The Changing Geography of World Trade: Projections to 2030

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Abstract

Asia's rapid economic growth has been shifting the global economic and industrial centres of gravity away from the north Atlantic, raising the importance of Asia in world trade, and boosting South-South trade. This paper examines how trade patterns are likely to change in the course of economic growth and structural changes in Asia and the rest of the world over the next two decades. It does so by projecting a core baseline for the world economy from 2004 to 2030 and comparing it with alternative scenarios for 2030, including slower economic growth rates in the 'North', slower productivity growth in primary sectors, and various trade policy reforms in Developing Asia, without and with policy reforms also in the 'North' and in South-South trade. Projected impacts on international trade patterns, including the continuing rise in significance of Developing Asia, changing sectoral shares, 'openness' to trade, and potential welfare gains from reforms are highlighted, in addition to effects on bilateral trade patterns as summarized by intra-and extra-regional trade intensity and propensity indexes. The paper concludes with implications for regional and multilateral trade policy.

Keywords: Global economy-wide model projections; Asian economic growth; South-South trade; intra-and extra-regional trade intensity and propensity indexes

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1. Introduction

Asia's rapid economic growth is shifting the global economic and industrial centre of gravity away from the north Atlantic, and accelerated globalization is causing trade to grow much faster than output, especially in Asia. Together these forces are raising the importance of the developing countries of Asia in world output and trade, as well as boosting South-South trade. Asia's share of global merchandise trade has doubled since 1973, to just over 30 percent, with its exports growing at three times the rate for the rest of the world over the past decade; and China is now the world's largest exporter, followed by Germany and the United States (WTO 2010).

This paper explores how trade patterns might change over the next two decades in the course of economic growth and structural changes in Asia and the rest of the world. In particular, it examines possible changes in the importance of Developing Asia's intra-regional trade and its trade with other developing country regions under various scenarios. It does so using indexes of intra-and extra-regional trade intensity and propensity (as defined by Anderson and Norheim 1993) in additional to bilateral trade shares.

The paper begins by outlining the global economy-wide modelling methodology and database to be used in projecting the world economy from 2004 to 2030. It then presents results that emerge from the core projection, followed by variants on that according to some altered assumptions about growth rates and trade policies. Some caveats are then presented,

before the final section draws implications (a) for policies that can affect endowment, productivity and income growth rates and (b) for regional and global trade policies.

2. Modeling methodology and database

In this study we employ the GTAP model (Hertel 1997) of the global economy and Version 7.1 of the GTAP database which is calibrated to 2004 levels of production, consumption, trade and protection (Narayanan and Walmsley 2008). The standard GTAP model is perhaps the most widely used CGE model for economy-wide global market analysis, in part due to its robust and explicit assumptions.

In its simplest form, the model assumes perfect competition and constant returns to scale in production. The functional forms are nested constant elasticities of substitution (CES) production functions. Land and other natural resources, labor (skilled and unskilled), and produced physical capital substitute for one another in a value added aggregate, and composite intermediate inputs substitute for value-added at the next CES level in fixed proportions. Land is specific to agriculture in the GTAP database, and is mobile amongst alternative agricultural uses over this projection period, according to a relatively high Constant Elasticity of Transformation (CET) which, through a revenue function, transforms land from one use to another. In the modified version of the GTAP model we use, natural resources including coal, oil and gas, are specific to the sector in which they are mined. Aggregate regional employment of each productive factor is fixed in the standard macro-economic closure, though we use exogenous projections to model changes in factor availability over time. Labor and capital are assumed to be mobile across all uses within a country, but immobile internationally, in the long-run model closure adopted.

On the demand side there is a regional representative household whose expenditure is governed by a Cobb-Douglas aggregate utility function which allocates net national expenditures across private, government, and saving activities. The greatest advantage of this household representation is the unambiguous indicator of economic welfare dictated by the regional utility function.[1] Government demand across composite goods is determined by a Cobb-Douglas assumption (fixed budget shares). Private household demand is represented by a Constant Difference of Elasticities (CDE) functional form, which has the virtue of capturing the non-homothetic nature of private household demands, calibrated to replicate a vector of own-price and income elasticities of demand (Hertel et al. 2008).

Bilateral international trade flows are handled through the Armington (1969) specification by which products are differentiated by country of origin. These Armington elasticities are the same across regions but are sector-specific, and the import-import elasticities have been estimated at the disaggregated GTAP commodity level (Hertel et al. 2007). For present purposes, where we are dealing with long-term changes, we follow the typical modelling practise of doubling the short-to-medium term Armington elasticities. The regional balance of trade is determined by the relationship between regional investment and savings and investment can be allocated either in response to rates of return, with capital markets in short run equilibrium, or in fixed shares across regions so that it moves in line with global savings. Given the long-term nature of our simulations, we use the fixed shares mechanism.

The GTAP version 7.1 database divides the world into 112 countries/country groups, and divides each economy into 57 sectors: 20 for agriculture, food, beverages and tobacco, 6 for other primary goods, 16 for manufactures and 15 for services. For most modelling tasks,

[1] Altering taxes in the GTAP model does not imply a reduction in government revenue and expenditure, as government expenditures are not tied to tax revenues. A tax reduction, for example, leads to a reduction in excess burden, so regional real income increases and real expenditure – including government expenditure – may also rise.

including this one, it is necessary for the sake of both computational speed and digestion of model outputs to restrict the number of regions and sectors. In the present study we initially aggregate to 33 countries/country groups and to 26 sector/product groups, as shown in column 2 of Appendix Tables A.1 and A.2. We then further aggregate to 13 regions and just 4 sectors for most tables presented in this paper, as defined in column 1 of those Appendix Tables.

3. Core projection of the database to 2030

We project the GTAP database's 2004 baseline for the world economy to a new core baseline for 2030 by assuming the 2004 stock of agricultural land and trade-related policies of each country do not change over that 26-year period but that national real GDP, population, unskilled and skilled labor, capital, and other natural resources (oil, gas, coal and other minerals) grow at exogenously set rates, summarized in Appendix Table A.3. The exogenous growth rates are based on ADB, OECD, USDA and World Bank projections, along with those of Tyers and Golley (2010), Valenzuela and Anderson (2011) and Walmsley and Strutt (2009), plus historical trends in mineral and energy raw material reserves from BP (2010) and the US Geological Survey (2010). The past annual rates of change in fossil fuel reserves since 1990 are assumed to continue for each country over the next two decades.[2] For other minerals, in the absence of country-specific data, the unweighed average of the annual rate of growth of global reserves for iron ore, copper, lead, nickel and zinc between 1995 and 2009 for all countries is used (from the US Geological Survey 2010). These rates of change in natural resources are summarized in the last four columns of Appendix Table A.3.

[2] Past reserves data are from BP (2010). For coal, however, production data are used since reserves data are not available. The growth rates for Vietnam's oil and gas, along with Thailand's coal, provided implausibly high projections for the future, so they were modified.

Given those exogenous growth rates,[3] the model is able to derive implied rates of total factor productivity and GDP per capita growth. For any one country the rate of total factor productivity growth is assumed to be the same in each of its non-primary sectors, and to be somewhat higher in its primary sectors. Higher productivity growth rates for primary activities were characteristic of the latter half of the 20th century (Martin and Mitra 2001), and are necessary in this projection if real international prices of primary products (relative to the aggregate change for all products) are to follow a relatively flat trend.[4] Once those higher TFP growth rates for primary sectors are determined, the uniform rates for non-primary sectors are re-calculated to ensure the targeted GDP levels are obtained. Those endogenous TFP growth rates for non-primary sectors are shown in Appendix Table A.4, and the international price consequences for the core simulation are depicted in the first column of Appendix Table A.5.

3.1 Consequences for size and sectoral and regional compositions of GDP and trade

The differences across regions in rates of growth of factor endowments and total factor productivity, and the fact that sectors differ in their relative factor intensities and their share of GDP, ensure that the structures of production, consumption and trade across sectors within countries, and also between countries, is going to be different in 2030 than in 2004.

In particular, the faster-growing developing economies (especially those of Asia) will account for considerably larger shares of the projected global economy over the next two

[3] There is much uncertainty in macroeconomic projections over this kind of timeframe. See, for example Garnaut (2011) for some discussion on the uncertain nature of GDP, population and energy projections.
[4] We chose that calibration because it is consistent with the World Bank projections over the next four decades (see van der Mensbrugghe and Roson 2010). An alternative in which agricultural prices fall, as projected in GTAP-based projection studies in the late 20th century (e.g., Anderson et al. 1997), is considered unlikely over the next two decades given the slowdown in agricultural R&D investment since 1990 and its consequent delayed slowing of farm productivity growth (Alston, Babcock and Pardey 2010). It is even less likely for farm products if fossil fuel prices and biofuel mandates in the US, EU and elsewhere are maintained over the next decade. Timilsina et al. (2010) project that by 2020 international prices will be higher in the presence vs the absence of those biofuel mandates for sugar (10 percent), corn (4 percent), oilseeds (3 percent), and wheat and coarse grains (2.2 percent), while petroleum product prices will be 1.4 percent lower.

decades. Their aggregate share of world GDP is projected to rise from 20 percent in 2004 to 35 percent in 2030, and for just Developing Asia from 11 to 22 percent. Western Europe's share, meanwhile, is projected to fall from one-third to one-quarter. Population shares change much less, with the developing countries' share rising from 80 to 84 percent but Developing Asia's component falling a little, from 55 to 53 percent between 2004 and 2030. Thus per capita incomes converge considerably, with the ratio of the high-income to developing country average nearly halving, from 16 to 9 between 2004 and 2030. In particular, the per capita income of Developing Asia is projected to rise from 20 to 42 percent of the global average over the projection period (bottom rows of Appendix Table A.6).

