7	28.6	10.3	0.0	0.0	13.4	10.4
Mexico	14.3	-9.6	19.1	6.8	1.2	0.0	6.2	3.4
Nicaragua	0.0	-2.8	10.9	3.9	0.0	-2.8	9.6	3.9
Rest of Latin America	-1.7	0.3	9.9	9.9	-1.7	0.3	9.9	9.9
<b>EEurope &amp; Central Asia</b>	<b>0.8</b>	<b>-2.6</b>	<b>13.8</b>	<b>9.6</b>	<b>0.8</b>	<b>-0.3</b>	<b>15.9</b>	<b>4.8</b>
Baltic States	3.4	0.0	8.2	0.9	3.4	0.0	8.2	0.9
Bulgary	0.6	0.0	14.8	11.5	0.6	0.0	14.8	11.5
CZE Republic	0.6	0.0	3.0	0.5	0.6	0.0	3.0	0.5
Hungary	3.1	0.0	6.2	0.5	3.1	0.0	6.2	0.5
Poland	0.4	0.0	6.2	0.8	0.4	0.0	6.2	0.8

(continued)

Table 1 (continued): Structure of price distortions in global goods markets drawn from the World Bank project,<sup>a</sup> 1980-84 and 2004  
(percent)

	1980-84				2004			
	Primary Agriculture	Agriculture and Lightly Processed Food		Other goods	Primary Agriculture	Agriculture and Lightly Processed Food		Other goods
		Domestic Support	Export Subsidy			Tariff	Domestic Support	
Romania	1.3	0.0	18.0	9.8	1.3	0.0	18.0	9.8
Slovakia	0.0	0.0	5.2	0.4	0.0	0.0	5.2	0.4
Slovenia	0.0	0.0	7.8	0.4	0.0	0.0	7.8	0.4
Russia	1.7	-0.9	18.9	7.4	1.7	-0.9	18.9	7.4
Kazakhstan	-0.9	0.0	3.4	2.7	-0.9	0.0	3.4	2.7
Turkey	0.8	-14.3	20.4	43.9	0.8	0.0	33.3	3.1
Rest of EEurope and CAsia	-1.1	-0.9	9.7	5.7	-1.1	-0.9	9.7	5.7
<b>High-income countries</b>	<b>6.6</b>	<b>20.9</b>	<b>24.0</b>	<b>2.4</b>	<b>2.6</b>	<b>7.2</b>	<b>22.3</b>	<b>1.2</b>
Australia	0.5	7.0	6.7	8.9	0.0	0.0	0.5	3.3
Canada	3.0	7.0	42.6	5.1	1.6	3.6	18.9	1.4
EU15	1.2	28.6	13.3	2.0	1.2	12.8	6.9	0.7
Japan	13.1	0.0	120.9	0.9	2.0	0.0	151.7	1.7
New Zealand	-5.3	15.4	1.7	18.0	0.0	-0.2	0.7	3.3
Rest West Europe	101.7	54.0	59.5	4.0	2.6	13.4	53.9	2.2
USA	3.3	14.1	6.5	2.9	5.2	0.6	6.1	1.3
<b>Developing countries</b>	<b>-0.6</b>	<b>-11.0</b>	<b>16.4</b>	<b>25.6</b>	<b>1.4</b>	<b>0.0</b>	<b>21.8</b>	<b>7.5</b>
Africa	-0.3	-2.5	17.0	12.6	-0.8	0.1	20.4	11.2
East Asia	-5.6	-21.5	24.3	29.6	-0.3	0.0	41.6	6.7
South Asia	3.5	-7.1	10.7	72.6	7.2	1.7	6.9	20.2
Latin America	3.8	-9.6	9.8	15.7	-0.2	-1.4	7.2	6.7
Middle East	-12.4	0.0	7.5	5.7	-12.4	0.0	7.5	5.7
EEurope and CAsia	0.8	-2.6	13.8	9.6	0.8	-0.3	15.9	4.8
<b>WORLD TOTAL</b>	<b>2.3</b>	<b>4.7</b>	<b>20.1</b>	<b>10.1</b>	<b>1.9</b>	<b>3.5</b>	<b>22.1</b>	<b>3.3</b>

<sup>a</sup> Using value of production at undistorted prices as weights.

Source: Authors' calculations based on Anderson and Valenzuela (2008).

Table 2: Economic welfare impact of going back to 1980-84 policies, by country/region

(relative to the 2004 benchmark, in 2004 US dollars and percent)

	<b>Total real income gain p.a. (\$billion)</b>	<i>Change in income due just to change in terms of trade (\$billion)</i>	<b>Total real income gain as percentage of 2004 benchmark<sup>a</sup></b>	
<b><i>North and Sub Saharan Africa</i></b>	<b>-2.8</b>	<b>1.8</b>	<b>-0.5</b>	<b>(0.3)</b>
Egypt	-0.1	0.1	-0.2	(0.1)
Madagascar	0.0	0.1	1.1	(2.0)
Mozambique	-0.2	0.4	-3.7	(7.2)
Nigeria	-0.2	-0.9	-0.5	(-2.0)
Senegal	0.0	0.0	-1.2	(-1.2)
South Africa	-2.6	-1.4	-1.8	(-0.9)
Uganda	-0.1	0.4	-2.3	(6.3)
Tanzania	-0.1	0.8	-1.1	(8.6)
Zambia	0.0	0.1	-0.8	(2.8)
Zimbabwe	-0.2	0.3	-8.7	(12.3)
Rest of Africa	0.7	1.9	0.3	(0.7)
<b><i>East and South Asia</i></b>	<b>-72.3</b>	<b>26.4</b>	<b>-2.1</b>	<b>(0.8)</b>
China	-46.4	29.1	-3.5	(2.2)
Korea	-6.9	-6.9	-1.4	(-1.4)
Taiwan	-2.9	-3.1	-1.2	(-1.2)
Indonesia	-3.5	1.3	-1.6	(0.6)
Malaysia	0.5	-0.5	0.6	(-0.6)
Philippines	0.1	1.4	0.2	(2.1)
Thailand	-1.5	-0.5	-0.6	(-0.2)
Vietnam	-0.3	-0.2	-0.8	(-0.5)
Bangladesh	0.0	0.0	0.1	(0.0)
India	-8.7	5.6	-1.7	(1.1)
Pakistan	-1.2	0.6	-1.6	(0.7)
Sri Lanka	-0.9	0.4	-5.8	(2.2)
Rest of East and South Asia	-0.7	-0.9	-0.5	(-0.6)
<b><i>Latin America</i></b>	<b>-7.1</b>	<b>13.7</b>	<b>-0.4</b>	<b>(0.8)</b>
Argentina	-1.7	0.1	-1.4	(0.1)
Brazil	-5.3	6.8	-1.2	(1.6)
Chile	0.1	0.7	0.1	(1.0)
Colombia	2.5	2.5	3.5	(3.5)
Ecuador	-0.6	0.3	-2.5	(1.2)
Mexico	-2.6	3.6	-0.5	(0.7)
Nicaragua	0.0	0.0	0.6	(0.0)
Rest of Latin America	0.5	-0.2	0.1	(-0.1)
<b><i>EEurope &amp; Central Asia</i></b>	<b>6.5</b>	<b>7.1</b>	<b>0.5</b>	<b>(0.6)</b>
Baltic States	0.3	0.2	1.1	(0.7)
Bulgaria	0.4	0.3	3.4	(2.6)
Czech Republic	0.4	0.3	0.6	(0.4)
Hungary	0.3	0.3	0.4	(0.4)

Poland	0.4	0.3	0.3	(0.2)
Romania	0.8	0.5	2.2	(1.4)
Slovakia	0.1	0.1	0.5	(0.5)
Slovenia	0.0	0.0	0.1	(0.0)
Russia	3.7	1.5	0.8	(0.3)
Kazakhstan	0.0	0.0	0.0	(0.0)
Turkey	-4.4	1.6	-2.0	(0.7)
Rest of EEurope & Central Asia	4.4	2.1	4.2	(2.0)
<b>High-income countries</b>	<b>-159.9</b>	<b>-50.8</b>	<b>-0.7</b>	<b>(-0.2)</b>
Australia	-2.4	-0.2	-0.5	(0.0)
Canada	-4.6	1.6	-0.7	(0.2)
EU 15	-63.0	-10.3	-0.8	(-0.1)
Japan	-14.6	-20.3	-0.5	(-0.6)
New Zealand	-2.5	-0.6	-3.6	(-0.8)
Rest of Western Europe	-59.7	-15.9	-12.1	(-3.2)
United States	-10.8	-2.6	-0.1	(0.0)
Hong Kong and Singapore	-2.2	-2.6	-1.8	(-2.1)
<b>Developing countries</b>	<b>-73.1</b>	<b>49.3</b>	<b>-1.0</b>	<b>(0.7)</b>
North Africa	0.6	0.1	0.3	(0.0)
Sub-Saharan Africa	-3.4	1.7	-1.0	(0.5)
East Asia	-61.5	19.9	-2.2	(0.7)
South Asia	-10.8	6.5	-1.7	(1.0)
Latin America	-7.1	13.7	-0.4	(0.8)
Middle East	2.6	0.4	0.5	(0.1)
EEurope & Central Asia	6.5	7.1	0.5	(0.6)
<b>High-income countries</b>	<b>-159.9</b>	<b>-50.8</b>	<b>-0.7</b>	<b>(-0.2)</b>
<b>World total</b>	<b>-233.0</b>	<b>-1.5</b>	<b>-0.8</b>	<b>(0.0)</b>

<sup>a</sup> Numbers in parentheses refer to that due to terms of trade effects.

