



Second-best Considerations in Multilateral Trade Liberalization

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***Would Developing Countries Gain from
Inclusion of Manufactures in the WTO
Negotiations?***

by

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Abstract

The importance of manufactures trade to the developing countries has increased dramatically since the early 1980s, and developing countries' reliance on each others as markets has also risen sharply. Developing countries face disproportionately high trade barriers in manufactures and barriers to their manufactures exports account for around 70 percent of the total barriers faced by their exports. The inclusion of manufactures trade in the WTO 2000 negotiations is particularly important for developing countries, who would benefit both from improved market access and through greater domestic efficiency. In fact, developing countries capture a majority of the benefits (75%) of manufacturing liberalization. In contrast, comparable cuts in agriculture and services benefit the high-income countries relatively more since only one-quarter and one-third, respectively, of the global benefits accrue to developing countries in these two cases.

I. Introduction

A novel feature of preparations for the WTO 2000 negotiations is the presence of a built-in agenda. This agenda includes agriculture and services trade—the two major areas where a framework for liberalization was developed during the Uruguay Round, and the process of liberalization commenced. It does not include trade in manufactures—the trade that was central to all previous rounds of negotiations. A key question in this context is whether the agenda should be broadened to include manufactures trade.

It has been traditional to assume that liberalization of manufactures trade is in the interest of developed countries, and that developing country interests lie predominantly with primary commodities. However, this simple dichotomy is now seriously in question given the relocation of manufacturing industries, particularly those relying heavily on unskilled labor, to developing countries during the past twenty-five years. As a consequence, developing countries have become much more interested in liberalization of trade in manufactures than was previously the case¹.

Given the dynamics of GATT negotiations, it is probably necessary that there be reciprocal market access gains if liberalization of tariffs on manufactures is to be endorsed by the full WTO membership. This effectively adds a mercantilist constraint to

¹ See, for example, the case for reciprocal liberalization in manufactures trade offered by the South Centre (1998, Section 14.2).

the economist's usual economic efficiency criterion that liberalization should be welfare-enhancing. Whether trade in manufactures meets this criterion will depend heavily upon the pattern of exports, and the pattern of protection in developing countries' export markets. While these same considerations are potentially also important from the viewpoint of economic efficiency, it is likely that these gains will be more heavily dependent upon the extent to which countries liberalize their own imports (Martin and Winters 1996, Ch 1; Bach, Lloyd, and Martin 1995).

In the next section of this paper, we consider the patterns of trade and protection, as well as other structural features of the global manufacturing economy that are likely to influence the welfare impacts of liberalizing manufactures trade. We then turn to projections of the global economy to the year 2005 when the Uruguay Round (UR) implementation is complete. Our goal is to assess the potential impact of further cuts from this post-UR base. Then, in the fourth section, we discuss the simulations performed and the key findings. The fifth section contains a summary and conclusions.

II. Patterns of trade and protection

In this section, we briefly review some of the broad features of global production, consumption, trade and protection that bear upon whether manufactures should be included in the WTO 2000 negotiations. We consider first the importance of manufactures² in the exports of developed and developing countries. Then, we consider the broad structure of protection in each group of countries.

Some very broad statistics on the composition of developing country exports are given in Figure 1. (For a listing of the countries included in the developing country aggregate, see appendix Table A1. Appendix Table A3 gives sectoral definitions.) This figure shows that manufactures made up only around a quarter of developing country merchandise exports in 1965, and that this share had increased to just over thirty percent by 1981, when preparations for the Uruguay Round were getting under way. Since then, however, the value-based share of manufactures in developing country exports has increased dramatically. By 1994, manufactures exports accounted for almost three-quarters of developing country exports. The share of mineral exports increased from around 30 percent in 1965 to around half of total exports in the 1974-81 period in response to the oil shock and related commodity prices, but then declined to around 15 percent by 1995. The share of agricultural exports declined more or less continuously to just over 10 percent in 1995. Given the subdued outlook for commodity exports (World Bank 1999), it seems likely that the overall importance of manufactures exports will increase further during the course of the WTO 2000 negotiations. This is confirmed by the 1996-2005 projections shown in Figure 1, which show the share of manufactures

² The definition of manufactures used follows as closely as possible the definition utilized in the WTO. Thus, agriculture includes the raw and processed agricultural products defined by the WTO agreement on agriculture (WTO 1995, p56)

rising to close to 80 percent. (The origin of these projections will be discussed in section three below.)