When global value added is broken down by sector,[5] the changes are more striking. This is especially so for China: by 2030 it is projected to return to its supremacy as the world's top producing country not only of primary products but also of manufactures (Table 1) – a ranking China has not held since perhaps the mid-19th century when first the UK and then (from 1895) the US was the top-ranked country for industrial production (see Bairoch 1982 and Crafts and Venables 2003).

The developing country share of global exports of all products almost doubles, rising from one-third in 2004 to 55 percent by 2030 (Table 2). China's share alone grows from 7 to 20 percent. Note, however, that the growth of China's export share is entirely at the expense of high-income countries, as the export shares for all the other developing-country regions in Table 2 also grow. The group's import share also rises, although not quite so dramatically: the increase for Developing Asia is from 18 to 29 percent.[6]

The developing country share of primary products in world exports rises slightly and its share of manufactures in world exports rises dramatically over the projection period (doubling in Asia's case, as does its services share – Table 3). The developing country share

[5] Using producer expenditure on value added in each sector.
[6] Capital flows explain the difference between each region's global export and import shares.

of primary products in world imports rises substantially though (Table 4), almost all of which is due to Developing Asia's expected continuing rapid industrialization.[7] Developing Asia and other developing countries increase their share in total world imports by nearly half, and even by one-quarter in manufactures. The latter rise is because of on-going fragmentation of global production of manufactured goods whereby the supply chain has many components whose production is footloose. In fact we understate that phenomenon because of the high degree of aggregation of manufacturing industries in the version of the GTAP model we use here.

Given the political sensitivity of farm products, regional shares of global trade in just agricultural and food products are shown in Table 5(a). The developing country share of exports of those goods is projected to remain virtually unchanged. However, that country group's share of global imports of farm products rises dramatically. The source of that rise is mainly China but also India. It is possible that these populous countries will seek to prevent such a growth in food import dependence in practice, by erecting protectionist barriers at least for food staples.

As for the sectoral shares of national trade, the consequences of continuing Asian industrialization are again evident: primary products are less important in developing country exports and considerably more important in their imports, and conversely for non-primary products, with the changes being largest in Developing Asia. The opposite is true for high-income countries (Tables 6 and 7), which may seem surprising but recall that what one part of the world imports the remaining part of the world must export to maintain global equilibrium.

[7] Recall, though, that we are assuming no change in agricultural (or other) trade policies over the projection period. Perhaps a more likely scenario, especially for rapidly growing Asia, would be a steady rise in agricultural protection to slow the decline in food self sufficiency – as has happened over the past 50 years in the most-advanced Asian economies (see, e.g., Anderson 2009).

3.2 Consequences for South-South and other bilateral trade

Turning now to bilateral trade patterns, the extent of South-South trade as a share of global trade is projected to double by 2030, rising from 13 to 27 percent. Among Asia's developing countries it slightly more than doubles, and for other developing countries it increases by two-fifths. The share of North-North trade in global trade, by contrast, is projected to fall, from 51 to 30 percent. Even so, the share of high-income countries' exports to Developing Asia in global trade is slightly higher by 2030, and the share of Developing Asia's exports to high-income countries in global trade is far higher, at 22 percent in 2030 compared with 12 percent in 2004 (Table 8(a, b)). The latter is not surprising, given that the share of Developing Asia's exports in world trade doubles over this projection period, thanks to not only its high GDP growth rate but also its high and rising trade-to-GDP ratio (first two columns of Table 9).

Trade indexes may be used to take into account changes in regional shares of global trade and in openness. Two in particular are used by Anderson and Norheim (1993): an intensity index, and a propensity index. The export trade intensity index is defined in value terms as the share of country i's exports going to country j [x_{ij}/x_i] divided by the share of country j's imports (m_j) in world imports (m_w) net of country i's imports (m_i). That is,

$$(1) \qquad I_{ij} = [x_{ij}/x_i]/[m_j/(m_w - m_i)]$$

If the importer j is a country group and country i is part of country group j, it is necessary to subtract country i's imports from m_j (the numerator of the second expression in square brackets in equation (1)), since country i does not export to itself. If the exporter i is a country group, an approximation can be calculated by excluding only $1/n^{th}$ of i's imports from m_w in the denominator of the second expression in square brackets in equation (1), where n is the number of countries in the exporter group; and in the case where i=j, also multiply m_j (the numerator of the second expression in square brackets in equation (1)), by (n-1)/n. The

weighted average of I_{ij} across all j is unity; and the more I_{ij} is above unity, the more intense is the bilateral trade relationship between i and j.

A change in trade openness within a region may result in so much net trade creation that, even though the index of intensity of region i's trade with other regions falls, there is a rise in the region's propensity to trade outside its own region because of an increase in the value of its trade with other regions as a proportion of i's GDP. To capture the combined effect of these two changes, in "openness" and in extra-regional trade intensity, Anderson and Norheim (1993) define the index of the propensity to export extra-regionally (P_{ij},) as

$$(2) \qquad P_{ij} = [x_{ij}/G_i]/[m_j/(m_w - m_i)] = t_i.I_{ij}$$

where G_i is i's GDP and t_i is the ratio of i's total exports to i's GDP. Unlike I_{ij}, P_{ij} does not have a weighted average across all j of unity.

Table 10 summarizes the trade intensity indexes. It suggests that, in the absence of trade policy changes, the intensity of intra-Developing Asia trade will decline between 2004 and 2030, from 1.84 to 1.24. The intensity of that region's exports to developing countries of other regions will rise a little, from 0.76 to 0.81, and the intensity of other developing countries exports to Developing Asia will rise by almost a quarter, from 0.98 to 1.21. The estimated indexes of intensity of the two developing regions' exports to high-income countries switch over that period, rising from 0.82 to 0.92 for Developing Asia and falling from 0.92 to 0.79 for other developing countries. Meanwhile, the intensity of exports from high-income countries to the two developing regions changes by less than 5 percent and remains below unity. In short, the intensity of trade between the two developing country groups is projected to grow by 2030 while that between the developing and high-income aggregate country groups changes little.

However, because of the projected growth in the trade-to-GDP ratios of Asian countries (see the first two columns of Table 9), the estimated index of propensity of

Developing Asia's trade with other regions increases considerable: from 0.38 to 0.50 for exports to high-income countries and from 0.35 to 0.44 for exports to other developing countries. There is a similarly large increase in the propensity of other developing countries to export to rapidly-growing Developing Asia too, from 0.32 to 0.41, in contrast to the other trade propensity indexes which change very little (Table 11).

4. Alternative projections to 2030

The above core projection is but one of myriad possibilities, so in this section we explore several others and compare their economic consequences with those just summarized for 2030. Specifically, the following two alternative growth scenarios are considered, plus a set of scenarios involving varying degrees of trade policy reform:

- A one-third ***reduction in rates of growth of GDP and capital*** in (and hence slower growth in the volume of trade of) high-income countries (the 'North');
- ***Slower total factor productivity (TFP) growth in primary sectors***, so that real international prices for agricultural, mineral and energy products by 2030 are much more above 2004 levels than in the core projection and thus more consistent with the projections of some international agencies that specialize in those markets instead of with the World Bank's projections;
- ***Full liberalization of goods trade barriers*** following the formation of a free trade area among "ASEAN+6", the six being China, Japan and Korea plus India, Australia and New Zealand (see Kawai and Wignaraja 2010), under three versions of this initiative to show how much a broadening of the product and country involvement brings the potential benefits ever-closer to those from global trade reform; and

- ***Partial liberalization of South-South goods trade barriers*** aimed at bringing them down to the same as the average tariffs faced in South-North trade in 2004 for those products for which the latter are lower (most non-farm goods – see Appendix Table A.7(a)).

4.1 Reduced rates of GDP and capital growth

If it is assumed the rates of growth to 2030 of GDP and capital in high-income countries are one-third lower than in the core projection, this also implies slower TFP growth in all regions (middle column of Appendix Table A.4) and it slows the structural transformation of output towards non-primary sectors in Developing Asian countries. This slowdown in high-income countries reduces their share of world GDP (by three percentage points) and raises the relative GDP per capita of developing countries by one-ninth.[8] It slows slightly the increase by 2030 in the extent to which national GDP is traded internationally (Table 9), which means trade would rise less over the projection period for that reason as well as because of the slower growth in GDP itself.

With slower growth in GDP and capital there is less demand for non-food primary products, hence their international prices relative to those for manufactures do not rise quite as much by 2030 as in the core scenario (bottom rows of Appendix Table A.5).

The impact of slower high-income country growth on bilateral trade patterns can be seen from Table 9: it raises the share of intra-Developing Asia trade in global trade from 14.2 percent to 15.4 percent, and of all South-South trade by almost 3 percentage points. Conversely, the share of North-North trade in global trade would be 3 percentage points

[8] If one were to assume that this one-third reduction in growth in high-income countries also caused growth to slow by half that extent (that is, by one-sixth) in developing countries, there would be almost no change in either the regional shares of world GDP or relative GDPs per capita projected for 2030. This is because developing countries are assumed in the core scenario to continue to grow somewhat faster than high-income countries, so even if their rate of growth were to slow proportionately less, it would translate to a slowdown in GDP by a similar number of percentage points.

lower. Similarly, regional shares of the world's agricultural trade shift away from high-income countries a little more (Table 5). If that slower growth of high-income countries did not slow down developing country GDP growth, then all but $116 billion of the net global cost of the slowdown ($6,500 billion per year in 2030) would be borne by high-income countries (Table 12).