Source: Authors' World Bank LINKAGE model simulations

Table 3: Impact of going back to 1980-84 policies on indexes of real<sup>a</sup> export and import prices, by region  
(percent)

	Percent change in export prices			Percent change in import prices			Percent change in terms of trade		
	<i>Agriculture and light processing</i>	<i>Manuf. and services</i>	<i>Total</i>	<i>Agriculture and light processing</i>	<i>Manuf. and services</i>	<i>Total</i>	<i>Agriculture and light processing</i>	<i>Manuf. and services</i>	<i>Total</i>
<b><i>Developing countries</i></b>	<b>0.6</b>	<b>0.4</b>	<b>0.4</b>	<b>-15.7</b>	<b>0.0</b>	<b>-1.3</b>	<b>16.3</b>	<b>0.4</b>	<b>1.7</b>
North Africa	1.6	0.5	0.6	-9.2	0.5	-0.9	10.7	0.1	1.5
Sub-Saharan Africa	-12.8	-0.5	-2.1	-18.7	0.3	-1.8	5.9	-0.8	-0.3
East Asia	-1.8	0.2	0.2	-7.1	-0.6	-1.1	5.4	0.8	1.3
South Asia	6.6	5.5	5.6	-6.8	0.1	-0.8	13.4	5.5	6.4
Latin America	5.4	0.5	1.1	-12.1	0.4	-0.5	17.5	0.2	1.6
Middle East	-2.2	-0.6	-0.7	-25.6	0.3	-2.6	23.4	-0.9	1.9
EEurope and Central Asia	3.9	0.4	0.6	-28.6	0.5	-1.8	32.5	-0.1	2.4
<b><i>High-income countries</i></b>	<b>-24.0</b>	<b>0.2</b>	<b>-1.7</b>	<b>-17.9</b>	<b>0.4</b>	<b>-0.8</b>	<b>-6.2</b>	<b>-0.2</b>	<b>-0.8</b>
<b><i>World total</i></b>	<b>-17.6</b>	<b>0.3</b>	<b>-1.0</b>	<b>-17.0</b>	<b>0.3</b>	<b>-1.0</b>	<b>-0.6</b>	<b>0.0</b>	<b>0.0</b>

<sup>a</sup> Relative to the numeraire which in this version of the LINKAGE model is the price of high-income countries' exports of manufactures.

Source: Authors' World Bank LINKAGE model simulations

Table 4: Terms of trade's contribution to real income changes from going back to 1980-84 policies, by region

(2004 \$billion)

	<b>Exports</b>		<b>Imports<sup>a</sup></b>		<b>Total impact</b>	
	<i>Agriculture and light processing</i>	<i>Manufacturing and services</i>	<i>Agriculture and light processing</i>	<i>Manufacturing and services</i>	<i>Net terms of trade impact</i>	<i>Net real income gain</i>
<b><i>Developing countries</i></b>	20,567	20,323	11,907	-3,458	49,340	-73,150
North Africa	157	390	-10	-452	85	598
Sub-Saharan Africa	2,359	-504	560	-696	1,719	-3,399
East Asia and Pacific	5,395	7,948	877	5,684	19,905	-61,550
South Asia	1,441	6,218	-818	-365	6,476	-10,761
Latin America	9,562	5,296	1,681	-2,867	13,671	-7,125
Middle East	-256	-1,560	3,545	-1,352	376	2,584
EEurope & Central Asia	1,909	2,536	6,072	-3,409	7,108	6,504
<b><i>High-income countries</i></b>	-65,099	12,403	32,558	-30,710	-50,847	-159,880
<b><i>World total</i></b>	-44,532	32,726	44,465	-34,167	-1,508	-233,030

Source: Authors' World Bank LINKAGE model simulations

Table 5: Impact of going back to 1980-84 policies on shares of global output exported, and developing country shares of global output and exports,<sup>a</sup> by product

(percent)

	Share of global output exported <sup>a</sup>		Developing countries' share of global output		Developing countries' share of global exports <sup>a</sup>	
	Benchmark	1980-84	Benchmark	1980-84	Benchmark	1980-84
Paddy rice	1	2	81	85	56	21
Wheat	16	19	67	56	25	10
Other grains	11	14	55	45	35	17
Oil seeds	21	23	69	60	54	34
Plant-based fibers	25	44	74	72	50	72
Vegetables and fruits	9	8	72	69	69	56
Other crops	14	12	49	45	75	62
Cattle sheep etc	2	2	43	41	56	53
Other livestock	4	6	65	57	43	41
Wool	13	14	82	80	16	14
Beef and sheep meat	7	6	27	26	31	24
Other meat products	7	10	32	21	42	2
Vegetable oils and fats	20	19	52	49	80	73
Dairy products	5	8	29	31	28	54
Processed rice	5	6	76	79	85	60
Refined sugar	8	22	52	69	78	95
Other food, beverages and tobacco	9	7	35	35	50	54
Other primary products	31	30	64	65	76	78
Textile and wearing apparel	28	23	53	50	74	71
Other manufacturing	24	21	32	33	43	42
Services	3	3	20	20	31	31
Agriculture and food	8	9	46	44	54	48
Primary agriculture	8	9	62	58	55	43
Processed foods	8	9	37	36	52	51

<sup>a</sup>excluding intra-EU trade.

Source: Authors' World Bank LINKAGE model simulations

Table 6: Impact of going back to 1980-84 policies on agricultural and food output and trade, by country/region

(relative to benchmark data, in 2004 billion US dollars and percent)

	\$billion			Percent change relative to baseline		
	Output	Exports	Imports	Output	Exports	Imports
<b><i>North and Sub Saharan Africa</i></b>	<b>5.0</b>	<b>3.9</b>	<b>8.0</b>	<b>2.6</b>	<b>18.9</b>	<b>37.0</b>
Egypt	-0.4	-0.2	0.2	-2.6	-13.9	6.8
Madagascar	0.0	0.0	0.0	0.7	12.1	22.6
Mozambique	1.2	1.1	0.2	75.9	676.8	80.5
Nigeria	-0.2	0.5	0.5	-1.1	115.5	33.3
Senegal	0.2	0.2	0.1	9.6	125.0	9.8
South Africa	8.4	6.4	0.6	30.8	192.1	32.3
Uganda	0.0	-0.1	0.0	-1.0	-21.1	-14.9
Tanzania	-0.3	-0.2	0.1	-5.0	-42.6	42.8
Zambia	-0.3	-0.3	0.1	-18.6	-81.7	105.8
Zimbabwe	-0.8	-0.7	0.1	-49.0	-77.5	40.9
Rest of Africa	-2.8	-2.8	6.0	-2.5	-22.1	46.8
<b><i>East and South Asia</i></b>	<b>-42.4</b>	<b>-3.9</b>	<b>29.9</b>	<b>-4.6</b>	<b>-8.2</b>	<b>44.4</b>
China	-44.4	-5.8	23.6	-12.6	-57.8	96.3
Korea	6.3	0.6	1.1	10.4	112.5	13.1
Taiwan	1.8	2.1	0.5	8.7	440.3	12.8
Indonesia	0.5	-0.6	-0.4	0.8	-7.8	-9.1
Malaysia	1.8	1.7	1.1	9.8	22.0	28.3
Philippines	0.3	0.0	0.4	0.9	0.1	16.2
Thailand	-1.1	0.3	0.7	-2.0	4.5	27.4
Vietnam	1.3	1.3	0.3	8.7	60.6	24.6
Bangladesh	0.4	-0.1	-0.1	1.5	-39.4	-4.8
India	-7.3	-2.6	1.3	-3.3	-38.2	22.7
Pakistan	-1.3	-0.6	0.2	-3.0	-49.7	9.5
Sri Lanka	-0.1	-0.5	0.0	-1.9	-62.4	-1.1
Rest of East and South Asia	-0.5	0.3	1.3	-2.4	13.4	25.8
<b><i>Latin America and the Caribbean</i></b>	<b>-22.5</b>	<b>-13.8</b>	<b>6.5</b>	<b>-6.9</b>	<b>-20.6</b>	<b>26.8</b>
Argentina	-6.4	-5.8	0.1	-19.9	-36.7	27.8
Brazil	-18.4	-12.4	0.7	-18.2	-48.5	30.7
Chile	-1.1	-0.2	0.1	-11.0	-7.8	12.7
Colombia	10.3	9.0	1.4	48.6	292.6	110.4
Ecuador	-1.4	-1.6	-0.1	-15.6	-69.6	-12.7
Mexico	-1.5	-2.9	1.2	-2.3	-54.0	12.6
Nicaragua	0.0	0.1	0.0	2.8	26.1	16.8
Rest of Latin America	-3.9	0.0	2.9	-4.6	-0.2	32.2
<b><i>EEurope &amp; Central Asia</i></b>	<b>-10.3</b>	<b>11.6</b>	<b>23.9</b>	<b>-2.6</b>	<b>53.4</b>	<b>91.6</b>
Baltic States	-0.8	0.2	1.0	-11.3	18.6	75.3
Bulgaria	4.3	1.9	0.4	6.8	266.2	71.2
Czech Republic	-1.1	0.0	1.0	-6.3	2.5	57.0
Hungary	-1.5	0.0	1.1	-10.9	0.3	88.8
Poland	-3.3	-0.1	1.8	-7.3	-3.9	64.0
Romania	-0.1	0.7	1.4	-0.5	101.6	101.6