The change in the structure of merchandise exports has potentially important implications for the developing countries in the negotiations. In the lead up to the Uruguay Round, it might have seemed reasonable for developing countries interested primarily in mercantilist export expansion to focus on improving the market access opportunities for their traditional commodity exports. By now, it is clear from the chart that this situation had changed dramatically at least for the “average” developing country. With such a large share of manufactures in their merchandise exports, it seems likely that the export gains for developing countries, taken as a group, will depend significantly upon the extent of liberalization in these products.

Despite this strong increase in the share of manufactures in total merchandise exports, the aggregated trade balance for the developing countries, *vis à vis* the high income countries, continues to show a deficit in manufactures. This is offset by a trade surplus in primary products (Table 1). Mercantilist logic might lead one to conclude that trade liberalization in manufactures is more likely to benefit the wealthy countries. However, as we shall see, this view is misguided, and ignores the cost of high levels of current protection to developing countries themselves.

The direction of exports of manufactures is likely to be important when developing countries are evaluating offers made in a multilateral context. For manufactures trade, Table 2 shows that developing countries are relatively more important destinations for manufactured exports from developing countries than they are for the industrial countries. Almost 40 percent of developing country exports of manufactures (39.6% from Table 2) were destined for other developing economies in 1995.

The share of developing country manufactures exports going to other developing countries has been increasing steadily over time, as is evident from Figure 2. (Definitions for each of the regions in this and subsequent figures may be found in Appendix Table A2.) The projected importance of developing country markets is expected to continue increasing over time, approaching 45% of developing country exports by the year 2005. Some part of this intra-developing country trade involves trade in components³ and may be liable for lower duty rates in the importing economies, particularly if the components are used in the production of exports. However, another important stimulus to the growth in intra-developing country trade in manufactures has undoubtedly been the reductions in developing country rates of protection during the last two decades (Srinivasan, Whalley and Wooton 1993).

The potential effects of liberalization in particular sectors are also heavily influenced by the height of the initial tariff barriers. With more than one sector subject to distortions, it is necessary to consider the distortions in all sectors if the full effects of

³ Yeats (1998) estimates that 30 percent of world trade in manufactures is in parts and components.

liberalization are to be understood. Estimates of the MFN applied rates of protection applying to three major categories of merchandise trade identified in the GTAP model are therefore presented in Table 3. These estimates are taken from the GTAP Version 4 database, which draws on the UNCTAD TRAINS data collection effort for tariffs, and estimates of protection to agriculture originally calculated by Ingco (1996). The patterns of protection are broadly consistent with those presented by Laird (1999) and by Abreu (1996).

From the first panel of Table 3, it is clear that, at 3.4 percent, the trade-weighted, aggregate MFN applied tariffs facing developing country exports of manufactures to high income countries are almost four times higher than the same tariffs facing industrial country exporters to the same markets. This is entirely due to the composition of trade, with higher tariffs being levied on products imported from developing countries. Developing country importers do not discriminate against other developing countries to the same extent, with the average tariff of 12.8 percent against developing countries only around one-sixth above the 10.9 percent applied to exports from industrial countries. However, the average tariff rates to developing country tariffs on imports from other developing countries are still more than two and a half-times as high as the high income country tariffs applied to developing countries (12.8% vs. 3.4%).

Estimates of the trade-weighted, average tariff rates applying to agricultural products are presented in the second panel of Table 3.⁴ From these data, it appears that average agricultural tariffs in the industrial countries are around ten times as high as those applied in manufactures. Interestingly, there is very little difference between the rates applied against imports from developing and from high income countries. In developing countries, average agricultural tariffs are also higher than those on imports of manufactures, but the difference is much smaller, with the average agricultural tariff less than twice that prevailing on manufactures.

The estimates of tariffs on mineral and energy products presented in the bottom panel of Table 3 suggest that trade barriers on these goods are generally relatively low. The only case where these tariffs exceed five percent is on imports by developing countries from other developing countries.