4.2 Slower TFP growth in primary sectors

The core projection sets higher TFP growth rates for some primary product sectors than for other sectors such that average real international prices for agricultural, mineral and energy products by 2030 are no more than 10 percent above 2004 levels (column 1 of Appendix Table A.5). That is quite different from what was experienced in the 20th century, when real primary product prices traced a long-run downward trend (apart from the 1973 and 1979 OPEC cartel-induced jumps in the price of fossil fuels). In the past decade, however, those prices have been rising, and price projections of several international agencies suggest they will be well above 2004 levels in the next decade or two (FAO/OECD 2010, Nelson et al. 2010, IEA 2010). Hence this second alternative scenario, in which we assume the additional TFP growth of 2 percentage points per year for forestry, fishing and other minerals is halved (to 1 percentage point). For fossil fuels, agriculture and lightly processed food the productivity differential in the core projection is smaller, but it too is reduced, and by the same amount as for the other natural resource sectors. These amendments lead to real international prices for farm products in 2030 to be 22 instead of just 7 percent above those in 2004, and those for other primary products to be 95 instead of 10 percent above 2004 levels (see Appendix Table A.5 for details by product).

The higher prices more than compensate for lower farming and mining productivity such that the share of primary products in GDP is somewhat higher in this scenario than in

the core projection. The latter share for Developing Asia was 23 percent, whereas in this scenario it is 37 percent. This does not lead to developing countries being more food self-sufficient though, or to much change in their share of global trade in farm products or in bilateral trade patterns (Tables 5 and 8(d)). It does, however, raise considerably the share of GDP that is traded by each region (Table 9), due simply to the higher prices of primary products.

5. Trade liberalization scenarios

Each of the following trade liberalization scenarios is compared from the 2030 core baseline. These scenarios are intended simply to be indicative of potential gains that may be possible, given the anticipated size and structure of global markets in 2030. In reality, some of these agreements are already partially implemented and others, if implemented, will be staggered over time.

5.1 Full liberalization of ASEAN+6 trade barriers versus global free trade in goods

If membership of the ASEAN free trade area were to be extended to the six additional countries currently being considered (China, Japan, South Korea, India, Australia and New Zealand) and their goods trade were to be liberalized fully, that could go a long way towards generating the benefits that could come from global goods trade liberalization. This is because the global shares of that expanded bloc of countries in 2004 would rise from 2 to 29 percent for GDP and from 6 to 38 percent for exports (Table 2 and Appendix Table A.6). But as with all such regional trading agreements, the potential benefits depend on the extent to which all trade is freed up. Hence we present results from three versions of this initiative plus global goods trade reform. Those three variants are:

- All merchandise trade *except for agricultural goods* is freed within the expanded bloc (that is, on a preferential basis, with no change to barriers to trade with other countries),
- All merchandise trade *including agricultural goods* is freed within the expanded bloc,
- All merchandise trade including agricultural goods is freed within the expanded bloc *and also with the rest of the world* (that is, on an MFN basis).

The economic welfare effects of those reforms are summarized in Table 12. If the ASEAN+6 initiative was purely preferential and the reform excluded farm products, the global gains would be only $18 billion a year by 2030. That would also be the gain to Developing Asia, with high-income countries gaining another $3 billion at the expense of other developing countries. Were agriculture *not* to be excluded from the deal, the global gains would nearly quadruple but most of them would be enjoyed in the Western Pacific, and non-Asian developing countries as a group still would be slightly worse off. Were those reforms by ASEAN+6 to be on an MFN basis (that is, removed for trade not only within the group but also with non-members), the global gains would more than double again, to $153 billion per year by 2030, while the group's gain would be about 50 percent higher at $56 billion. In that case non-Asian developing countries would gain around $29 billion. For all three sets of countries those welfare benefits are almost half what they would be if all countries of the world were to remove their barriers to goods trade. Such an extreme reform would generate welfare gains of $333 billion per year globally by 2030, made up of just over $130 billion each for high-income countries and Developing Asia, and about half that for other developing countries.[9]

[9] That estimated global welfare gain from freeing all of the world's merchandise trade is small both in absolute terms and compared with the welfare effect of a GDP slowdown in high-income countries (shown in column 1 of Table 11). However, as the caveats in the next section make clear, those gains from global trade reform are very much lower-bound estimates.

The impacts of such reforms on the world's bilateral trade pattern are similar for all four reform options (Table 8). Not surprisingly, preferential trade reforms raise intra-Developing Asian trade's share of global trade, by almost 3 percentage points. That drops back half a point if ASEAN+6 remove their barriers to trade with all partners rather than with just bloc member countries. However, South-South trade as a share of global trade is 28.8 percent in both cases (compared with 26.5 in the core projection) – and it rises to 29.4 percent when all countries fully liberalize their goods trade multilaterally.

Each of these reform scenarios adds to globalization, as captured by the share of GDP traded. In the core simulation that is 58 percent globally, but it is 61 percent with ASEAN+6 preferential trade and 67 percent with global free trade: and for Developing Asia those numbers are 97, 108 and 118 percent, respectively (last two rows of Table 9).

The consequences of freeing all global trade for bilateral trade intensity and propensity indexes are shown in part (c) of Tables 10 and 11. Compared with the 2030 baseline, such reform would further strengthen the intensity and propensity of Developing Asia's exports to other developing countries, raising the intensity index from 0.81 to 0.94 and the propensity index from 0.44 to 0.61. The propensity of other developing countries to export to Developing Asia also would increase, from 0.41 to 0.46. Such reform would alter the shares of global GDP by sector, but compared with the changes shown in Table 1 due to economic growth from 2004 to 2030, the changes in shares by 2030 due to full global reform would be relatively small (different by no more than one percentage point in most cases).

5.2 Partial liberalization of South-South trade barriers

In this scenario, we explore the impacts of intra-South import tariffs being reduced to the average level of tariffs imposed on exports from the South to the North. Tariffs imposed by the South in the initial database tend to be relatively high, particularly to other South

countries (see Appendix Table A.7(b)). To model the impact of reduced intra-South tariffs, the South-North average tariffs for each commodity become the ceiling tariff for South-South trade, with any bilateral tariffs already lower than these remaining unaffected (that exception being predominately farm products – see Appendix Table A.7(a)). This tariff reduction is nearly as beneficial to developing countries as a group as is a move to global free trade: while it hurts high-income countries slightly, a lowering of barriers to South-South trade even to just the levels prevailing in South-North trade could bring three-quarters of the gains to developing countries as would flow from a freeing of all countries' goods trade (Table 12). Furthermore, it gives an even larger boost to the share of South-South trade in global trade, raising it to 33 percent compared with the core projection of 27 percent (Table 8).

6. Caveats

As with the results from all other economy-wide projections modelling, it is necessary to keep in mind numerous qualifications. One is that for the core projection we have assumed all trade-related policies and trade costs remain unchanged through the projection period. As noted above, the former is somewhat unrealistic when that simulation suggests populous developing countries such as China and India would become far more dependent on food imports by 2030. We have also assumed trade expenses in the form of transport and communications costs do not change, even though they have been falling steadily during the current wave of globalization. If they were to continue to decline over time, those countries that have been trading little and in only a few products because they are small, remote or have poor transport infrastructure will be able to trade more – and thus would gain doubly if governmental barriers were to be lowered at the same time as transport costs fall (Venables 2004).

A second trade assumption is that we do not constrain trade imbalances over time. However, even in the initial database, these are huge for the United States and China and some argue that these imbalances are unlikely to be sustained over time (see Feldstein 2011 and Garnaut 2011, among others). Given that the large and rapidly growing Chinese economy is an important driver of some of the changes we model, we tested the sensitivity of key results to determine how they might change in an alternative scenario where China's trade surplus is constrained. In particular, we considered a fairly extreme alternative scenario in which the trade surplus for China and the trade deficit for the United States are essentially eliminated over the next two decades.[10] Since we simply wished to test the robustness of our findings to this possibility, we did not modify other assumptions from the core baseline, including the GDP growth and capital accumulation rates, or trade balances in other regions. The importance of China in global exports will naturally reduce if it is not able to continue huge trade surpluses, while the importance of the United States in global exports will increase if it no longer runs large trade deficits. Bilateral trade flows, particularly for the United States and China, will thus be impacted fairly significantly by this modified assumption. There will also be repercussions for trade flows with other regions, including somewhat lower exports from most Developing Asian regions to China, due to China's reduced need for intermediate imported components once its net export flows are constrained. Indeed, total intra-developing Asia trade reduces significantly, as a result of the importance of China in this region. However, if we exclude China from the region, total intra-developing Asian trade is a little higher than in the core baseline and we find that other developing regions also increase their relative contribution to global trade flows. If global growth rates are not impacted by the trade rebalancing, we find that this modified trade balance assumption does not change the

[10] Changes in the trade balance are accomodated here by allowing saving rates to reduce in China and increase in the US, given the relationship S-I=X-M, consistent with the projections in Garnaut (2011). We note that the trade balance needs to be fixed relative to income to preserve homogeneity in the GTAP model, therefore it was necessary to iterate to drive the actual trade balances close to zero.

overall pattern of our main findings. In particular, the South's share in global trade still almost doubles, from 12.7 in 2004 to 25.2 percent in 2030 (compared with 26.5 percent in our core baseline that does not constrain trade imbalances).

Third, we have aggregated the model into just 26 sectors/product groups. This leads to gross underestimation not only of the gains from trade reform but also of the extent to which firms can take advantage of intra-industry trade through exploiting the increasing opportunities to lower costs through fragmenting the production process into ever-more pieces whose location is footloose (Hanson, Mataloni and Slaughter 2005).

Fourth, we have assumed constant returns to scale and perfect competition rather than allowing firms to enjoy increasing returns and some degree of monopoly power for their differentiated products. This too leads to underestimates of the welfare gains from trade reform (Krugman 2009). The fact that opening an economy exposes monopolistic firms to greater competition generates gains from trade reform that could be quite substantial in terms of reducing firm mark-ups, according to numerous country case studies (see, e.g., Krishna and Mitra (1998) on India, Pavcnik (2002) on Chile).