Slovakia	-0.4	0.0	0.3	-5.1	-0.3	53.6
Slovenia	-0.1	0.1	0.2	-2.4	31.8	40.2
Russia	-7.8	0.5	11.2	-8.0	28.5	126.3
Kazakhstan	0.6	0.7	0.1	5.0	75.7	33.6
Turkey	-2.6	-1.0	2.0	-4.2	-25.2	62.8
Rest of EEurope & Central Asia	2.6	8.7	3.5	6.7	148.9	94.9
<b>High-income countries<sup>a</sup></b>	<b>195.8</b>	<b>256.1</b>	<b>183.7</b>	<b>11.0</b>	<b>110.8</b>	<b>78.3</b>
Australia	-1.2	0.0	1.3	-2.0	-0.2	80.9
Canada	6.5	9.1	3.3	9.8	61.6	40.0
EU 15 <sup>a</sup>	123.1	165.5	123.9	13.7	124.6	77.7
Japan	-6.2	1.0	8.0	-3.6	230.5	32.9
New Zealand	3.4	2.0	0.4	14.9	23.8	64.2
Rest of Western Europe	74.7	69.1	30.1	125.3	1849.8	409.0
United States	-4.4	9.4	15.9	-0.9	17.5	55.9
Hong Kong and Singapore	-0.1	0.0	0.8	-2.5	38.9	17.9
<b>Developing countries</b>	<b>-62.8</b>	<b>8.1</b>	<b>80.5</b>	<b>-3.2</b>	<b>4.9</b>	<b>50.3</b>
North Africa	-0.4	1.2	2.1	-0.7	35.2	21.4
Sub-Saharan Africa	5.5	2.7	5.9	4.3	15.5	50.0
East Asia	-34.0	-0.1	28.4	-5.4	-0.2	51.2
South Asia	-8.4	-3.8	1.4	-2.8	-41.2	12.3
Latin America	-22.5	-13.8	6.5	-6.9	-20.6	26.8
Middle East	7.3	10.3	12.2	7.1	154.2	58.6
EEurope & Central Asia	-10.3	11.6	23.9	-2.6	53.4	91.6
<b>High-income countries</b>	<b>195.8</b>	<b>256.1</b>	<b>183.7</b>	<b>11.0</b>	<b>110.8</b>	<b>78.3</b>
<b>World total<sup>a</sup></b>	<b>133.0</b>	<b>264.2</b>	<b>264.2</b>	<b>3.6</b>	<b>66.9</b>	<b>66.9</b>

<sup>a</sup>(excluding intra-EU trade.

Source: Authors' World Bank LINKAGE model simulations

Table 7: Impact of going back to 1980-84 policies on self sufficiency<sup>a</sup> in agricultural and other products, by product and region (percent)

	High-income countries		Developing countries		Africa		Latin America		East Asia		South Asia		EEurope & Central Asia	
	2004 benchmark	1980-84 policies	2004 benchmark	1980-84 policies	2004 benchmark	1980-84 policies	2004 benchmark	1980-84 policies	2004 benchmark	1980-84 policies	2004 benchmark	1980-84 policies	2004 benchmark	1980-84 policies
Paddy rice	101	108	100	99	97	96	93	79	100	100	101	100	95	94
Wheat	141	190	88	79	67	61	80	59	68	43	100	98	102	96
Other grains	108	124	94	88	94	97	98	100	88	76	103	103	103	95
Oil seeds	104	124	97	88	104	102	140	110	66	64	100	99	106	103
Plant-based fibers	161	168	88	83	177	141	94	78	54	11	93	91	104	243
Vegetables and fruits	90	94	105	103	108	107	153	134	102	100	99	100	99	98
Other crops	90	94	113	107	138	115	143	122	110	115	104	103	90	91
Cattle sheep etc	100	100	100	100	101	101	102	101	98	97	100	100	102	103
Other livestock	101	98	100	102	101	103	101	104	99	99	100	100	99	106
Wool	161	167	92	91	103	103	103	102	78	74	96	95	96	96
Beef and sheep meat	101	106	97	95	96	94	108	104	83	86	126	110	95	89
Other meat products	100	149	100	82	92	74	121	83	101	92	96	91	96	74
Vegetable oils and fats	95	100	103	100	69	86	141	115	115	116	78	73	93	92
Dairy products	103	101	94	102	76	80	97	100	78	77	99	99	102	109
Processed rice	99	104	100	99	69	72	94	89	104	104	104	100	92	94
Refined sugar	98	69	102	130	95	173	131	239	98	103	96	92	98	96
Other food, bev. and tob.	99	99	103	103	101	100	108	107	105	107	106	104	100	100
Other primary products	76	74	122	123	180	181	148	152	84	85	75	88	115	116
Textile and wearing app.	81	86	123	119	98	104	104	106	144	134	144	129	101	105
Other manufacturing	101	100	98	99	77	77	96	97	106	107	90	95	95	94
Services	101	101	101	100	101	101	100	100	101	101	100	99	101	101
Agriculture and food	100	104	101	100	100	100	112	109	100	97	100	99	99	99
Agriculture	99	104	100	98	104	101	115	106	96	92	100	99	100	103
Processed foods	100	104	101	101	94	98	110	110	104	104	100	97	99	96

<sup>a</sup> Self sufficiency is defined as domestic production as a percentage of domestic consumption measured in value terms at fob prices.

Source: Authors' World Bank LINKAGE model simulations

Table 8: Impact of going back to 1980-84 policies on shares of production exported and of consumption imported by world, high-income and developing countries, (percent)

	Share of production exported				Share of consumption imported			
	High-income countries <sup>a</sup>		Developing countries		High-income countries <sup>a</sup>		Developing countries	
	2004 benchmark	1980-84	2004 benchmark	1980-84	2004 benchmark	1980-84	2004 benchmark	1980-84
Paddy rice	3	10	1	0	2	4	1	2
Wheat	37	40	6	3	11	10	17	22
Other grains	15	21	7	5	9	13	11	16
Oil seeds	31	37	16	13	26	22	16	21
Plant-based fibers	50	45	17	44	18	18	26	59
Vegetables and fruits	10	12	9	7	18	16	4	4
Other crops	7	8	21	16	16	13	11	10
Cattle sheep etc	1	1	2	2	2	2	2	2
Other livestock	6	8	3	4	6	9	3	3
Wool	60	59	2	2	35	36	10	11
Beef and sheep meat	6	6	7	5	5	4	10	11
Other meat products	6	13	9	1	6	10	8	18
Vegetable oils and fats	8	10	31	29	12	11	26	27
Dairy products	5	6	4	14	2	7	10	12
Processed rice	3	11	5	5	4	9	5	5
Refined sugar	4	4	12	30	5	33	10	13
Other food, bev. and tob.	7	5	12	11	8	6	9	8
Other primary products	20	18	37	36	38	39	22	20
Textile and wearing app.	15	13	39	33	30	25	23	19
Other manufacturing	20	18	32	27	19	18	32	27
Services	3	3	5	5	2	2	5	5
Agriculture and food	7	8	9	10	8	8	8	10
Agriculture	9	12	7	7	10	10	7	8
Processed foods	6	7	12	12	7	7	10	11

<sup>a</sup> Excluding intra-EU trade

Source: Authors' Linkage model simulations

Table 9: Impact of going back to 1980-84 policies on shares of agricultural and food production exported, by country/region

(percent)

	2004 benchmark	1980-84
<b><i>Developing countries</i></b>	<b>9.5</b>	<b>9.5</b>
North Africa	6.3	7.9
Sub-Saharan Africa	13.8	13.5
East Asia	8.4	7.7
South Asia	3.7	2.4
Latin America	18.1	16.3
Middle East	7.4	14.2
EEurope & Central Asia	6.8	9.1
<b><i>High-income countries</i></b>	<b>13.0</b>	<b>15.9</b>
<b><i>World total<sup>a</sup></i></b>	<b>11.4</b>	<b>13.1</b>
<b><i>World total (excluding intra-EU trade)</i></b>	<b>8.1</b>	<b>8.7</b>

<sup>a</sup> Including intra-EU trade

Source: Authors' World Bank LINKAGE model simulations

Table 10: Impact of going back to 1980-84 policies on real international product prices

(percent relative to 2004 baseline)

Paddy rice	-11.6
Wheat	-15.4
Other grains	-27.5
Oil seeds	-8.6
Sugar cane and beet	-0.5
Plant-based fibers	0.8
Vegetables and fruits	2.8
Other crops	2.6
Cattle sheep etc	0.5
Other livestock	-2.0
Raw milk	0.4
Wool	-1.9
Beef and sheep meat	-15.0
Other meat products	-45.5
Vegetable oils and fats	-1.4
Dairy products	-8.5
Processed rice	0.6
Refined sugar	-2.5
Other food, bevs. and tobacco	0.1
Textile and wearing apparel	1.4
Other manufacturing	0.3
Merchandise trade	-1.2
Agriculture and food	-12.6
Primary agriculture	-5.9
Agric & lightly processed food	-17.6

*Note:* Model numéraire is the export price index of high-income countries' manufactured exports

*Source:* Authors' World Bank LINKAGE model simulations

Table 11: Impact of going back to 1980-84 policies on real factor prices,<sup>a</sup> by country/region  
(relative to the benchmark data, percent)