One way to obtain an extremely crude indication of the importance of particular trade flows is to examine the product of the tariff rate and the value of the trade flows, or the implied tariff revenues associated with particular trade barriers. Table 4 presents estimates of the financial implications of these tariffs in the same format as Table 3. The estimates in Table 4 highlight the importance of the remaining barriers to industrial trade in manufactures to both developing and developed countries. For the world as a whole, manufactures tariffs amounted to almost \$189 billion. Roughly 40 percent of the total tariff impost on manufactures, or \$80 billion, was levied on manufactures exports from developing countries. Interestingly, \$57 billion, or just over 70 percent, of this burden

⁴ Given the continued difficulties in obtaining reliable *ad valorem* tariff rates for agriculture, in many cases, these tariffs have been estimated using price comparison data (McDougall *et al.*, 1999, chp. 13).

was imposed by developing countries themselves. The global tariff imposts on agricultural exports, at \$87 billion, were also substantial, with developing country exports facing just over a third of this impost. The total tariff burden on developing country exports was \$115 billion, or 40 percent of the global total—almost double their 22% share in global GDP.

The relatively high level of tariffs in developing countries has influenced the cost structure of their manufacturing sectors. Table 5 reports the estimated 1995 share of industrial firms' expenditures on labor, capital, agriculture, minerals, manufacturing and services inputs in the developing and high income regions. Note that developing countries spend more on intermediates, per \$ of output, while they spend less on labor. This difference in cost structure reflects the relatively lower wages (and emphasis on unskilled labor) in lower income countries, as well as the relatively higher tariffs on imported manufactures. We can also break out the share of total costs devoted to intermediate imports. These are reported in the parenthetical terms of Table 5. From this we see that imported manufactures account for 14.4 percent of total manufacturing costs in the developing countries, versus only 9 percent in the high income region.

We can break out consumer expenditure in a similar way. These budget shares (measured at producer prices) are reported in Table 6. From this table, it is clear that manufactures are also relatively more important in the final consumption bundle of developing countries (24 percent vs. 17 percent in the high income countries). Despite this heavier reliance on manufactures in both production and consumption, the manufacturing sector's share in aggregate developing country GDP is about the same as that in the high income region (21.5 percent). This is consistent with the observed manufactures trade deficit for developing countries, reported in Table 1.

Of course, these averages mask considerable variation across individual economies. Figures 3-5 display the shares of manufactures in GDP, the share of this production which is exported, and the share of manufactures in total merchandise exports for the 19 countries and regions which we highlight in this paper. (The country/region abbreviations used in these figures are detailed in Table A2.) It is clear from the diversity in both the developing and high income regions, that endowments and country size are more important determinants of these GDP and trade shares than is the country's income level. Focusing on the high income countries in Figure 3, we see that Japan shows a relatively high share of manufacturing in GDP, whereas this share for the natural resource-abundant Australia/New Zealand region is quite low. The export orientation of manufacturing (Figure 4) is relatively low for the largest high income economies (North America, Japan), and larger for the smaller, highly integrated, high income economies of Western Europe. Developing countries' GDP shares of manufactures range from a high of 28% in Taiwan, to a low of less than 10% in Sub-Saharan Africa. The export orientation of manufacturing activity ranges from very low in the case of Brazil, to very important in the case of the East Asian economies.

These differences in GDP and export shares are also reflected in the observed variation in the share of manufacturing in total merchandise exports. Figure 5 reports this

share for the 19 individual countries and regions. From this figure, it is clear that a large number of the economies that would be likely to elect for developing country status in the WTO rely very heavily on manufactures trade. Of these, Korea, Hong Kong and Singapore (Other NICs), Taiwan (China), and China all have manufactures shares that are above 80 percent, and above that of the Western Europe and North America. At the other extreme, in only one of the 19 countries/regions identified in the chart was the share of manufactured exports less than a quarter. This group is the Sub-Saharan African countries outside the Southern African Customs Union, where manufactures accounted for only 19 percent of total merchandise exports.

The database underpinning the proceeding figures is the version 4.0 GTAP database (McDougall, *et al.*, 1998). We have aggregated this up from the 45 region - 50 sector level at which it is maintained, in order to facilitate our analysis. It represents a snapshot of the world economy in 1995, which is the first year of implementation for the Uruguay Round (UR) agreement. For our analysis of the potential gains from manufacturing liberalization in the next WTO round, we need to look ahead to 2005, when the UR agreement is due to be fully implemented. Of course, there will be many other changes to the world economy between 1995 and 2005 and we therefore employ a formal projections approach to establish a 2005 starting point for our WTO2000 analysis.