Fifth, where consumers (including firms importing intermediate inputs) value a greater variety of goods, or a greater range of qualities, intra-industry trade can grow as a result of both economic growth and trade policy reform, but that too is not taken into account in the above analysis.

Sixth, in the trade reform scenarios we have not allowed domestic policies also to be reformed (apart from agricultural subsidies), even though it is typical for trade reforms – including in the context of signing regional trade agreements – to be part of a broader program of microeconomic policy reform. Recent studies show, for example, that when labor markets are freed up at the same time as trade, they can have very different welfare and bilateral trade effects than if those factor markets remain inflexible (Helpman, Marin and

Verdier 2008, Helpman and Itskhoki 2010). That is true also when financial market reforms are considered, not least because the inclusion of financial markets allows an additional set of influences on real exchange rates (see, e.g., McKibbin and Stegman 2005). Hoxha, Kalemli-Ozcan and Vollrath (2009) examine gains from financial integration and find that a move from autarky to full integration of financial markets globally could boost real consumption by 7.5 percent permanently, even assuming no accompanying productivity gains. National case studies of reform to services trade more generally also find gains several times those from goods trade reform (e.g., Dee, Hanslow and Pham 2003, Konan and Maskus 2006, Rutherford and Tarr 2008). However, estimating the extent of and effects of globally removing barriers to services and factor flows between countries is far less developed than methodologies applied to trade in goods (Francois and Hoekman 2010).

Seventh, the savings in bureaucratic costs of administering trade barriers, in traders' costs of circumventing barriers, and in lobbyists costs of rent-seeking to secure or maintain trade-distorting policies are all non-trivial but are not captured in the above modelling.

Eighth, the standard GTAP model used here is comparative static. It therefore does not measure the additional dynamic gains from trade reform. Dynamic gains arise in numerous ways. One of the more important is through encouragement of the more-efficient firms to take over from the less efficient in each country (Melitz 2003, Trefler 2004, Bernard et al. 2007, Melitz and Ottaviano 2008). Another way is through multinational firms sharing technologies and knowledge across countries within the firm (Markusen 2002). Offshoring is yet another mechanism through which heterogeneous firms are affected by trade liberalization, including via re-locating from small to larger nations (Baldwin and Okuba 2011). The greater competition that accompanies trade reform also can stimulate more innovation (Aghion and Griffith 2005), leading to higher rates of capital accumulation and productivity growth (Lumenga-Neso, Olarreaga and Schiff 2005).

In short, the aggregate welfare gains from freeing up trade are likely to be far bigger than the estimates reported here suggest, but their distribution, and the estimated bilateral patterns of global trade and relative GDPs of nations by 2030, also may be somewhat different if an empirical model with all of the above features had been available and used.[11] We also note that in the current modelling, we are not able to explicitly explore implications for poverty alleviation or environmental outcomes and their consequent impact on economies.

7. Conclusions

Should relatively rapid economic growth in Asia and to a lesser extent in other developing countries continue to characterize world economic development to the extent suggested above, the South's share of global GDP and trade will continue to rise steeply over the next two decades. More particularly, the share of South-South trade in global trade is projected to double in the core projection, from 13 to 26.5 percent – or to 29 percent if GDP and capital growth in the North were to be one-sixth slower than in the core projection (or if ASEAN+6 opened up or all goods trade were to be freed globally), and to 27.1 percent if there were to be a 1 percentage point slowdown in annual rate of productivity growth in the world's primary industries.

Our results suggest that a slowdown in economic growth in the North need not damage Developing Asia and other developing economies so long as the latter can keep growing. One important way to immunize developing economy growth from a slowdown in the North is through greater openness to South-South trade. We find that lowering barriers to South-South trade, even to just the levels prevailing in South-North trade, could bring three-

[11] For more on the challenges of enhancing standard global economy-wide models in these ways, see Francois and Martin (2010).

quarters of the gains to developing countries as would flow from a freeing of all countries' goods trade.

The results also suggest developing countries need not wait for a multilateral trade agreement to benefit from freer trade: an agreement by members of the prospective ASEAN+6 bloc to free their trade on an MFN basis could generate for Asia almost half what is estimated to flow if the whole world so liberalized. Since Doha is likely to generate only a tiny fraction of the global gains from full trade reform (Anderson and Martin 2006; Laborde, Martin and van der Mensbrugghe 2011), freeing up Developing Asia under a broad regional agreement has the potential to bring even higher gains than Doha.

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Table 1: Regional shares of global value added by sector, 2004 base, 2030 core and 2030 with full liberalization

(percent)

(a) 2004 Base

	Agric. & Food	Other Primary	Manufactures	Services	Total
W. Europe	26.9	12.9	33.8	33.0	32.1
E. Europe	4.7	8.0	2.0	2.2	2.5
US & Canada	17.0	14.0	26.5	35.2	32.0
ANZ	2.0	2.6	1.3	1.9	1.8
Japan	6.9	1.4	11.5	12.6	11.7
China	9.4	8.9	8.8	2.8	4.4
ASEAN	4.3	6.1	3.0	1.3	1.9
Pacific Islands	0.1	0.1	0.0	0.0	0.0
Rest E. Asia	1.8	1.0	4.1	2.7	2.9
South Asia	9.3	3.1	1.5	1.5	2.0
Central Asia	0.4	1.2	0.1	0.1	0.2
Latin America	9.1	7.4	5.0	3.7	4.4
M.E. & Africa	8.2	33.2	2.3	2.8	4.0
High-income	**57.5**	**39.0**	**75.1**	**84.8**	**80.1**
Developing	**42.5**	**61.0**	**24.9**	**15.2**	**19.9**
of which Asia:	25.2	20.5	17.6	8.6	11.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(b) 2030 core

	Agric. & Food	Other Primary	Manufactures	Services	Total
W. Europe	16.9	8.7	23.9	27.4	25.1
E. Europe	3.6	7.3	2.3	2.7	2.9
US & Canada	13.0	9.4	22.4	33.9	29.2
ANZ	1.8	2.0	1.2	2.1	1.9
Japan	3.3	0.4	6.8	9.4	8.0
China	20.9	18.3	21.3	5.9	10.2
ASEAN	4.9	7.1	4.2	2.0	2.9
Pacific Islands	0.0	0.1	0.0	0.1	0.1
Rest E. Asia	1.5	0.8	5.0	3.5	3.5
South Asia	16.6	5.7	3.1	3.3	4.3
Central Asia	0.5	1.4	0.1	0.2	0.3
Latin America	8.1	9.3	6.2	5.3	5.8
M.E. & Africa	9.0	29.5	3.3	4.3	5.7
High-income	**38.6**	**27.8**	**56.6**	**75.5**	**67.2**
Developing	**61.4**	**72.2**	**43.4**	**24.5**	**32.8**
of which Asia:	44.3	33.4	33.8	15.0	21.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Derived from the authors' GTAP Model results

Table 2: Shares of world exports and imports of all goods and services, 2004 and 2030

(percent)

	Exports		Imports	
	2004	**2030**	**2004**	**2030**
W. Europe	42.3	26.3	42.5	31.0
E. Europe	3.6	3.9	3.2	3.7
US & Canada	13.7	10.8	18.8	18.0
ANZ	1.3	1.3	1.4	1.5
Japan	6.1	2.5	5.1	4.4
China	6.7	19.6	5.7	12.1
ASEAN	6.0	8.2	5.2	6.8
Pacific Islands	0.1	0.1	0.1	0.1
Rest E. Asia	6.3	6.9	5.3	5.7
South Asia	1.4	4.4	1.7	3.9
Central Asia	0.4	0.6	0.4	0.5
Latin America	5.4	6.6	4.7	5.4
M.E. & Africa	6.8	8.8	5.8	7.1
High-income	**67**	**45**	**71**	**59**
Developing	**33**	**55**	**29**	**41**
of which Asia:	21	40	18	29
Total	**100**	**100**	**100**	**100**

Source: Derived from the authors' GTAP Model results

Table 3: Regional sectoral shares of global exports of all products, 2004 and 2030
(percent)

(a) 2004

	Agric & Food	Other Primary	Manufactures	Services	Total
W. Europe	2.9	1.0	29.4	9.1	42.3
E. Europe	0.2	1.0	1.9	0.5	3.6
US & Canada	1.0	0.4	9.4	3.0	13.7
ANZ	0.3	0.2	0.5	0.3	1.3
Japan	0.0	0.0	5.5	0.6	6.1
China	0.2	0.1	6.0	0.5	6.7
ASEAN	0.4	0.4	4.4	0.7	6.0
Pacific Islands	0.0	0.0	0.0	0.0	0.1
Rest E. Asia	0.1	0.0	4.9	1.3	6.3
South Asia	0.1	0.1	0.9	0.3	1.4
Central Asia	0.0	0.2	0.1	0.1	0.4
Latin America	0.9	0.8	3.0	0.6	5.4
M.E. & Africa	0.4	3.3	2.2	0.9	6.8
High-income	**4.4**	**2.6**	**46.6**	**13.5**	**67.0**
Developing	**2.2**	**4.8**	**21.6**	**4.3**	**33.0**
of which Asia:	0.9	0.7	16.4	2.8	20.8
Total	**6.6**	**7.4**	**68.2**	**17.8**	**100.0**