	Unskilled wages	Skilled wages	Capital <sup>b</sup> user cost	Land <sup>b</sup> user cost	Aggregate CPI	Food CPI
<b><i>Developing countries</i></b>	<b>-2.1</b>	<b>-1.7</b>	<b>-1.5</b>	<b>-4.1</b>	<b>1.0</b>	<b>0.4</b>
North Africa	0.3	0.1	-0.2	-1.1	0.3	-0.7
Sub-Saharan Africa	0.1	0.6	1.2	-1.5	-1.4	-3.1
East Asia	-4.5	-3.7	-3.4	-6.2	0.7	1.9
South Asia	-4.1	-4.7	-1.7	-6.6	5.4	4.7
Latin America	0.0	-0.1	-0.2	-8.1	2.2	0.2
Middle East	0.6	0.7	0.2	-4.3	-1.2	-3.9
EEurope & Central Asia	0.2	-0.1	0.2	4.1	-0.2	-1.6
<b><i>High-income countries</i></b>	<b>0.4</b>	<b>-0.7</b>	<b>-0.4</b>	<b>102.1</b>	<b>-0.1</b>	<b>-1.2</b>
<b><i>World total</i></b>	<b>-0.1</b>	<b>-0.9</b>	<b>-0.7</b>	<b>21.1</b>	<b>0.2</b>	<b>-0.5</b>

<sup>a</sup> Nominal factor prices deflated by national aggregate consumer price index (CPI), column 5

<sup>b</sup> The user cost of capital and land represents the subsidy inclusive rental cost.

Source: Authors' World Bank LINKAGE model simulations

Table 12: Impact of going back to 1980-84 policies on sectoral value added, agricultural and all-sector policy changes

(relative to 2004 benchmark data)

	billion US dollars				Percent			
	Agricultural policies		All sectors' policies		Agricultural policies		All sectors' policies	
	Agric	Non-agric	Agric	Non-agric	Agric	Non-agric	Agric	Non-agric
<b><i>North and Sub Saharan Africa</i></b>	-0.9	-0.2	-2.3	-0.6	-0.9	0.0	-2.2	-0.1
Egypt	0.0	-0.7	-0.1	0.0	-0.1	-1.1	-0.8	0.1
Madagascar	0.0	-0.1	0.1	0.0	-3.4	-3.1	7.1	1.0
Mozambique	0.3	0.0	0.3	0.4	22.7	0.1	24.8	10.0
Nigeria	-1.2	-0.8	-0.6	-0.8	-9.3	-1.7	-4.7	-1.6
Senegal	0.0	0.0	0.1	0.0	-1.1	-0.8	9.0	-1.0
South Africa	-0.1	0.1	1.6	-1.6	-0.7	0.1	20.3	-0.8
Uganda	-0.1	-0.1	-0.1	-0.1	-2.9	-1.6	-1.9	-2.1
Tanzania	0.0	-0.1	-0.1	0.3	-0.3	-1.3	-1.3	4.2
Zambia	0.0	0.0	-0.3	0.0	0.6	0.6	-28.2	0.3
Zimbabwe	0.2	0.2	-0.3	-0.1	38.9	4.9	-62.7	-3.8
Rest of Africa	0.0	1.4	-3.1	1.2	0.1	0.5	-4.9	0.4
<b><i>East and South Asia</i></b>	2.0	100.7	-27.1	-65.2	0.5	2.9	-6.4	-1.9
China	9.4	37.5	-27.0	-29.7	5.7	3.0	-16.3	-2.4
Korea	-3.2	31.3	1.2	-24.9	-15.1	5.4	5.4	-4.3
Taiwan	-0.5	10.1	0.8	-12.2	-9.9	3.7	17.6	-4.4
Indonesia	0.2	2.7	0.4	-3.2	0.8	1.2	1.4	-1.5
Malaysia	-0.1	4.0	0.3	-0.4	-2.0	3.8	12.9	-0.3
Philippines	1.9	1.0	-0.6	-1.9	15.6	1.7	-4.6	-3.3
Thailand	3.0	7.3	0.0	-6.3	14.3	2.8	-0.2	-2.4
Vietnam	1.2	4.5	1.0	-1.2	18.8	15.6	15.8	-4.2
Bangladesh	-0.3	-2.1	0.3	0.9	-3.8	-4.4	3.8	1.9
India	-10.6	-1.3	-2.7	16.1	-8.3	-0.3	-2.1	3.5
Pakistan	-0.1	0.2	-0.5	-0.1	-0.5	0.2	-2.8	-0.1
Sri Lanka	0.3	1.3	-0.6	-1.0	7.1	9.6	-12.8	-7.4
Rest of East and South Asia	0.7	4.3	0.3	-1.4	11.2	2.7	5.2	-0.9
<b><i>Latin America</i></b>	40.7	34.6	-10.8	40.2	37.0	2.3	-9.8	2.7
Argentina	10.9	15.1	-2.7	14.3	103.5	13.8	-25.5	13.1
Brazil	13.0	21.3	-7.6	8.0	42.6	4.2	-24.9	1.6
Chile	0.2	0.7	-0.1	1.0	5.5	0.9	-1.8	1.3
Colombia	5.0	1.2	1.3	12.1	53.5	1.5	13.6	15.3
Ecuador	2.9	1.7	-0.8	-0.5	126.0	6.7	-35.4	-1.9
Mexico	0.1	-3.4	-0.9	6.3	0.3	-1.0	-4.0	1.8
Nicaragua	0.0	0.1	0.0	0.0	2.4	2.3	5.1	-0.4
Rest of Latin America	8.6	-2.1	0.0	-0.9	28.7	-0.6	0.0	-0.2
<b><i>EEurope &amp; Central Asia</i></b>	-6.2	4.4	1.7	-0.9	-5.2	0.3	1.5	-0.1
Baltic States	-0.1	0.2	0.0	0.3	-8.9	0.5	0.5	0.9
Bulgaria	0.4	0.1	0.4	0.6	5.6	0.3	5.6	3.4
Czech Republic	-0.7	-0.3	0.0	0.8	-20.9	-0.3	-1.1	0.8
Hungary	-0.7	-0.1	-0.3	0.8	-17.9	-0.1	-8.3	0.9

Poland	-2.5	1.7	0.3	1.0	-22.6	0.9	2.5	0.5
Romania	-0.5	0.3	0.1	1.1	-5.8	0.5	1.6	1.9
Slovakia	-0.1	0.1	0.0	0.3	-13.5	0.4	0.3	0.8
Slovenia	0.0	0.1	0.1	0.1	-11.1	0.4	11.8	0.4
Russia	-2.3	-1.3	-0.8	-5.6	-6.6	-0.3	-2.3	-1.2
Kazakhstan	0.5	0.5	0.1	0.1	23.0	1.2	5.0	0.4
Turkey	-1.5	0.9	-3.1	0.4	-4.7	0.4	-9.5	0.2
Rest of EEurope & C. Asia	1.5	2.1	5.0	-0.8	11.1	1.8	37.8	-0.7
<b>High-income countries</b>	<b>-58.5</b>	<b>28.6</b>	<b>144.2</b>	<b>-143.1</b>	<b>-14.7</b>	<b>0.1</b>	<b>36.2</b>	<b>-0.5</b>
Australia	2.7	11.7	0.2	-0.5	13.7	2.1	1.2	-0.1
Canada	0.7	-4.6	5.9	2.8	5.3	-0.5	45.7	0.3
EU 15	-47.4	-45.9	36.6	14.7	-25.4	-0.4	19.6	0.1
Japan	-7.6	93.2	7.3	-149.3	-16.8	2.3	16.1	-3.7
New Zealand	2.7	4.4	0.5	0.8	57.2	5.4	9.8	0.9
Rest of Western Europe	-3.6	-8.4	88.3	-25.8	-25.8	-1.3	631.3	-4.0
United States	-6.0	-25.2	5.3	17.6	-5.3	-0.2	4.6	0.2
Hong Kong and Singapore	0.0	3.4	0.1	-3.4	2.2	2.1	10.3	-2.1
<b>Developing countries</b>	<b>44.4</b>	<b>145.6</b>	<b>-38.8</b>	<b>-32.1</b>	<b>5.6</b>	<b>1.9</b>	<b>-4.9</b>	<b>-0.4</b>
North Africa	-0.3	1.8	-0.1	0.7	-1.1	0.8	-0.3	0.3
Sub-Saharan Africa	-0.6	-2.0	-2.2	-1.3	-0.8	-0.5	-3.1	-0.3
East Asia	12.6	102.8	-23.6	-81.4	4.7	3.5	-8.9	-2.8
South Asia	-10.7	-2.1	-3.5	16.2	-6.7	-0.3	-2.2	2.7
Latin America	40.7	34.6	-10.8	40.2	37.0	2.3	-9.8	2.7
Middle East	8.9	6.1	-0.4	-5.7	25.4	0.9	-1.1	-0.8
EEurope & Central Asia	-6.2	4.4	1.7	-0.9	-5.2	0.3	1.5	-0.1
<b>World total</b>	<b>-14.2</b>	<b>174.2</b>	<b>105.4</b>	<b>-175.2</b>	<b>-1.2</b>	<b>0.5</b>	<b>8.8</b>	<b>-0.5</b>

Source: Authors' World Bank LINKAGE model simulations

Table 13: Impact on real income of full liberalization of global merchandise trade, by country/region, 2004