III. Projections to 2005

Overall rates of economic growth: We employ the widely used GTAP model of global trade (Hertel, 1997).⁵ This is a relatively standard, multi-region, applied general equilibrium model which features explicit modeling of international transport margins, a global “bank” designed to mediate between world savings and investment, and a relatively sophisticated consumer demand system designed to capture differential price and income responsiveness across countries. The latter is particularly important in the case of projections work. Throughout the paper we employ the simplistic, but robust assumption of perfect competition and constant returns to scale in production activities.⁶ Validation efforts with this model (Gehlhar, 1997; Coyle *et al.*, 1998) show that it is able to track, to a reasonable degree, some of the major changes in trade patterns over the past two decades.⁷

Following earlier projections work with the GTAP model (Gehlhar *et al.*, 1994; Anderson *et al.*; Arndt *et al.*), we assemble external projections for population, skilled and unskilled labor, investment and capital stock. When combined with assumptions about likely productivity growth rates, this permits us to predict the level and composition of GDP in 2005, as well as trade flows, input usage, and a wide range of

⁵ The model is implemented using GEMPACK, (Harrison and Pearson, 1996),

⁶ Alternative versions of the GTAP model feature imperfect competition (Francois, 1998), but these are demanding of additional information and unstable for projections purposes.

⁷ Gehlhar's work showed that projections over a period of one decade were improved by increasing the size of the trade elasticities. Accordingly, for this work, we have doubled the size of the standard GTAP trade elasticities.

other variables. Our forecasts for these fundamental drivers of change over the 1995-2005 period are reported in Table 7. These projections were generated by combining historical and forecast data from the World Bank. Projections for population and unskilled labor were obtained by cumulating the average growth rates between 1995 and the projected 2005 data. The skilled labor projections, based on forecasts of the growth in the stock of tertiary educated labor in each developing country (Ahuja and Filmer, 1995) and projected growth rates of skilled labor in developed countries from the World Bank, provide an indication of changes in the stock of those qualified for employment as professional and technical workers. Growth rates of physical capital were obtained from 1995 and the projected 2005 stock of physical capital. Projections of the stock of physical capital were calculated using the Harberger-style, perpetual inventory method, that is, by adding investment net of depreciation to update the capital stock in each year. Data for initial physical capital stock for 1995 as well as annual forecasts of gross domestic investment were obtained from the World Bank.

Our projections of total factor productivity (TFP) growth vary by sector and region. Regions are grouped into four categories accordingly to their assumed rate of annual productivity growth in manufactures. These range from low productivity growth (0.33%/year), to medium (1%/year), and high (2%/year), with a final category -- very high (3%) reserved for China and Taiwan, China. The latter two economies seem to be growing at rates that can only be explained by taking into account factors such as the demographic transition (Bloom and Williamson 1998), rapid intersectoral movements of labor, and productivity-enhancing reforms. Sectoral variation in productivity growth builds on the econometric work of Bernard and Jones (1996). They find that the annual rate of productivity growth over the 1970-87 period in OECD agriculture was about 40% faster than that of manufacturing⁸. Similarly, services TFP growth was about half that in manufacturing, while they did not find significant productivity growth in mining over this period. By combining these factors of proportion with the above-mentioned manufacturing TFP growth rates, we are able to obtain region/sector-specific productivity forecasts for the 1995-2005 period.

A difficult aspect of constructing such projections has to do with the rate at which natural resources are depleted -- or perhaps augmented through new discoveries. Rather than attempt to estimate changes in the natural resource endowments over this period, we have simply opted to target a particular rate of change in the prices of natural resource-based commodities over the projections period. Grilli and Yang (1988) report an average rate of price decline for metals in the 20th century of about 0.8%/year, while grains prices have fallen about 0.3%/year, on average. We allow the model to select a rate of natural resource augmentation in agriculture and mining which achieves a continuation of these downward trends in commodity prices throughout the 1995-2005 period.