(b) 2030

	Agric & Food	Other Primary	Manufactures	Services	Total
W. Europe	2.6	1.4	16.3	5.9	26.3
E. Europe	0.3	1.3	1.8	0.6	3.9
US & Canada	1.5	1.0	6.3	2.0	10.8
ANZ	0.4	0.4	0.3	0.2	1.3
Japan	0.1	0.0	2.2	0.3	2.6
China	0.0	0.0	17.8	1.8	19.6
ASEAN	0.6	0.8	5.9	1.0	8.2
Pacific Islands	0.0	0.0	0.0	0.0	0.1
Rest E. Asia	0.1	0.0	5.5	1.3	6.9
South Asia	0.1	0.1	3.1	1.2	4.4
Central Asia	0.1	0.3	0.1	0.1	0.6
Latin America	1.0	1.5	3.4	0.7	6.6
M.E. & Africa	0.6	4.0	2.8	1.5	8.8
High-income	**4.8**	**4.2**	**26.9**	**8.9**	**44.8**
Developing	**2.4**	**6.8**	**38.4**	**7.5**	**55.2**
of which Asia:	0.8	1.3	32.3	5.4	39.8
Total	**7.2**	**11.0**	**65.3**	**16.4**	**100.0**

Source: Derived from the authors' GTAP Model results

Table 4: Regional sectoral shares of global imports of all products, 2004 and 2030
(percent)

(a) 2004

	Agric. & Food	Other Primary	Manufactures	Services	Total
W. Europe	3.1	2.5	28.2	8.6	42.5
E. Europe	0.3	0.4	2.1	0.5	3.3
US & Canada	0.9	1.6	13.7	2.7	18.8
ANZ	0.1	0.1	1.0	0.3	1.4
Japan	0.5	0.8	2.8	1.0	5.1
China	0.3	0.5	4.4	0.6	5.7
ASEAN	0.3	0.4	3.8	0.8	5.2
Pacific Islands	0.0	0.0	0.1	0.0	0.1
Rest E. Asia	0.3	0.6	3.6	0.8	5.3
South Asia	0.1	0.4	1.0	0.3	1.8
Central Asia	0.0	0.0	0.3	0.1	0.4
Latin America	0.4	0.2	3.5	0.7	4.8
M.E. & Africa	0.7	0.2	3.9	1.0	5.8
High-income	**4.9**	**5.3**	**47.9**	**13.0**	**71.1**
Developing	**2.0**	**2.3**	**20.5**	**4.2**	**28.9**
of which Asia:	1.0	1.9	13.0	2.5	18.4
Total	**6.9**	**7.6**	**68.3**	**17.2**	**100.0**

(b) 2030

	Agric. & Food	Other Primary	Manufactures	Services	Total
W. Europe	1.9	1.6	20.7	6.8	31.0
E. Europe	0.3	0.5	2.3	0.6	3.7
US & Canada	0.6	1.5	13.3	2.6	18.0
ANZ	0.1	0.1	1.1	0.3	1.5
Japan	0.3	0.4	2.8	0.8	4.4
China	1.9	3.5	6.1	0.6	12.1
ASEAN	0.5	0.6	4.9	0.9	6.8
Pacific Islands	0.0	0.0	0.1	0.0	0.1
Rest E. Asia	0.3	0.8	3.8	0.8	5.7
South Asia	0.6	1.6	1.4	0.3	3.9
Central Asia	0.0	0.0	0.3	0.1	0.5
Latin America	0.4	0.4	3.8	0.8	5.4
M.E. & Africa	0.8	0.3	5.0	1.1	7.1
High-income	**3.1**	**4.1**	**40.2**	**11.1**	**58.5**
Developing	**4.4**	**7.2**	**25.4**	**4.6**	**41.5**
of which Asia:	3.3	6.5	16.6	2.7	29.1
Total	**7.5**	**11.3**	**65.5**	**15.7**	**100.0**

Source: Derived from the authors' GTAP Model results

Table 5: Regional shares of world trade in agricultural and food products and agricultural self sufficiency, 2004 base and 2030 core and slower growth scenarios

(a) Regional shares of world (including intra-EU) trade (percent)

	Exports				Imports			
	2004 base	**2030 Core base**	**2030 Slower GDP& K growth**	**2030 Slower prim TFP**	**2004 base**	**2030 Core base**	**2030 Slower GDP& K growth**	**2030 Slower prim TFP**
W. Europe	43.6	36.4	35.8	32.7	45.5	25.7	24.5	23.3
E. Europe	3.1	4.0	3.8	4.8	4.4	3.5	3.2	3.7
US & Canada	14.4	20.3	19.1	23.4	12.4	8.2	8.0	7.5
ANZ	4.7	5.2	4.9	4.7	1.0	0.8	0.8	0.8
Japan	0.5	0.9	0.9	1.3	7.2	3.4	3.3	3.0
China	3.5	0.3	0.3	0.1	3.7	24.9	25.6	25.7
ASEAN	6.7	7.8	8.4	9.1	4.4	6.3	6.6	7.6
Pacific Islands	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Rest E. Asia	0.9	1.5	1.6	1.6	4.0	3.6	3.7	3.4
South Asia	2.0	1.0	1.0	1.3	1.8	7.8	8.1	6.3
Central Asia	0.5	0.8	0.8	1.0	0.4	0.4	0.5	0.5
Latin America	13.6	13.6	14.5	12.1	5.5	5.0	5.1	5.5
M.E. & Africa	6.2	8.1	8.7	7.8	9.5	10.3	10.6	12.7
High-income	**66.3**	**66.9**	**64.5**	**66.9**	**70.5**	**41.6**	**39.7**	**38.2**
Developing	**33.7**	**33.1**	**35.5**	**33.1**	**29.5**	**58.4**	**60.3**	**61.8**
of which Asia:	13.9	11.5	12.3	13.2	14.5	43.2	44.6	43.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(b) Agricultural self-sufficiency (excluding 'other food products')

	2004 base	**2030 core sim**	**2030 slower GDP&K in HICs**	**2030 slower primary TFP**
W. Europe	0.94	1.09	1.10	1.07
E. Europe	0.94	0.98	1.00	1.01
US & Canada	1.04	1.22	1.22	1.26
ANZ	1.45	1.69	1.71	1.65
Japan	0.81	0.86	0.87	0.89
China	0.97	0.79	0.80	0.79
ASEAN	0.97	0.88	0.88	0.84
Pacific Islands	0.92	0.85	0.86	0.84
Rest E. Asia	0.77	0.80	0.80	0.77
South Asia	1.00	0.89	0.89	0.91
Central Asia	1.05	1.11	1.12	1.14
Latin America	1.11	1.13	1.14	1.13
M.E. & Africa	0.93	0.96	0.96	0.93
High-income	**0.97**	**1.12**	**1.13**	**1.13**
Developing	**0.98**	**0.89**	**0.90**	**0.89**
of which Asia:	0.96	0.84	0.84	0.84

Source: Derived from the authors' GTAP Model results

Table 6: Sectoral shares of national exports, 2004 and 2030
(percent)

(a) 2004

	Agric. & Food	Other Primary	Manufactures	Services	Total
W. Europe	6.8	2.4	69.4	21.5	100
E. Europe	5.8	26.6	52.7	14.8	100
US & Canada	6.9	3.1	68.3	21.7	100
ANZ	23.3	18.1	35.4	23.2	100
Japan	0.5	0.1	90.1	9.3	100
China	3.5	1.2	88.6	6.7	100
ASEAN	7.4	6.2	74.3	12.2	100
Pacific Islands	17.1	25.2	31.9	25.7	100
Rest E. Asia	1.0	0.2	78.4	20.4	100
South Asia	9.5	4.0	68.5	18.0	100
Central Asia	8.4	53.1	26.7	11.9	100
Latin America	16.7	15.1	56.4	11.8	100
M.E. & Africa	6.0	48.0	32.5	13.5	100
High-income	**6.5**	**3.9**	**69.5**	**20.1**	**100**
Developing	**6.7**	**14.6**	**65.6**	**13.1**	**100**
of which Asia:	4.4	3.6	78.7	13.3	100
Total	**6.6**	**7.4**	**68.2**	**17.8**	**100**

(b) 2030

	Agric. & Food	Other Primary	Manufactures	Services	Total
W. Europe	10.0	5.5	62.0	22.4	100
E. Europe	7.4	32.2	44.9	15.5	100
US & Canada	13.6	9.6	58.5	18.2	100
ANZ	29.8	32.1	25.4	12.6	100
Japan	2.5	1.7	84.9	10.9	100
China	0.1	0.1	90.5	9.3	100
ASEAN	6.9	9.2	71.6	12.3	100
Pacific Islands	11.3	31.5	30.7	26.5	100
Rest E. Asia	1.6	0.6	79.5	18.4	100
South Asia	1.6	2.7	68.9	26.8	100
Central Asia	10.0	57.7	23.2	9.0	100
Latin America	14.9	23.2	51.8	10.1	100
M.E. & Africa	6.6	45.7	31.1	16.6	100
High-income	**10.8**	**9.4**	**60.0**	**19.9**	**100**
Developing	**4.3**	**12.4**	**69.7**	**13.6**	**100**
of which Asia:	2.1	3.2	81.2	13.5	100
Total	**7.2**	**11.0**	**65.3**	**16.4**	**100**

Source: Derived from the authors' GTAP Model results

Table 7: Sectoral shares of national imports, 2004 and 2030

(percent)

(a) 2004

	Agric_Food	Other Primary	Manufactures	Services	Total
W. Europe	7.4	5.9	66.4	20.3	100
E. Europe	9.3	11.0	64.7	15.0	100
US & Canada	4.5	8.5	72.8	14.1	100
ANZ	4.9	3.9	73.2	18.0	100
Japan	9.6	16.3	55.0	19.1	100
China	4.4	8.5	77.0	10.0	100
ASEAN	5.9	6.8	72.6	14.7	100
Pacific Islands	11.7	0.8	69.1	18.4	100
Rest E. Asia	5.3	11.5	68.2	15.0	100
South Asia	6.9	22.0	55.9	15.2	100
Central Asia	7.8	5.5	63.3	23.4	100
Latin America	7.9	4.6	73.4	14.0	100
M.E. & Africa	11.3	3.6	67.9	17.2	100
High-income	**6.8**	**7.5**	**67.4**	**18.3**	**100**
Developing	**7.0**	**7.9**	**70.7**	**14.4**	**100**
of which Asia:	5.4	10.1	70.9	13.6	100
Total	**6.9**	**7.6**	**68.3**	**17.2**	**100**