(relative to the 2004 benchmark data, in 2004 US dollars and percent)

	<b>Total real income gain p.a. (\$billion)</b>	<i>Change in income due just to change in terms of trade (\$billion)</i>	<b>Total real income gain as percentage of benchmark<sup>a</sup></b>	
<b><i>North and Sub Saharan Africa</i></b>	<b>0.9</b>	<b>-6.0</b>	<b>0.2</b>	<b>(-1.1)</b>
Egypt	-0.2	-0.6	-0.3	(-0.9)
Madagascar	0.0	0.0	-0.9	(-1.2)
Mozambique	0.1	-0.1	2.4	(-2.0)
Nigeria	0.3	-0.6	0.7	(-1.3)
Senegal	0.0	-0.1	-2.3	(-4.0)
South Africa	0.2	-0.7	0.1	(-0.5)
Uganda	0.0	0.0	-0.6	(-0.1)
Tanzania	0.0	0.0	-0.5	(-0.4)
Zambia	0.0	0.0	0.1	(-0.3)
Zimbabwe	0.1	0.0	3.4	(0.5)
Rest of Africa	0.5	-3.8	0.2	(-1.5)
<b><i>East and South Asia</i></b>	<b>29.7</b>	<b>-4.9</b>	<b>0.9</b>	<b>(-0.1)</b>
China	3.3	0.5	0.2	(0.0)
Korea	14.0	0.2	2.8	(0.0)
Taiwan	1.0	0.0	0.4	(0.0)
Indonesia	0.5	0.0	0.2	(0.0)
Malaysia	4.2	-1.0	4.7	(-1.1)
Philippines	0.0	-0.5	0.1	(-0.7)
Thailand	3.3	-0.1	1.4	(-0.1)
Vietnam	1.9	-0.9	5.3	(-2.5)
Bangladesh	-0.2	-0.8	-0.4	(-1.7)
India	-0.8	-2.9	-0.2	(-0.6)
Pakistan	-0.1	-0.6	-0.2	(-0.8)
Sri Lanka	0.8	0.5	5.1	(3.1)
Rest of East and South Asia	1.9	0.8	1.4	(0.5)
<b><i>Latin America</i></b>	<b>15.8</b>	<b>2.5</b>	<b>1.0</b>	<b>(0.2)</b>
Argentina	3.2	-0.7	2.6	(-0.6)
Brazil	6.8	5.6	1.6	(1.3)
Chile	0.3	0.2	0.4	(0.3)
Colombia	2.2	0.7	3.1	(1.0)
Ecuador	2.0	1.1	8.2	(4.4)
Mexico	-0.7	-3.4	-0.1	(-0.6)
Nicaragua	0.0	0.0	1.3	(0.4)
Rest of Latin America	2.0	-1.0	0.5	(-0.3)
<b><i>EEurope &amp; Central Asia</i></b>	<b>14.2</b>	<b>-3.6</b>	<b>1.2</b>	<b>(-0.3)</b>
Baltic States	0.5	0.1	1.8	(0.3)
Bulgaria	0.2	-0.2	1.4	(-1.4)
Czech Republic	1.0	-0.1	1.4	(-0.2)
Hungary	0.4	-0.1	0.6	(-0.1)

Poland	2.0	0.1	1.2	(0.1)
Romania	-0.1	-0.7	-0.3	(-1.9)
Slovakia	0.7	0.1	2.3	(0.4)
Slovenia	0.3	0.1	1.5	(0.3)
Russia	5.4	-3.1	1.2	(-0.7)
Kazakhstan	0.4	0.2	1.1	(0.6)
Turkey	1.3	-0.5	0.6	(-0.2)
Rest of EEurope & Central Asia	2.2	0.5	2.1	(0.4)
<b>High-income countries</b>	<b>102.8</b>	<b>11.3</b>	<b>0.5</b>	<b>(0.1)</b>
Australia	2.4	1.9	0.5	(0.4)
Canada	0.6	-1.2	0.1	(-0.2)
EU 15	56.8	-3.8	0.7	(0.0)
Japan	23.1	10.4	0.7	(0.3)
New Zealand	2.2	1.8	3.2	(2.6)
Rest of Western Europe	13.1	-0.1	2.7	(0.0)
United States	2.8	0.9	0.0	(0.0)
Hong Kong and Singapore	1.7	1.4	1.4	(1.1)
<b>Developing countries</b>	<b>64.9</b>	<b>-12.2</b>	<b>0.9</b>	<b>(-0.2)</b>
North Africa	0.9	-2.8	0.5	(-1.5)
Sub-Saharan Africa	0.0	-3.2	0.0	(-0.9)
East Asia	30.1	-1.0	1.1	(0.0)
South Asia	-0.4	-3.9	-0.1	(-0.6)
Latin America	15.8	2.5	1.0	(0.2)
Middle East	4.2	-0.2	0.8	(0.0)
EEurope & Central Asia	14.2	-3.6	1.2	(-0.3)
<b>World total</b>	<b>167.7</b>	<b>-1.0</b>	<b>0.6</b>	<b>(0.0)</b>

<sup>a</sup> Numbers in parentheses refer to that due to terms of trade effects.

Source: Authors' World Bank LINKAGE model simulations

Table 14: Regional and sectoral sources of welfare gains from full liberalization of global merchandise trade, 2004

(relative to the 2004 benchmark data in 2004 US dollars and percent)

	Gains <sup>a</sup> by region in \$billion			Percent of regional gain <sup>b</sup>		
	<i>Developing</i>	<i>High-income</i>	<i>World</i>	<i>Developing</i>	<i>High-income</i>	<i>World</i>
<b>Developing countries liberalize:</b>						
<i>Agriculture and light processing</i>	35.6	4.7	40.3	30.1	9.4	24.0
<i>Manufacturing and services</i>	6.0	51.5	57.5	5.1	103.9	34.3
<i>Total</i>	41.6	56.2	97.7	35.2	113.3	58.3
<b>High-income countries liberalize:</b>						
<i>Agriculture and light processing</i>	62.6	-2.0	60.6	53.0	-4.0	36.1
<i>Manufacturing and services</i>	13.9	-4.6	9.3	11.8	-9.3	5.6
<i>Total</i>	76.5	-6.6	69.9	64.8	-13.3	41.7
<b>All countries liberalize:</b>						
<i>Agriculture and light processing</i>	98.2	2.7	100.9	83.1	5.4	60.1
<i>Manufacturing and services</i>	19.9	46.9	66.8	16.9	94.6	39.9
<i>Total</i>	118.1	49.6	167.7	70.4	29.6	100

<sup>a</sup> Small interaction effects are distributed proportionately and numbers are rounded to sum to 100 percent<sup>b</sup> Percentage in last row refers to the total regional gain relative to the world total.

Source: Authors' World Bank LINKAGE model simulations

Table 15: Impact of full global liberalization on shares of global output exported, and developing country shares of global output and exports,<sup>a</sup> by product, 2004

(percent)

	Share of global output exported <sup>a</sup>		Developing countries' share of global output		Developing countries' share of global exports <sup>a</sup>	
	Benchmark	Full Global liberalization	Benchmark	Full Global liberalization	Benchmark	Full Global liberalization
Paddy rice	1	2	81	82	56	42
Wheat	16	22	67	71	25	39
Other grains	11	15	55	57	35	56
Oil seeds	21	28	69	74	54	68
Plant-based fibers	25	25	74	83	50	79
Vegetables and fruits	9	15	72	77	69	80
Other crops	14	17	49	49	75	62
Cattle sheep etc	2	2	43	48	56	59
Other livestock	4	4	65	67	43	46
Wool	13	14	82	81	16	18
Beef and sheep meat	7	21	27	41	31	68
Other meat products	7	12	32	34	42	45
Vegetable oils and fats	20	30	52	58	80	84
Dairy products	5	11	29	33	28	41
Processed rice	5	7	76	79	85	87
Refined sugar	8	42	52	85	78	90
Other food, beverages and tobacco	9	12	35	36	50	59
Other primary products	31	33	64	63	76	76
Textile and wearing apparel	28	35	53	57	74	77
Other manufacturing	24	26	32	31	43	43
Services	3	3	20	20	31	30
Agriculture and food	8	13	46	50	54	64
Agriculture	8	11	62	65	55	64
Processed foods	8	14	37	40	52	63

<sup>a</sup>excluding intra-EU trade.