In order to gauge the reasonableness of our projections, Figure 6 compares our projected GDP growth rates over this period to those from the World Bank's International Economic Analysis and Prospects Division. By and large they are quite close. This is

⁸ Martin and Mitra (1999) find evidence of an even larger differential of agricultural over manufacturing productivity in developing countries.

hardly surprising, since the two studies share many of the same basic assumptions. Significant departures arise in the cases of the South Africa Customs Union, the Economies in Transition (EIT) and Indonesia. In each case, our projected growth rates are substantially higher than the World Bank's. The only way the World Bank forecasts for these three regions could be achieved in our framework is to have negative productivity growth rates, or substantial increases in unemployment rates. We have opted not to do either of these, and so our forecasts are higher. Our forecast for China's GDP growth is slightly higher than that of the Bank, however, the difference is negligible when viewed in terms of annual growth rates.

Changes in trade policy: From the point of view of this paper, the most important trade policy developments over the 1995-2005 period are likely to be the completion of manufacturing tariff cuts under the Uruguay Round, implementation of the Agreement on Textiles and Clothing (ATC) and the accession of China and Taiwan, China to the WTO. We have incorporated these changes by drawing on the work of Francois and Strutt (1999) to specify the remaining UR cuts to be made from our 1995 base period. The estimate of China's reforms in manufactures were made by beginning with its 1997 applied tariffs, and reducing them in those cases where its most recent multilateral tariff offer would require reductions. The reduction in protection in Taiwan, China was brought about by reducing all tariffs by the extent needed to reach the widely-reported target of 4 percent in manufactures.

Figure 7 reports the average MFN tariff on manufactures, by importer in 1995, and 2005, where the latter is based on the lesser of individual countries' UR bindings and their 1995 applied tariffs. For many regions, the 1995 and 2005 tariffs are very similar, indicating that we do not anticipate significant manufacturing tariff reductions over the course of our projections period. However, deep cuts are expected for South Asia, as can be seen from the entries for India and OthSoAsia. Similarly, China's offer to the WTO appears to involve substantial cuts in manufacturing protection from the tariffs in place as of 1995.

The Agreement on Textiles and Clothing implements accelerated growth of quotas established under the previous, Multi-fibre Agreement, culminating in their abolition at the end of the UR implementation period. However, China and Taiwan, as non-members of the WTO, remain constrained by the old, MFA quotas until a date to be determined in their accession negotiations. Thus their accessions will bring important changes in the textiles and apparel trade. Since their accessions are likely to involve the complete elimination of China and Taiwan, China's quotas by 2005 or soon after, it is likely that these reforms will largely be complete before any cuts under a Millennium Round are finalized. For this reason, we include their abolition in our baseline analysis as well.

Trade policies affecting mining products are treated in the same way as manufacturing (i.e. tariff cuts based on completion of the UR). However, for agriculture and services, we do not implement any changes from the 1995 base. In the case of agriculture, 1995 was a year of very high world prices -- and therefore low measured protection. In contrast, UR commitments were made from a base period from the late 1980's when world prices were very low and measured protection was at an historic high. In light of these facts -- and in light of the extensive "dirty tariffication" in agriculture

(Hathaway and Ingco, 1996; Ingco 1996), we believe that the assumption of no change from 1995 protection in agriculture is sensible.

Structural Changes 1995-2005: Figure 8 reports the share of manufactures output destined for exports in 1995 (previously shown in Figure 4) and that implied by our projections for 2005. Several points are worthy of note. First of all, the export orientation of manufactures rises over this period in most developing regions -- a fact which is confirmed in Figure 9. The second point to be taken from Figure 8 is that those regions undertaking significant policy reforms between 1995 and 2005 also become much more export-oriented. The most striking case is that of Other South Asia (primarily Bangladesh and Pakistan), where the combination of deep tariff cuts and removal of the textile and apparel quotas results in a doubling of the share of manufactures output destined for export markets. Significant increases also occur in Taiwan and China (WTO accession), as well as India.

The relatively more rapid growth in developing countries over the projections period, coupled with relatively deeper cuts in import prices in several large developing countries, translates into a continuation of the trend towards increased importance of intra-developing country trade. This is evident from Figure 2. The trend towards increased reliance on manufacturing exports also continues. We project that by 2005, nearly 45% of developing country merchandise exports will be to other developing countries (Figure 2) and 80% of total developing country merchandise exports will be manufactures (Figure 1). This further heightens the importance of tariff cuts in the developing countries under the next Round of negotiations.