(b) 2030

	Agric_Food	Other Primary	Manufactures	Services	Total
W. Europe	6.2	5.2	66.6	21.9	100
E. Europe	7.1	14.7	62.2	15.9	100
US & Canada	3.5	8.1	74.1	14.4	100
ANZ	4.2	3.4	72.3	20.1	100
Japan	5.8	10.1	65.3	18.7	100
China	15.6	29.2	50.2	5.1	100
ASEAN	7.0	8.0	72.2	12.8	100
Pacific Islands	10.8	2.6	69.0	17.6	100
Rest E. Asia	4.7	13.4	67.2	14.7	100
South Asia	15.1	40.6	36.8	7.5	100
Central Asia	6.7	7.6	63.6	22.1	100
Latin America	7.0	8.0	70.1	14.9	100
M.E. & Africa	10.9	4.0	70.0	15.1	100
High-income	**5.4**	**7.0**	**68.7**	**19.0**	**100**
Developing	**10.6**	**17.3**	**61.0**	**11.1**	**100**
of which Asia:	11.2	22.2	57.2	9.4	100
Total	**7.5**	**11.3**	**65.5**	**15.7**	**100**

Source: Derived from the authors' GTAP Model results

Table 8: Shares of bilateral trade of high-income and developing countries in global trade, 2004 base and 2030 core and slower growth and trade reform scenarios

(percent)

(a) 2004 base

Importer: / ***Exporter:***	**High-income**	**Developing Asia**	**Other Developing**	**Total**
High-income	51.2	9.1	6.7	**67.0**
Developing Asia	12.2	**6.9**	1.7	**20.8**
Other Developing	8.0	2.2	2.0	**12.2**
Total	**71.4**	**18.2**	**10.4**	**100.0**

(b) 2030 core sim

Importer: / ***Exporter:***	**High-income**	**Developing Asia**	**Other Developing**	**Total**
High-income	30.2	9.2	5.5	**44.8**
Developing Asia	21.5	**14.2**	4.1	**39.7**
Other Developing	7.1	5.4	2.8	**15.4**
Total	**58.9**	**28.8**	**12.4**	**100.0**

(c) 2030 slower GDP and capital growth for HICs

Importer: / *Exporter:*	**High-income**	**Developing Asia**	**Other Developing**	**Total**
High-income	27.1	8.9	5.2	**41.1**
Developing Asia	22.5	**15.4**	4.6	**42.5**
Other Developing	7.3	5.9	3.2	**16.4**
Total	**56.9**	**30.2**	**12.9**	**100.0**

(d) 2030 slower primary TFP growth

Importer: / ***Exporter:***	**High-income**	**Developing Asia**	**Other Developing**	**Total**
High-income	28.5	10.0	7.0	**45.4**
Developing Asia	19.7	**13.4**	4.4	**37.5**
Other Developing	7.8	6.9	2.4	**17.0**
Total	**56.0**	**30.3**	**13.7**	**100.0**

Table 8 (cont.): Shares of bilateral trade of high-income and developing countries in global trade, 2004 base and 2030 core and slower growth and trade reform scenarios
(percent)

(e) 2030 core sim plus ASEAN+6 preferential lib'n without agric

Importer: / *Exporter:*	High-income	Developing Asia	Other Developing	Total
High-income	29.05	9.02	5.26	**43.33**
Developing Asia	21.12	**16.84**	3.90	**41.86**
Other Developing	6.95	5.12	2.73	**14.80**
Total	**57.12**	**30.98**	**11.89**	**100.00**

(f) 2030 core sim plus ASEAN+6 preferential lib'n, all goods

Importer: / *Exporter:*	High-income	Developing Asia	Other Developing	Total
High-income	28.92	9.08	5.21	**43.21**
Developing Asia	21.07	**17.18**	3.87	**42.11**
Other Developing	6.93	5.03	2.72	**14.68**
Total	**56.92**	**31.29**	**11.80**	**100.00**

(g) 2030 core sim plus ASEAN+6 MFN lib'n, all goods

Importer: / *Exporter:*	High-income	Developing Asia	Other Developing	Total
High-income	27.79	10.08	4.94	**42.81**
Developing Asia	21.83	**16.47**	4.28	**42.58**
Other Developing	6.55	5.54	2.50	**14.60**
Total	**56.18**	**32.10**	**11.73**	**100.00**

(h) 2030 core sim plus global MFN lib'n, all goods

Importer: / *Exporter:*	High-income	Developing Asia	Other Developing	Total
High-income	26.40	10.33	5.31	**42.05**
Developing Asia	20.95	**15.68**	5.27	**41.91**
Other Developing	7.62	5.83	2.58	**16.04**
Total	**54.98**	**31.85**	**13.17**	**100.00**

(i) 2030 core sim plus partial South-South trade lib'n

Importer: / *Exporter:*	High-income	Developing Asia	Other Developing	Total
High-income	29.22	8.23	3.87	**41.32**
Developing Asia	19.03	**16.93**	6.38	**42.35**
Other Developing	7.04	6.30	2.99	**16.33**
Total	**55.29**	**31.46**	**13.25**	**100.00**

Source: Derived from the authors' GTAP Model results

Table 9: Exports plus imports of goods and services as a proportion of GDP, 2004 base and alternative 2030 simulations

	2004	2030 Core sim	2030 Slower HIC growth	Slower prim. TFP growth	ASEAN6 No Ag.	ASEAN6	ASEAN6 MFN	Full Lib	SS Lib
W. Europe	0.66	0.66	0.66	0.79	0.66	0.66	0.66	0.69	0.65
E. Europe	0.69	0.74	0.72	0.94	0.73	0.73	0.75	0.86	0.73
US & Canada	0.27	0.30	0.30	0.37	0.29	0.29	0.30	0.31	0.29
ANZ	0.39	0.42	0.42	0.48	0.46	0.47	0.46	0.47	0.41
Japan	0.26	0.27	0.27	0.36	0.29	0.30	0.30	0.31	0.26
China	0.77	0.96	0.96	1.41	1.06	1.07	1.14	1.18	1.06
ASEAN	1.49	1.53	1.52	1.63	1.69	1.71	1.72	1.73	1.65
Pacific Islands	0.96	0.95	0.94	1.06	0.93	0.93	0.95	1.28	1.07
Rest E. Asia	1.05	1.07	1.06	1.38	1.12	1.14	1.18	1.22	1.15
South Asia	0.39	0.54	0.54	0.70	0.62	0.65	0.74	0.79	0.71
Central Asia	1.00	0.98	0.96	1.18	0.98	0.98	0.98	1.07	1.02
Latin America	0.49	0.50	0.49	0.62	0.50	0.50	0.50	0.60	0.56
M.E. & Africa	0.80	0.80	0.79	0.90	0.79	0.79	0.80	0.97	0.89
High-income	**0.44**	**0.46**	**0.45**	**0.57**	**0.46**	**0.46**	**0.47**	**0.49**	**0.45**
Developing	**0.77**	**0.84**	**0.83**	**1.06**	**0.90**	**0.91**	**0.95**	**1.02**	**0.94**
of which Asia:	0.90	0.97	0.96	1.28	1.06	1.08	1.14	1.18	1.08
Total	**0.51**	**0.58**	**0.59**	**0.73**	**0.60**	**0.61**	**0.62**	**0.67**	**0.61**

Source: Derived from the authors' GTAP Model results

Table 10: Intra-and extra-regional trade intensity indexes[a] for Developing Asian countries, other developing countries and high-income countries, 2004 and 2030

(a) Benchmark database, 2004

	High-income countries	Developing Asian countries	Other developing countries
High-income	1.08	0.73	0.94
Developing Asia	0.82	1.84	0.76
Other Developing	0.92	0.98	1.55

(b) Core baseline, 2030

	High-income countries	Developing Asian countries	Other developing countries
High-income	1.16	0.69	0.97
Developing Asia	0.92	1.24	0.81
Other Developing	0.79	1.21	1.48

(c) Full global MFN tariff liberalization, 2030

	High-income countries	Developing Asian countries	Other developing countries
High-income	1.16	0.76	0.94
Developing Asia	0.91	1.18	0.94
Other Developing	0.87	1.13	1.22

[a] For definitions of the intensity indexes, see text in section 3.2

Source: Derived from the authors' GTAP Model results.

Table 11: Intra-and extra-regional trade propensity indexes[a] for Developing Asian countries, other developing countries and high-income countries, 2004 and 2030

(a) Benchmark database, 2004

	High-income countries	Developing Asian countries	Other developing countries
High-income	0.22	0.15	0.20
Developing Asia	0.38	0.85	0.35
Other Developing	0.30	0.32	0.50

(b) Core baseline, 2030

	High-income countries	Developing Asian countries	Other developing countries
High-income	0.22	0.13	0.18
Developing Asia	0.50	0.67	0.44
Other Developing	0.27	0.41	0.50

(c) Full global MFN tariff liberalization, 2030

	High-income countries	Developing Asian countries	Other developing countries
High-income	0.23	0.15	0.19
Developing Asia	0.59	0.76	0.61
Other Developing	0.35	0.46	0.50

[a] For definitions of the propensity indexes, see text in section 3.2

Source: Derived from the authors' GTAP Model results.