Source: Authors' World Bank LINKAGE model simulations

Table 16: Impacts of full global trade liberalization on agricultural and food output and trade, by country/region, 2004

(relative to 2004 benchmark data, in 2004 billion US dollars and percent)

	\$billion			Percent change relative to baseline		
	Output	Exports	Imports	Output	Exports	Imports
<b><i>North and Sub Saharan Africa</i></b>	<b>13.8</b>	<b>20.5</b>	<b>10.0</b>	<b>7.2</b>	<b>99.1</b>	<b>46.0</b>
Egypt	0.4	0.5	-0.1	2.2	39.2	-4.2
Madagascar	0.0	0.0	0.0	-0.4	2.7	-4.3
Mozambique	0.9	1.0	0.1	52.3	597.1	33.3
Nigeria	-0.5	0.4	0.7	-2.9	92.8	43.1
Senegal	0.0	0.0	0.0	-1.9	35.0	0.3
South Africa	0.7	0.9	0.8	2.4	26.7	42.9
Uganda	0.0	0.0	0.0	-0.6	1.3	1.5
Tanzania	0.0	0.2	0.1	-0.7	28.5	31.2
Zambia	0.1	0.1	0.0	5.2	22.3	35.9
Zimbabwe	0.4	0.3	0.1	25.7	38.0	39.2
Rest of Africa	12.0	17.0	8.3	10.5	133.1	64.3
<b><i>East and South Asia</i></b>	<b>25.0</b>	<b>39.5</b>	<b>24.7</b>	<b>2.7</b>	<b>83.4</b>	<b>36.7</b>
China	6.2	7.7	6.7	1.7	76.5	27.5
Korea	-1.0	1.0	6.2	-1.7	194.1	75.0
Taiwan	-1.9	0.3	1.5	-9.1	62.8	35.5
Indonesia	1.1	1.6	1.0	1.8	21.6	21.5
Malaysia	1.6	1.3	0.7	8.9	17.0	17.8
Philippines	1.1	1.9	0.8	3.5	120.5	35.0
Thailand	9.5	8.3	1.9	17.4	133.0	78.1
Vietnam	0.5	1.1	0.6	3.3	54.0	55.6
Bangladesh	-0.6	0.4	0.8	-2.4	261.2	38.3
India	1.1	9.0	1.4	0.5	131.2	24.2
Pakistan	-0.6	0.5	1.0	-1.3	45.0	43.0
Sri Lanka	-0.1	-0.1	0.6	-1.2	-18.2	69.3
Rest of East and South Asia	8.0	6.4	1.4	41.5	266.1	29.5
<b><i>Latin America</i></b>	<b>87.2</b>	<b>71.5</b>	<b>7.2</b>	<b>26.8</b>	<b>106.4</b>	<b>29.8</b>
Argentina	12.2	15.1	0.3	37.8	95.6	81.8
Brazil	45.8	25.7	2.1	45.3	100.7	94.8
Chile	0.5	0.4	0.2	4.7	11.3	15.8
Colombia	3.1	4.9	1.1	14.6	161.4	81.7
Ecuador	4.2	4.6	0.3	46.1	198.7	71.8
Mexico	-0.3	0.3	0.4	-0.4	5.8	4.3
Nicaragua	0.0	0.1	0.0	2.9	21.6	19.4
Rest of Latin America	21.6	20.4	2.8	25.7	175.9	30.4
<b><i>EEurope &amp; Central Asia</i></b>	<b>-10.4</b>	<b>17.4</b>	<b>20.3</b>	<b>-2.6</b>	<b>79.7</b>	<b>77.6</b>
Baltic States	-1.2	-0.1	0.4	-16.9	-15.5	30.9
Bulgaria	4.2	2.6	0.6	6.6	366.5	118.1
Czech Republic	-2.2	-0.1	0.7	-12.0	-10.9	40.5
Hungary	-0.9	0.4	0.8	-6.0	17.1	66.6
Poland	1.7	2.5	2.5	3.9	80.7	88.8
Romania	-0.2	1.3	1.1	-1.0	190.5	78.3

Slovakia	-0.9	-0.1	0.4	-11.3	-12.0	64.1
Slovenia	-0.6	-0.1	0.2	-17.1	-54.1	26.2
Russia	-12.9	3.2	8.8	-13.1	179.4	98.9
Kazakhstan	1.5	1.4	0.0	11.8	142.9	11.6
Turkey	-2.0	2.3	2.9	-3.1	61.5	92.1
Rest of EEurope & Central Asia	3.0	4.1	2.0	7.7	71.3	53.4
<b>High-income countries</b>	<b>-233.2</b>	<b>-9.2</b>	<b>89.8</b>	<b>-13.1</b>	<b>-4.0</b>	<b>38.3</b>
Australia	12.0	7.0	0.2	19.8	41.2	11.1
Canada	-1.6	3.6	2.7	-2.4	24.1	32.8
EU 15	-190.9	-38.8	50.9	-21.2	-29.2	31.9
Japan	-39.1	0.4	16.8	-22.9	87.7	69.1
New Zealand	10.6	6.4	0.2	46.6	74.3	27.1
Rest of Western Europe	-11.6	11.7	9.8	-19.4	312.0	132.7
United States	-12.8	0.6	9.3	-2.6	1.1	32.4
Hong Kong and Singapore	0.1	0.0	0.1	2.1	6.3	1.6
<b>Developing countries</b>	<b>137.6</b>	<b>163.6</b>	<b>64.6</b>	<b>7.1</b>	<b>100.0</b>	<b>40.4</b>
North Africa	11.4	13.3	6.1	17.3	377.2	62.5
Sub-Saharan Africa	2.5	7.2	3.8	1.9	41.9	32.3
East Asia	25.1	29.5	20.8	4.0	77.4	37.4
South Asia	-0.1	10.0	3.9	0.0	108.3	33.2
Latin America	87.2	71.5	7.2	26.8	106.4	29.8
Middle East	22.0	14.8	2.5	21.5	222.7	12.1
EEurope & Central Asia	-10.4	17.4	20.3	-2.6	79.7	77.6
<b>World total</b>	<b>-95.7</b>	<b>154.4</b>	<b>154.4</b>	<b>-2.6</b>	<b>39.1</b>	<b>39.1</b>

Source: Authors' World Bank LINKAGE model simulations

Table 17: Impact of global liberalization on share of agricultural and food production exported by country/region, 2004

(percent)

	<b>2004 benchmark data</b>	<b>Full global liberalization</b>
<b><i>Developing countries</i></b>	<b><i>9.5</i></b>	<b><i>16.9</i></b>
North Africa	6.3	20.6
Sub-Saharan Africa	13.8	19.3
East Asia	8.4	15.1
South Asia	3.7	7.5
Latin America	18.1	28.2
Middle East	7.4	17.2
EEurope & Central Asia	6.8	11.1
<b><i>High-income countries</i></b>	<b><i>13.0</i></b>	<b><i>14.1</i></b>
<b><i>World total</i></b>	<b><i>11.4</i></b>	<b><i>15.4</i></b>

Source: Authors' World Bank LINKAGE model simulations

Table 18: Impact of global liberalization on self sufficiency<sup>a</sup> in agricultural and other products, by region, 2004

	High-income countries		Developing countries		North and Sub Saharan Africa		Latin America		East Asia		South Asia		EEurope & Central Asia	
	Global Benchmark	Global lib	Global Benchmark	Global lib	Global Benchmark	Global lib	Global Benchmark	Global lib	Global Benchmark	Global lib	Global Benchmark	Global lib	Global Benchmark	Global lib
Paddy rice	101	105	100	99	97	96	93	72	100	101	101	101	95	92
Wheat	141	140	88	89	67	46	80	98	68	65	100	98	102	117
Other grains	108	102	94	98	94	91	98	119	88	81	103	105	103	113
Oil seeds	104	92	97	103	104	130	140	167	66	51	100	101	106	115
Plant-based fibers	161	112	88	97	177	265	94	107	54	58	93	95	104	118
Vegetables and fruits	90	78	105	109	108	103	153	221	102	104	99	98	99	92
Other crops	90	91	113	110	138	138	143	133	110	104	104	104	90	88
Cattle sheep etc	100	100	100	100	101	99	102	102	98	97	100	100	102	102
Other livestock	101	101	100	100	101	100	101	100	99	99	100	100	99	98
Wool	161	180	92	91	103	104	103	102	78	75	96	93	96	99
Beef and sheep meat	101	85	97	134	96	102	108	183	83	77	126	652	95	85
Other meat products	100	99	100	103	92	85	121	143	101	103	96	95	96	93
Vegetable oils and fats	95	85	103	114	69	191	141	143	115	116	78	66	93	96
Dairy products	103	100	94	101	76	79	97	102	78	78	99	99	102	104
Processed rice	99	95	100	101	69	63	94	85	104	108	104	104	92	87
Refined sugar	98	41	102	133	95	100	131	227	98	196	96	91	98	70
Other food, bev. and tob.	99	97	103	105	101	100	108	112	105	113	106	94	100	98
Other primary products	76	76	122	122	180	189	148	155	84	82	75	69	115	116
Textile and wearing app.	81	76	123	128	98	91	104	91	144	155	144	153	101	95
Other manufacturing	101	102	98	96	77	74	96	91	106	105	90	89	95	95
Services	101	101	101	101	101	102	100	100	101	100	100	101	101	101
Agriculture and food	100	95	101	105	100	103	112	126	100	102	100	100	99	98
Agriculture	99	96	100	102	104	103	115	126	96	95	100	100	100	101
Processed foods	100	95	101	108	94	103	110	126	104	111	100	101	99	96

<sup>a</sup> Self sufficiency is defined as domestic production as a percentage of domestic consumption measured in value terms at fob prices.