IV. Analysis of WTO2000

Description of the Experiment: We focus most our attention in this paper on analyzing the impact of an across-the-board, 40% cut in post-UR manufacturing tariffs from our 2005 projection of the world economy. This cut is slightly deeper than the one-third cuts agreed in agriculture and manufactures trade during the Uruguay Round, and it is very much in line with some of the proposals being discussed at the time of this writing. More liberalization, and greater welfare gains, could be achieved by cuts that go deeper, or which focus more on reducing peak tariffs. The estimates presented in the paper are intended to provide a benchmark for comparing liberalization in the manufacturing sector with liberalization in other sectors.

In order to facilitate our analysis of the manufacturing tariff cuts, it is instructive to carefully examine the level of the post-UR tariffs themselves. Recall that the second set of bars in Figure 7 report the trade-weighted, average tariffs by importing region.⁹ From this, we see that manufacturing tariffs in the high-income countries have almost disappeared. (The one exception was Australia/New Zealand, where average manufacturing tariffs were estimated at about 7 percent in 1995). These low

⁹ These tariffs are based on applied MFN rates and do not reflect the presence of trade preferences, excepting in the case of intra regional trade in NAFTA, the EU, and the EU/EFTA region.

manufacturing tariffs in the OECD stand in sharp contrast to some of the developing countries. Despite dramatic reforms in the early 1990's, and further commitments under the Uruguay Round, industrial tariffs in India are still expected to be about 35% on a trade-weighted basis in the year 2005. China's tariffs were also quite high – nearly 30% on average in 1995. However, Chinese tariff collections are much lower than this because of the prevalence of duty exemptions and reductions for investment and export processing purposes¹⁰. China's current WTO offer would bring their trade-weighted average tariff down to about 20% in 2005. Manufacturing tariffs in Other South Asia are projected to come down dramatically by 2005, but they will still average 20%. In sum, there are still substantial trade gains to be had from manufacturing tariff cuts in the developing countries, whereas such cuts are expected to have only a modest impact on the imports of most high-income countries.

In order to ascertain how such cuts would affect the demand for a region's exports, it is also instructive to look at the trade-weighted average tariffs, *by exporter*. This provides an indication of how much each region is exporting to the more heavily protected markets. From Figure 10 it is clear that the North America and Western Europe are not exporting a large share of their manufactures to heavily protected markets. The trade-weighted average tariff facing them is 4% or less. However, the trade-weighted average tariff facing most developing countries is much higher. Taiwan and the other East Asian NICs, Turkey, and India all face average tariffs on their exports of 10% or more. This suggests that across-the-board reductions in manufacturing tariffs will stimulate demand for developing country exports relatively more than it does so for industrialized countries' manufactures exports.

Results: The 40% cut in manufacturing tariffs, worldwide, generates an increase in global trade volume of more than \$380 billion – or about 4.7% of projected merchandise and non-factor service trade in 2005. This increase is reflected in almost all products, including non-manufactures, as shown in Figure 11. The largest increase is for wearing apparel, where trade volume rises by more than 20%. This politically sensitive sector remains heavily protected, even in the high-income countries. Textiles and autos follow in importance. Clearly, opening up this sector would require use of a “concertina” approach, such as the Swiss Formula (Laird and Yeats 1987; Brown and Whalley 1980) that brings down high rates by more than lower tariff rates. Metals, other manufactures and manufactured petrol-chemical and mineral products experience an increased trade flow of about 5percent per year in 2005, following this 40 percent post-UR tariff cut.

When viewed on a regional basis, export volumes rise in almost all regions (Figure 12). The ordering of these regions is quite similar to the ordering of countries in Figure 7. Those regions that liberalize trade most vigorously, encourage increased imports, thereby indirectly requiring higher export volumes. India, ROW, China, OthSoAsia, and Brazil top the list in terms of projected tariff levels in 2005 -- and hence are required to make

¹⁰ Collections of tariffs and VAT on imports amounted to less than a fifth of the combined tax rate in 1996 (World Bank 1997, p13). The IMF estimated China's actual tariff revenues at 2.6 percent of the value of imports in 1995.

the largest cuts. These countries also experience the largest increase in export volumes following the liberalization. At the other end of the spectrum, North America, OthNICs (Singapore and Hong Kong), Japan and Western Europe, show the smallest 2005 tariffs in Figure 7. Therefore, it is little surprise that these economies also have the smallest export volume increases in the wake of the 40 percent tariff reduction.