Table 12: Effects on welfare and GDP of liberalizing trade in Asia and globally, 2030

(a) Change in welfare (in 2004US$ billion per year)[a]

	Slower HIC gr.	ASEAN+ no ag	ASEAN+ with ag	ASEAN+ MFN	Global MFN	Sth-Sth lib'n
W. Europe	-2,203	-8.3	-7.6	18.1	65.6	-26.1
E. Europe	-460	-0.6	-0.5	5.8	18.1	1.9
US & Canada	-3,099	-4.1	-5.9	15.2	13.7	-19.6
ANZ	-228	1.7	12.3	4.0	7.3	-2.2
Japan	-392	14.5	29.6	25.5	33.2	-7.7
China	-24	2.2	-2.5	-15.0	25.1	15.5
ASEAN	-12	17.4	27.6	27.8	34.9	23.2
Pacific Islands	0	-0.1	-0.2	0.1	1.0	0.5
Rest E. Asia	-6	5.1	15.9	25.6	39.3	34.9
South Asia	3	-7.0	-2.7	16.7	26.9	18.0
Central Asia	-5	-0.1	0.0	1.1	2.9	2.5
Latin America	-19	-0.8	-1.9	4.5	18.4	13.8
M.E. & Africa	-53	-2.0	-0.2	24.3	46.4	37.7
High-income	**-6,381**	**3.3**	**27.9**	**68.5**	**137.9**	**-53.7**
Developing	**-116**	**14.7**	**35.9**	**85.0**	**194.8**	**146.2**
of which: Asia	-44	17.4	38.0	56.2	130.0	94.7
Other	-72	-2.7	-2.2	28.8	64.8	51.5
Total	**-6,497**	**18.0**	**63.8**	**153.4**	**332.7**	**92.5**

[a] As measured by an equivalent variation in income.

(b) Change in real GDP (%)

	ASEAN+ no ag	ASEAN+ with ag	ASEAN+ MFN	Global MFN	South-South lib'n
W. Europe	-0.03	-0.01	0.01	0.51	-0.08
E. Europe	0.00	0.01	0.10	0.79	-0.02
US & Canada	0.00	0.00	0.02	0.11	-0.02
ANZ	0.11	0.09	0.16	0.17	-0.03
Japan	0.04	0.41	0.52	0.52	-0.02
China	0.13	0.14	0.45	0.55	0.22
ASEAN	0.67	0.79	1.95	2.08	0.92
Pacific Islands	-0.04	-0.14	0.13	2.44	1.05
Rest E. Asia	0.16	0.82	1.00	1.32	0.99
South Asia	-0.02	0.34	1.46	1.79	1.27
Central Asia	-0.04	-0.03	0.01	0.34	0.22
Latin America	0.00	-0.01	0.03	0.33	0.32
M.E. & Africa	-0.05	-0.05	0.02	1.03	0.35
High-income	**0.00**	**0.05**	**0.08**	**0.34**	**-0.04**
Developing	**0.10**	**0.23**	**0.60**	**0.96**	**0.54**
of which Asia	0.17	0.39	0.96	1.16	0.68
World	**0.03**	**0.11**	**0.25**	**0.55**	**0.15**

Source: Derived from the authors' GTAP Model results.

Appendix Table A.1: Aggregations of regions in the GTAP Model

Aggregations of regions	Modelled regions	Description	Original GTAP regions
W. Europe	WesternEurope	EU27 and EFTA	AUT BEL CYP CZE DNK EST FIN FRA DEU GRC HUN IRL ITA LVA LTU LUX MLT NLD POL PRT SVK SVN ESP SWE GBR CHE NOR XEF BGR ROU
E. Europe	Russia	Russia	RUS
	RestEEurope	Other Europe	ALB BLR HRV UKR XEE XER TUR
US & Canada	USA	USA	USA
	Canada	Canada	CAN
ANZ	Australia	Australia	AUS
	NewZealand	New Zealand	NZL
Japan	Japan	Japan	JPN
China	China	China	CHN
ASEAN	Singapore	Singapore	SGP
	Indonesia	Indonesia	IDN
	Malaysia	Malaysia	MYS
	Philippines	Philippines	PHL
	Thailand	Thailand	THA
	Vietnam	Vietnam	VNM
	RestSEAsia	Cambodia, Laos, Brunei, Myanmar, Timor Leste	KHM LAO XSE
Pacific Islands	PacificIslands	Pacific Countries	XOC
Rest E. Asia	HongKong	Hong Kong	HKG
	SouthKorea	South Korea	KOR
	Taiwan	Taiwan	TWN
	RestNEAsia	North Korea, Macau, Mongolia	XEA
South Asia	India	India	IND
	Pakistan	Pakistan	PAK
	Bangladesh	Bangladesh	BGD
	RestSAsia	Afghanistan Bhutan Maldives, Nepal, Sri Lanka	LKA XSA
Central Asia	CentralAsia	Arm Azeb Geo Kaz Kyr Taj Tkm Uzbek	KAZ KGZ XSU ARM AZE GEO
Latin America	Mexico	Mexico	MEX
	Argentina	Argentina	ARG
	Brazil	Brazil	BRA
	RestLatAmer	Other Latin America	XNA BOL CHL COL ECU PRY PER URY VEN XSM CRI GTM NIC PAN XCA XCB
M.E. & Africa	ME_NAfrica	Middle East and North Africa	IRN XWS EGY MAR TUN XNF
	SthAfrica	South Africa	ZAF
	RestSSAfrica	Sub-Saharan Africa	NGA SEN XWF XCF XAC ETH MDG MWI MUS MOZ TZA UGA ZMB ZWE XEC BWA XSC

High-income countries (the 'North') are defined as the first five country groups in the table (i.e. the regions of WEurope, EEurope, USC, ANZ and Japan). The rest are defined as developing countries (the 'South'), of which China, ASEAN, PacificIslands, Rest E Asia, South Asia and Central Asia make up 'Developing Asia' in our analysis.
Source: Authors' compilation from www.gtap.org

Appendix Table A.2: Aggregations of sectors in the GTAP Model

Aggregations of commodities	Modelled commodities	Description	Original GTAP sectors
Agric. & Food	Rice	Paddy and processed rice	pdr pcr
	Wheat	Wheat	wht
	Fruit_Veg	Vegetables, fruit, nuts	v_f
	Oilseeds	Oil seeds	osd
	Sugar	Raw and processed sugar	c_b sgr
	Cotton	Plant-based fibres	pfb
	Grains	Other cereal grains	gro
	OtherCrops	Other crops	ocr
	Beef_Sheep	Beef & sheep	ctl wol cmt
	Pork_Chicken	Pork & chicken	oap omt
	Dairy	Dairy products	rmk mil
	OtherFood	Other processed food	vol ofd b_t
Other Primary	Fish_Forest	Forestry and fishing	frs fsh
	Coal	Coal	coa
	Oil	Oil	oil
	Gas	Gas	gas
	OthMinerals	Other minerals	omn
Manufactures	Text_App_Lea	Textiles, apparel & leather	tex wap lea
	MotorVehicle	Motor vehicles & parts	mvh
	Electronics	Electronic equipment	ele
	OtherLtMan	Other light manufacturing	lum ppp fmp otn omf
	HeavyManuf	Heavy manufacturing	p_c crp nmm i_s nfm ome
Services	Utiliti_Cons	Utilities and construction	wtr cns
	Elect_Gas	Electricity & gas distribution	ely gdt
	Trade_transp	Trade & transport	trd otp wtp atp
	OthServices	Other Services	cmn ofi isr obs ros osg dwe

Source: Authors' compilation from www.gtap.org

Appendix Table A.3: Average annual GDP and endowment growth rates, 2004 to 2030

	GDP growth	Population growth	Unskilled Labor	Skilled Labor	Capital	Oil	Gas	Coal	Other minerals
W. Europe	1.72	0.12	-0.03	-0.68	1.80	2.81	0.77	-2.51	2.07
E. Europe	3.52	-0.34	0.18	0.66	4.04	2.64	0.12	-1.86	2.07
US & Canada	2.34	0.83	0.77	-0.20	2.54	1.00	-0.14	0.19	2.07
ANZ	2.89	0.98	0.83	-0.17	3.32	1.49	6.10	3.55	2.07
Japan	1.04	-0.44	-0.71	-1.38	1.30	0.00	0.00	-9.34	2.07
China	6.63	0.29	0.49	2.35	8.00	-0.40	4.85	5.62	2.07
ASEAN	4.60	1.04	1.06	2.82	4.67	1.31	1.48	11.71	2.07
Pacific Islands	3.61	1.53	1.98	3.54	3.60	1.54	1.21	0.15	2.07
Rest E. Asia	3.69	0.38	-0.14	1.62	4.09	0.00	0.00	-1.59	2.07
South Asia	6.22	1.27	1.66	3.05	7.41	0.24	-0.47	4.83	2.07
Central Asia	4.53	0.73	0.52	0.59	4.50	2.81	0.77	-2.51	2.07
Latin America	3.99	1.01	1.33	2.76	4.11	3.29	-0.34	5.15	2.07
M.E. & Africa	4.34	2.03	1.89	2.09	4.33	1.27	3.64	1.89	2.07
High-income	**1.95**	**0.15**	**0.25**	**-0.51**	**2.08**	**2.07**	**0.40**	**-0.26**	**2.07**
Developing	**4.83**	**1.10**	**1.03**	**2.36**	**5.52**	**1.48**	**2.24**	**5.57**	**2.07**
of which Asia:	5.40	0.83	0.66	2.24	6.41	0.72	0.93	5.93	2.07
Total	**2.54**	**0.91**	**0.38**	**-0.19**	**2.97**	**1.67**	**1.23**	**2.50**	**2.07**

Source: Authors' assumptions (see text for details).