Source: Authors' World Bank LINKAGE model simulations

Table 19: Share of production exported and of consumption imported by world, high-income and developing countries, before and after full global liberalization of all merchandise trade, by product, 2004  
(percent)

	Share of production exported				Share of consumption imported			
	High-income countries <sup>a</sup>		Developing countries		High-income countries <sup>a</sup>		Developing countries	
	<i>2004 benchmark</i>	<i>Global lib.</i>	<i>2004 benchmark</i>	<i>Global lib.</i>	<i>2004 benchmark</i>	<i>Global lib.</i>	<i>2004 benchmark</i>	<i>Global lib.</i>
Paddy rice	3	7	1	1	2	3	1	2
Wheat	37	47	6	12	11	25	17	21
Other grains	15	16	7	15	9	14	11	15
Oil seeds	31	34	16	25	26	36	16	22
Plant-based fibers	50	31	17	24	18	22	26	25
Vegetables and fruits	10	13	9	15	18	30	4	7
Other crops	7	13	21	22	16	20	11	14
Cattle sheep etc	1	2	2	2	2	2	2	2
Other livestock	6	7	3	3	6	6	3	3
Wool	60	62	2	3	35	31	10	12
Beef and sheep meat	6	11	7	35	5	24	10	13
Other meat products	6	10	9	16	6	12	8	14
Vegetable oils and fats	8	11	31	43	12	24	26	34
Dairy products	5	10	4	14	2	10	10	14
Processed rice	3	4	5	8	4	9	5	7
Refined sugar	4	30	12	44	5	66	10	25
Other food, bev. and tob.	7	8	12	20	8	10	9	16
Other primary products	20	21	37	39	38	39	22	24
Textile and wearing app.	15	19	39	48	30	37	23	31
Other manufacturing	20	21	32	36	19	20	32	38
Services	3	3	5	4	2	2	5	5
Agriculture and food	7	9	9	17	8	13	8	12
Agriculture	9	11	7	11	10	15	7	9
Processed foods	6	9	12	23	7	13	10	16

<sup>a</sup> Excluding intra-EU trade

Source: Authors' Linkage model simulations

Table 20: Impact of full global liberalization on real international product prices, 2004

(percent relative to 2004 baseline)

	<b>Agricultural policies</b>	<b>All goods sectors' policies</b>
Paddy rice	6.9	6.6
Wheat	1.8	1.4
Other grains	2.6	2.7
Oil seeds	-2.2	-2.4
Sugar cane and beet	-1.1	-2.0
Plant-based fibers	4.7	2.9
Vegetables and fruits	2.4	1.8
Other crops	1.7	1.0
Cattle sheep etc	-0.2	-1.1
Other livestock	-1.2	-2.1
Raw milk	0.7	-0.2
Wool	3.5	3.3
Beef and sheep meat	5.6	4.6
Other meat products	1.3	0.6
Vegetable oils and fats	-1.4	-1.9
Dairy products	4.6	3.8
Processed rice	2.8	2.9
Refined sugar	2.5	1.3
Other food, beverages and tobacco	-1.7	-1.3
Textile and wearing apparel	0.3	-1.2
Other manufacturing	0.2	-0.2
Merchandise trade	0.3	-0.2
Agriculture and food	0.8	0.3
Agriculture	1.5	0.9
Agriculture and light processing	2.0	1.3

*Note:* Model numéraire is the export price index of high-income countries' manufactured exports

*Source:* Authors' World Bank LINKAGE model simulations

Table 21: Impacts of full global merchandise trade liberalization on real factor prices,<sup>a</sup> 2004

(relative to the benchmark data, percent)

	Unskilled wages	Skilled wages	Capital <sup>b</sup> user cost	Land <sup>b</sup> user cost	Aggregate CPI	Food CPI
<b><i>Developing countries</i></b>	<b>3.5</b>	<b>3.0</b>	<b>2.9</b>	<b>1.6</b>	<b>-0.9</b>	<b>-2.8</b>
North Africa	7.0	7.7	5.3	-0.5	-5.2	-7.2
Sub-Saharan Africa	3.2	3.2	3.8	0.2	-3.8	-4.9
East Asia	4.0	3.4	3.3	1.9	0.1	-2.7
South Asia	-0.6	2.3	1.2	-6.2	-1.6	0.3
Latin America	4.5	1.4	1.9	21.1	1.2	3.2
Middle East	8.3	2.9	4.7	43.8	-3.3	-10.5
EEurope & Central Asia	1.7	3.2	2.6	-4.5	-2.3	-4.5
<b><i>High-income countries</i></b>	<b>0.2</b>	<b>1.0</b>	<b>0.5</b>	<b>-17.9</b>	<b>-0.6</b>	<b>-3.6</b>
<b><i>World total</i></b>	<b>0.9</b>	<b>1.3</b>	<b>1.2</b>	<b>-3.1</b>	<b>-0.7</b>	<b>-3.2</b>

<sup>a</sup> Nominal factor prices deflated by national aggregate consumer price index (CPI), column 5

<sup>b</sup> The user cost of capital and land represents the subsidy inclusive rental cost.

Source: Authors' World Bank LINKAGE model simulations

Table 22: Effects of full global liberalization and own-liberalization of agricultural and other merchandise trade on sectoral value added, by region's policies

(relative to benchmark data,)

	billion US dollars				Percent			
	<i>Global Liberalization</i>				<i>Global Liberalization</i>			
	<i>Agricultural policies</i>		<i>All sectors' policies</i>		<i>Agricultural policies</i>		<i>All sectors' policies</i>	
	Agric	Non-agric	Agric	Non-agric	Agric	Non-agric	Agric	Non-agric
<b><i>North and Sub Saharan Africa</i></b>	0.1	5.1	-0.9	-0.2	0.1	0.8	-0.9	0.0
Egypt	0.1	0.2	0.0	-0.7	1.3	0.4	-0.1	-1.1
Madagascar	0.0	0.0	0.0	-0.1	-3.2	0.1	-3.4	-3.1
Mozambique	0.3	0.0	0.3	0.0	23.6	0.6	22.7	0.1
Nigeria	-0.6	0.2	-1.2	-0.8	-4.8	0.5	-9.3	-1.7
Senegal	0.0	0.0	0.0	0.0	1.5	-0.8	-1.1	-0.8
South Africa	-0.2	0.7	-0.1	0.1	-2.7	0.4	-0.7	0.1
Uganda	-0.1	0.0	-0.1	-0.1	-1.6	-0.4	-2.9	-1.6
Tanzania	0.0	0.0	0.0	-0.1	0.6	-0.3	-0.3	-1.3
Zambia	0.0	0.0	0.0	0.0	0.7	0.5	0.6	0.6
Zimbabwe	0.1	0.0	0.2	0.2	24.2	0.8	38.9	4.9
Rest of Africa	0.5	3.9	0.0	1.4	0.7	1.4	0.1	0.5
<b><i>East and South Asia</i></b>	-1.4	24.4	2.0	100.7	-0.3	0.7	0.5	2.9
China	4.6	2.5	9.4	37.5	2.8	0.2	5.7	3.0
Korea	-4.0	7.2	-3.2	31.3	-18.7	1.2	-15.1	5.4
Taiwan	-0.5	0.8	-0.5	10.1	-11.3	0.3	-9.9	3.7
Indonesia	0.3	1.1	0.2	2.7	1.1	0.5	0.8	1.2
Malaysia	-0.2	0.9	-0.1	4.0	-6.3	0.8	-2.0	3.8
Philippines	1.7	0.3	1.9	1.0	13.8	0.5	15.6	1.7
Thailand	2.9	2.7	3.0	7.3	14.0	1.0	14.3	2.8
Vietnam	1.4	0.0	1.2	4.5	22.8	0.0	18.8	15.6
Bangladesh	-0.2	0.4	-0.3	-2.1	-2.6	0.9	-3.8	-4.4
India	-7.8	6.3	-10.6	-1.3	-6.1	1.4	-8.3	-0.3
Pakistan	-0.2	-0.1	-0.1	0.2	-1.0	-0.1	-0.5	0.2
Sri Lanka	0.0	0.0	0.3	1.3	0.0	0.1	7.1	9.6
Rest of East and South Asia	0.6	2.3	0.7	4.3	9.6	1.4	11.2	2.7
<b><i>Latin America</i></b>	40.0	42.2	40.7	34.6	36.3	2.8	37.0	2.3
Argentina	12.4	8.1	10.9	15.1	116.8	7.4	103.5	13.8
Brazil	12.2	22.7	13.0	21.3	40.1	4.4	42.6	4.2
Chile	0.2	0.3	0.2	0.7	5.0	0.3	5.5	0.9
Colombia	5.0	2.1	5.0	1.2	53.5	2.7	53.5	1.5
Ecuador	2.6	2.9	2.9	1.7	113.1	11.4	126.0	6.7
Mexico	-0.2	0.6	0.1	-3.4	-1.0	0.2	0.3	-1.0
Nicaragua	0.0	0.0	0.0	0.1	3.0	1.4	2.4	2.3
Rest of Latin America	7.9	5.5	8.6	-2.1	26.3	1.5	28.7	-0.6
<b><i>EEurope &amp; Central Asia</i></b>	-5.2	4.4	-6.2	4.4	-4.4	0.3	-5.2	0.3
Baltic States	-0.1	0.1	-0.1	0.2	-7.5	0.3	-8.9	0.5
Bulgaria	0.3	-0.1	0.4	0.1	5.1	-0.4	5.6	0.3
Czech Republic	-0.7	0.4	-0.7	-0.3	-19.2	0.4	-20.9	-0.3