An important feature of the simulation results is a strong expansion in South-South trade. Whereas North-North trade *falls* by 1% percent, and exports from the high income economies rise by only 2% in the wake of the 40% manufactures tariff cuts, exports from the developing countries rise by 12% and South-South increases by 11 percent. This expansion reflects the combination of liberalization in the importing developing countries, and the improvements in competitiveness and exports that follow the reductions in countries' own protection.

The real income impacts of these manufacturing tariff cuts are more complex to analyze. Welfare gains from such multilateral liberalization are fundamentally determined by two factors: the change in the efficiency with which any given economy utilizes its resources, and changes in a country's terms of trade (TOT). The first bar in Figure 13 reports the efficiency gains, by region, as a share of 2005 income. These efficiency gains are closely related to the degree to which a country liberalizes its markets. Sharp tariff cuts, giving rise to increased access to cheaper imported goods, generate gains in consumption as well as improvements in the efficiency with which domestic resources are used.

It is not surprising to see that the largest efficiency gains (as a share of income) are in the developing economies where tariffs are highest in the 2005 base (second set of bars in Figure 7). China's gains lead the way, followed by Other South Asia and India. These are also the regions with the highest initial tariffs. China's greater gains, relative to India (which is projected to have higher protection levels in 2005), are due to the fact that the manufacturing sector in China is larger and more trade-oriented in our 2005 projections. At the far right hand side of Figure 13, we see that the tariff cuts in the industrialized economies generate almost no efficiency gains, because tariffs are already extremely low and there is little left to be gained from cuts.

As noted above, there is a second source of welfare gains that can be obtained through improvements in a country's terms of trade (TOT). Since the effects of TOT changes are primarily transfers from one region to another, their impacts are essentially a zero-sum game. One region's gains are another's loss¹¹. In the case of manufacturing liberalization, the extent of a country's TOT gain can be assessed by the extent to which its welfare gain (second set of bars in Figure 13) exceeds the efficiency gain. This is most pronounced for Taiwan and the other NICs, followed by Turkey. What is generating these strong TOT gains? Return to Figure 10 which shows the average tariff cut facing

¹¹ The welfare impacts of terms of trade changes depend also on whether the changes exacerbate or ameliorate existing distortions, so their effects need not be precisely zero-sum. For the purposes of this paper, however, the zero-sum characterization is probably reasonable.

various manufactures exporters. This gives us a first-cut at how much the demand for any region's exports is likely to increase. The cuts are largest for Taiwan, Turkey and the Other NICs. These are also regions for which export volume increases are relatively modest (Figure 12), thereby translating into a substantial export price hike, relative to other regions.

Of course, where there are TOT gains, there must also be losses to other regions (i.e. the second bar in Figure 13 is lower than the first). These show up in those regions making the deepest tariff cuts: China, India and Other South Asia. In order to pay for their increased imports, they must export a great deal more of their own products (Figure 12), thereby depressing their export prices and passing some of their efficiency gains on to importers.

In general, we can see from Figure 13 that the biggest gainers from manufactures cuts under a WTO2000 Round would be the developing countries, as opposed to the high income economies. With the exception of Japan, the gains to the latter group are barely visible in this figure! No wonder there is little interest among the major players in the WTO negotiations in including manufactures on the agenda. However, the same cannot be said for the developing countries, where these modest cuts in tariffs protecting about 20% of the productive activity in their combined economies generates a substantial boost to the annual flow of real income. When measured against value-added in this sector, as opposed to total expenditure Figure 14 shows that the equivalent variation of these annual gains are about 14% in the case of China and Other South Asia. India's annual gains are 7% of manufacturing value-added, and they are in the neighborhood of 2 – 4 % for many of the developing countries. This is a substantial boost to their economies.