Appendix Table A.4: Implied annual growth in total factor productivity for non-primary sectors,[a] 2004 to 2030

(percent, using 2004 national GDP values as weights)

	Core 2030 sim	Slower growth HICs	Slower primary TFP growth
W. Europe	1.08	0.81	1.13
E. Europe	1.17	0.76	1.60
US & Canada	1.30	0.87	1.37
ANZ	1.14	0.74	1.27
Japan	1.04	0.89	1.06
China	1.25	1.25	1.66
ASEAN	1.28	1.28	1.63
Pacific Islands	0.51	0.52	0.69
Rest E. Asia	1.39	1.39	1.45
South Asia	1.69	1.69	2.35
Central Asia	1.98	1.96	2.87
Latin America	1.06	1.06	1.38
M.E. & Africa	1.12	1.12	1.79
High-income	**1.17**	**0.84**	**1.23**
Developing	**1.25**	**1.25**	**1.66**
of which Asia	1.38	1.38	1.74
Total World	**1.18**	**0.92**	**1.32**

[a] The above TFP growth rates are those implied for the non-primary sectors by the GDP and factor growth rates in Appendix Table A.3 and the following assumptions about primary sector TFP growth. Primary sector TFP rates were exogenously set higher than those for the non-primary sectors to the following extent in the core projection for all countries, with the aim of ensuring slow growth in international relative prices for those products (shown in Appendix Table A.5): 1% for agriculture and lightly processed food, 0% for fossil fuels, and 2% for forestry, fishing and other minerals. In the slower primary TFP growth scenario, the increment for forestry, fishing and other minerals is halved to 1%, the increment for agriculture and lightly processed food is removed, and productivity growth in fossil fuels is assumed to be 1% lower than in non-primary sectors. For the trade reform scenarios, the core projection's TFP growth assumptions are maintained.

Source: Derived from the GTAP Model, based on authors' assumptions (see text for details).

Appendix Table A.5: Cumulative changes in international prices, 2004 to 2030

(price relative to global average output price change across all sectors, percent)

	Core 2030 sim	Slower growth HICs	Slower TFP growth	ASEAN+ no ag	ASEAN+ with ag	ASEAN+ MFN	Global MFN	South-South lib'n
Rice	9.9	10.1	27.8	0.4	0.8	-3.0	-2.4	-0.6
Wheat	16.4	17.7	51.6	-0.3	-0.1	-2.4	-2.7	-2.8
Coarse Grains	17.3	18.4	62.6	0.0	-0.8	-1.7	0.5	-0.2
Fruit & Veg.	40.0	42.4	93.5	0.3	-1.5	-5.7	-4.7	-1.3
Oilseeds	27.3	29.4	71.6	-0.2	-4.2	-8.0	-3.4	-3.9
Sugar	-2.2	-2.4	6.8	-0.1	-1.9	-3.6	-3.3	-0.7
Cotton	22.9	24.4	59.4	-1.1	-1.9	-3.0	1.3	-1.2
Other Crops	7.6	8.0	45.6	0.0	-1.1	-2.7	-2.1	-1.6
Beef & Sheep	-1.4	-1.1	10.3	-0.1	-0.1	-0.5	-0.1	-0.5
Pork & Chicken	8.2	9.1	22.2	0.1	-0.6	-2.0	-2.9	-0.3
Dairy	-4.7	-4.8	4.8	-0.2	-0.7	-0.4	0.9	-0.5
Other Food	2.4	3.0	7.2	0.1	-0.6	-1.5	-2.0	-0.4
Forest & Fish	30.4	32.4	86.5	-0.1	0.2	0.0	-0.7	1.1
Coal	-8.2	-10.6	115.0	-0.4	0.1	-0.8	0.2	0.1
Oil	13.5	10.9	121.9	0.2	0.4	2.5	1.2	2.5
Gas	13.6	1.9	126.0	-0.8	-0.2	0.1	-0.8	-2.1
Other Minerals	-8.8	-9.1	7.7	0.0	0.3	-0.5	-0.2	1.1
Text., App. & Lea.	-3.3	-3.9	-5.9	-0.6	-1.0	-2.1	-2.4	-0.2
Motor Vehicle	-0.4	-0.8	-3.6	-0.2	-0.1	-0.2	-0.8	-0.4
Electronics	-4.9	-5.9	-11.1	-0.2	0.0	-0.3	0.5	0.5
Other Light Man.	-1.0	-1.4	-3.5	-0.1	-0.1	-0.2	-0.2	-0.1
Heavy Manuf.	-1.5	-2.3	7.4	-0.1	0.0	-0.1	-0.1	0.2
Utiliti & Const.	0.2	0.1	-3.9	0.1	0.2	0.3	0.2	-0.1
Elect & Gas	-5.8	-6.2	8.3	-0.1	0.0	0.2	0.2	-0.2
Trade & Transp	-1.6	-1.4	-7.7	0.1	0.1	0.4	0.3	0.0
Other Services	0.4	0.9	-7.5	0.1	0.1	0.4	0.5	0.0
Aggregate prices:								
Agric. & Food	**6.7**	**7.4**	**22.4**	**0.1**	**-0.8**	**-2.3**	**-2.0**	**-0.7**
Other Primary	**10.0**	**7.7**	**94.6**	**0.0**	**0.3**	**1.0**	**0.3**	**1.4**
Manufactures	**-1.8**	**-2.4**	**1.1**	**-0.1**	**-0.1**	**-0.3**	**-0.3**	**0.1**
Services	**-0.3**	**0.0**	**-6.6**	**0.1**	**0.1**	**0.4**	**0.4**	**0.0**

Source: Derived from the authors' GTAP Model results

Appendix Table A.6: Regional shares of world real GDP and population, and GDP per capita relative to world average, 2004 and the core projection for 2030 (percent)[a]

	World real GDP share		World population share		Real GDP per capita relative to world average	
	2004	**2030**	**2004**	**2030**	**2004**	**2030**
W. Europe	33.0	25.1	7.8	6.2	423	401
Russia	1.4	1.5	2.2	1.5	62	99
Rest E. Europe	1.1	1.6	2.4	1.8	47	86
USA	28.5	25.1	4.6	4.5	618	564
Canada	2.4	2.3	0.5	0.5	479	506
Australia	1.6	1.6	0.3	0.3	500	519
New Zealand	0.2	0.2	0.1	0.1	378	338
Japan	11.4	7.3	2.0	1.4	569	526
China	4.1	10.6	20.4	17.1	20	62
Singapore	0.3	0.4	0.1	0.1	391	646
Indonesia	0.6	1.0	3.4	3.4	18	29
Malaysia	0.3	0.5	0.4	0.4	72	112
Philippines	0.2	0.4	1.3	1.5	16	26
Thailand	0.4	0.5	1.0	0.9	40	56
Vietnam	0.1	0.2	1.3	1.3	8	14
Rest SE Asia	0.1	0.1	1.1	1.1	5	7
Pacific Islands	0.1	0.1	0.1	0.2	38	41
Hong Kong	0.4	0.5	0.1	0.1	366	566
South Korea	1.7	2.1	0.7	0.6	222	363
Taiwan	0.7	0.8	0.4	0.3	210	301
Rest NE Asia	0.1	0.1	0.4	0.4	16	20
India	1.6	3.7	17.0	17.9	9	21
Pakistan	0.2	0.6	2.4	2.7	10	21
Bangladesh	0.1	0.3	2.2	2.5	6	11
Rest Sth. Asia	0.1	0.2	1.2	1.4	7	14
Central Asia	0.2	0.3	1.1	1.1	18	29
Mexico	1.7	1.9	1.7	1.6	101	118
Argentina	0.4	0.5	0.6	0.6	61	94
Brazil	1.5	2.3	2.9	2.9	52	79
Rest L. America	1.7	2.4	3.5	3.6	50	67
M.E. & Nth Africa	2.7	3.8	5.3	6.2	52	61
South Africa	0.5	0.8	0.7	0.6	71	132
Rest SS Africa	0.8	1.4	10.7	15.4	7	9
High-income	**80**	**65**	**20**	**16**	**399**	**398**
Developing	**20**	**35**	**80**	**84**	**26**	**42**
of which Asia:	11	22	55	53	20	42
World	**100**	**100**	**100**	**100**	**100**	**100**

[a] 2004 prices.

Source: Derived from the authors' GTAP Model results

Appendix Table A.7: Average import tariffs by sector and region, 2004
(percent)

(a) Tariffs faced by the South when exporting to the North, to other South regions, and to the World

	North	Rest of South	World
Rice	89.6	21.4	33.8
Wheat	17.3	6.1	8.1
Coarse Grains	21.0	8.5	12.0
Fruit & Veg	11.7	15.8	12.8
Oilseeds	2.7	11.5	7.5
Sugar	85.3	18.5	46.1
Cotton	0.2	3.1	2.2
Other Crops	6.2	15.1	8.3
Beef & Sheep	51.6	7.2	29.1
Pork & Chicken	16.6	7.2	13.2
Dairy	30.1	7.7	11.9
Other Food	6.8	16.7	11.0
Forest & Fish	2.2	5.8	3.9
Coal	0.0	3.1	1.3
Oil	0.1	3.9	1.5
Gas	0.1	0.6	0.2
Other Minerals	0.1	2.1	0.9
Text., App. & Lea.	8.7	13.1	10.1
Motor Vehicle	2.3	13.0	5.5
Electronics	0.7	1.8	1.1
Other Light Manuf.	1.4	7.4	3.3
Heavy Manuf.	1.3	6.5	4.0
Utiliti & Const.	0.0	0.0	0.0
Elect. & Gas	0.0	0.4	0.2
Trade & Transp	0.0	0.0	0.0
Other Services	0.0	0.0	0.0
Total	**2.5**	**6.1**	**3.9**

(b) Average tariffs imposed by aggregate region

		Importing region:		
		North	**South**	**World**
Exporting region:	**North**	1.04	5.68	2.14
	South	2.46	6.06	3.86
	World	1.45	5.85	2.72

Source: Derived from the authors' GTAP Model baseline