Hungary	-0.7	0.3	-0.7	-0.1	-16.8	0.4	-17.9	-0.1
Poland	-2.4	2.1	-2.5	1.7	-21.8	1.1	-22.6	0.9
Romania	-0.3	0.2	-0.5	0.3	-3.7	0.4	-5.8	0.5
Slovakia	-0.1	0.1	-0.1	0.1	-11.8	0.2	-13.5	0.4
Slovenia	0.0	0.1	0.0	0.1	-9.2	0.4	-11.1	0.4
Russia	-2.2	-0.7	-2.3	-1.3	-6.3	-0.2	-6.6	-0.3
Kazakhstan	0.5	0.4	0.5	0.5	23.1	1.1	23.0	1.2
Turkey	-1.0	0.9	-1.5	0.9	-3.2	0.4	-4.7	0.4
Rest of EEurope & Central Asia	1.5	0.5	1.5	2.1	11.1	0.4	11.1	1.8
<b>High-income countries</b>	<b>-55.1</b>	<b>61.9</b>	<b>-58.5</b>	<b>28.6</b>	<b>-13.8</b>	<b>0.2</b>	<b>-14.7</b>	<b>0.1</b>
Australia	2.2	8.4	2.7	11.7	10.9	1.5	13.7	2.1
Canada	0.4	2.5	0.7	-4.6	3.4	0.3	5.3	-0.5
EU 15	-42.9	16.7	-47.4	-45.9	-23.0	0.2	-25.4	-0.4
Japan	-7.6	4.5	-7.6	93.2	-16.7	0.1	-16.8	2.3
New Zealand	2.7	4.1	2.7	4.4	57.7	5.0	57.2	5.4
Rest of Western Europe	-3.6	6.5	-3.6	-8.4	-25.8	1.0	-25.8	-1.3
United States	-6.4	18.6	-6.0	-25.2	-5.7	0.2	-5.3	-0.2
Hong Kong and Singapore	0.0	0.6	0.0	3.4	3.7	0.4	2.2	2.1
<b>Developing countries</b>	<b>42.7</b>	<b>79.5</b>	<b>44.4</b>	<b>145.6</b>	<b>5.4</b>	<b>1.0</b>	<b>5.6</b>	<b>1.9</b>
North Africa	-0.1	3.9	-0.3	1.8	-0.4	1.8	-1.1	0.8
Sub-Saharan Africa	0.2	1.2	-0.6	-2.0	0.3	0.3	-0.8	-0.5
East Asia	6.8	17.7	12.6	102.8	2.6	0.6	4.7	3.5
South Asia	-8.2	6.7	-10.7	-2.1	-5.1	1.1	-6.7	-0.3
Latin America	40.0	42.2	40.7	34.6	36.3	2.8	37.0	2.3
Middle East	9.2	3.3	8.9	6.1	26.3	0.5	25.4	0.9
EEurope & Central Asia	-5.2	4.4	-6.2	4.4	-4.4	0.3	-5.2	0.3
<b>World total</b>	<b>-12.4</b>	<b>141.4</b>	<b>-14.2</b>	<b>174.2</b>	<b>-1.0</b>	<b>0.4</b>	<b>-1.2</b>	<b>0.5</b>

Source: Authors' World Bank LINKAGE model simulations

Appendix Table A: Protection structure<sup>a</sup> in GTAP version 7p5 and in the distortion rates drawn from the World Bank project, 2004

	(percent)							
	GTAP version 7p5				Amended rates			
	Primary Agriculture	Agriculture and Lightly Processed Food		Other goods	Primary Agriculture	Agriculture and Lightly Processed Food		Other goods
		Domestic Support	Export Subsidy			Tariff	Tariff	
Australia	0.0	0.0	0.7	3.3	0.0	0.0	0.5	3.3
New Zealand	0.0	0.0	2.8	3.3	0.0	-0.2	0.7	3.3
EU15	1.0	10.8	7.1	0.7	1.2	12.8	6.9	0.7
Rest West Europe	2.6	8.6	52.9	2.2	2.6	13.4	53.9	2.2
Russia	1.7	-0.1	7.5	7.4	1.7	-0.9	18.9	7.4
Kazakhstan	-0.9	0.0	2.9	2.7	-0.9	0.0	3.4	2.7
Kyrgyzstan	-1.0	-0.1	3.1	5.0	-1.0	-0.1	3.8	5.0
Turkey	0.8	0.0	29.0	3.1	0.8	0.0	33.3	3.1
RestECA	-1.1	0.0	9.8	5.7	-1.1	-0.9	9.9	5.7
Bulgary	0.6	0.0	17.0	11.5	0.6	0.0	14.8	11.5
CZE Republic	0.6	10.2	3.1	0.5	0.6	0.0	3.0	0.5
Estonia	0.0	9.7	6.2	0.9	0.0	0.0	5.0	0.9
Hungary	3.1	9.7	6.6	0.5	3.1	0.0	6.2	0.5
Latvia	13.1	9.9	3.7	0.9	13.3	0.0	3.3	0.9
Lithuania	0.5	9.4	13.1	1.0	0.5	0.0	12.1	1.0
Poland	0.4	8.3	6.1	0.8	0.4	0.0	6.2	0.8
Romania	1.3	0.0	19.8	9.8	1.3	0.0	18.0	9.8
Slovakia	0.0	10.4	5.5	0.4	0.0	0.0	5.2	0.4
Slovenia	0.0	10.5	6.3	0.4	0.0	0.0	7.8	0.4
USA	4.0	0.5	2.5	1.3	5.2	0.6	6.1	1.3
Canada	1.6	2.0	23.1	1.4	1.6	3.6	18.9	1.4
Japan	2.0	0.0	141.1	1.7	2.0	0.0	151.7	1.7
Korea	0.0	0.0	172.7	5.9	0.0	0.0	319.4	5.9
Taiwan	-0.4	0.0	77.4	3.9	-0.4	0.0	84.2	3.9
OthHYC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
China	0.0	0.0	12.6	7.1	0.0	0.2	6.5	7.1
Indonesia	0.0	0.0	6.4	4.9	0.0	-1.6	7.3	4.9
Malasya	0.0	0.0	2.4	5.9	0.0	-0.2	5.0	5.9
Philippines	-4.7	0.0	20.0	3.4	-4.7	0.0	7.1	3.4
Thailand	-0.2	0.0	22.1	12.9	-0.2	0.0	26.2	12.9
Vietnam	-3.6	0.0	15.5	18.5	-3.6	-0.5	21.5	18.5
Bangladesh	-1.0	0.0	16.3	22.5	-1.0	0.0	9.9	22.5
India	3.9	0.0	29.8	20.9	10.1	2.5	2.9	20.8
Pakistan	0.0	0.0	10.8	18.5	0.0	-0.2	19.4	18.5
Sri Lanka	0.6	0.2	24.3	5.8	0.6	-0.3	23.8	5.8
Rest Sasia	-0.5	0.0	5.0	15.6	-0.5	0.0	6.9	15.6
Rest Easia	-0.7	0.0	2.8	2.3	-0.7	0.0	3.2	2.3
RestME	-12.4	0.0	9.0	5.7	-12.4	0.0	7.5	5.7
Egypt	0.0	0.0	4.0	13.5	0.0	0.0	5.0	13.5

(continued)

Appendix Table A (continued): Protection structure<sup>a</sup> in GTAP version 7p5 and in the distortion rates drawn from the World Bank project, 2004  
(percent)

	GTAP version 7p5				Amended rates			
	Agriculture and		Other goods		Agriculture and		Other goods	
	Primary	Lightly Processed			Primary	Lightly		
	Agriculture	Food	Agriculture	Processed Food				
Domestic Support	Export Subsidy	Tariff	Tariff	Domestic Support	Export Subsidy	Tariff	Tariff	
Morocco	0.0	-0.3	33.3	20.0	0.0	-0.4	28.4	20.0
RestNAfrica	-3.9	0.5	24.9	13.1	-3.9	1.3	30.7	13.1
South Africa	0.0	0.0	9.7	6.5	0.0	0.0	10.2	6.5
Madagascar	0.0	0.0	3.9	2.7	0.0	-4.4	3.4	2.7
Mozambique	0.2	0.0	12.5	10.9	0.2	0.0	14.5	10.9
Zambia	-0.8	0.0	5.6	9.0	-0.8	0.0	7.0	9.0
Zimbabwe	-3.2	0.0	13.6	15.4	-3.2	0.0	8.9	15.4
Uganda	0.0	0.0	9.5	5.5	0.0	-2.6	9.2	5.5
Tanzania	-0.3	0.0	11.6	13.7	-0.3	0.0	11.8	13.7
Nigeria	0.1	0.0	74.0	17.2	0.1	0.0	76.1	17.2
Senegal	0.0	0.0	8.4	8.9	0.0	-1.1	6.2	8.9
RestWCAfrica	-0.2	0.0	10.5	8.9	-0.2	0.0	10.8	8.9
RestAfrica	-0.4	0.0	10.4	14.1	-0.4	0.0	10.6	14.1
Argentina	-4.9	0.0	2.9	5.7	0.0	-14.8	0.0	5.8
Brazil	0.0	0.0	4.5	8.9	0.0	0.0	4.8	8.9
Chile	-1.7	0.0	1.3	1.8	0.0	0.0	2.4	1.8
Colombia	0.0	0.0	12.9	9.8	0.0	0.0	21.6	9.8
Ecuador	0.0	0.0	6.8	10.4	0.0	0.0	13.4	10.4
Mexico	1.3	0.0	8.6	3.4	1.2	0.0	6.2	3.4
Nicaragua	0.0	0.0	8.0	3.9	0.0	-2.8	9.6	3.9
RestLAC	-1.7	0.6	9.8	9.9	-1.7	0.3	9.9	9.9

<sup>a</sup> Using value of production at undistorted prices as weights.

Source: Authors' calculations from GTAP version 7p5 and own estimates drawn from Anderson and Valenzuela (2008).