What about the overall gains from this 40% cut in manufacturing tariffs? These total \$70 billion in 2005. Since the high income countries dominate global GDP, it is possible that they still capture a large share of the absolute gains in global welfare following these tariff cuts. Figure 15 reports the distribution of welfare gains across regions. More than 80% of the efficiency gains are generated in the developing countries and they capture nearly three-quarters of these aggregate gains in the form of increased real income. Given the continued dominance of the high income countries in global manufactures trade, this figure is quite striking. How does it compare with agriculture and services liberalization?

Comparison with Agriculture and Services Liberalization: Given the emphasis on agriculture and services trade liberalization in the upcoming round of trade talks, it is of some interest to compare the distribution of gains from manufacturing tariff cuts to those offered by comparable relative reductions in agriculture and services protection. Here we draw on work by Hertel et al. (1999) which estimates the impact of 40% cuts in agriculture and services protection on global trade and welfare. Those authors place the total gains from agriculture cuts at \$69 billion. The estimated gains from services liberalization are necessarily tentative, due to the difficulty of estimating patterns of protection. Hertel et al. draws on the work of Francois (1999) and Hoekman (1995) to specify these impacts of liberalization. Their best estimate is about \$350 billion in gains. from a 40% liberalization in services trade. From our point of view, the interesting

question is not the absolute size of these gains, but rather their distribution between developing and high income regions. From Figure 15, we see that developing countries capture only one-third of the total gains from services liberalization and less than one-fourth of the gains from cuts in agricultural protection. In summary, the liberalization efforts in the built-in agenda *yield disproportionate benefits to the high income countries*. Perhaps this helps to explain the much greater interest in agriculture and services liberalization by the high-income countries in the context of the WTO2000 negotiations.

Of course, these findings are potentially sensitive to some of the assumptions that we have employed in our analysis. Of particular relevance are the trade elasticities that we have employed. Based on the backcasting work of Gehlhar (1997) and Coyle et al. (1998), we have increased these elasticities beyond their standard medium run values in the GTAP database. Specifically, we double them in order to capture the increased potential for product substitution over the long run (10+ years). This has the effect of dampening the terms of trade effects associated with trade liberalization. If instead, we adopt the smaller trade elasticities – one-half the values used in this paper – the global welfare gains are also cut in half (\$35 billion in total). Furthermore, the distribution of welfare gains between developing and high income countries is also altered (Figure 16). Smaller trade elasticities translate into larger terms of trade effects. Since the lion's share of the liberalization occurs in the developing countries, their exports increase most (recall Figure 12) and they have the strongest terms of trade losses. This dilutes the developing country share of gains from the 40% manufactures tariff cuts by about 11 percentage points, from 74% to 63% of the total (Figure 16).

Possible Extensions to the Analysis: This study has taken into account only the direct implications of liberalization on the static welfare of consumers and producers. Even these benefits have been underestimated because we have ignored the reductions in the variability of protection within the broad sectors identified in the model. Bach, Martin and Stevens (1996) have shown that taking into account the reductions in protection within sectors can substantially increase the estimated gains from liberalization that reduces the variation of protection within the broad commodity groups typically used in model-based analysis.

If negotiators elect to proceed with a formula approach to reducing protection, then the gains from reductions in the variability of protection may be even larger. A formula such as the Swiss formula used in the Tokyo Round negotiations, or any other formula that brings down high rates more than the low, can be expected to provide greater benefits than a proportional cut of the type considered in this paper (Brown and Whalley 1980).

Clearly, the assumption of perfect competition throughout the present analysis fails to take account of the potential for scale economies in many sectors. Incorporating the interaction between scale economies and liberalization could substantially affect the estimated benefits from liberalization. In earlier work, we examined the implications of incorporating monopolistic competition in manufactures. This increased the global benefits of liberalizing manufactures trade, while reducing somewhat the share of these

gains accruing to developing countries. One other recent study, by Harrison, Rutherford and Tarr (1996), found the additional welfare gains from incorporating this factor to be relatively small. Clearly, more work is needed to satisfactorily resolve this issue.

Another possible extension to the analysis would take into account the potentially very gains resulting from increases in productivity as countries become more strongly integrated with the world economy. Rodriguez and Rodrik (1999) have recently emphasized both the importance, and the difficulty, of rigorously establishing this link, and highlight the importance of ensuring that complementary policy reforms if trade liberalization is to be associated with higher growth. While they are skeptical of much of the evidence available in the literature, they do not argue that protection is good for growth. The link between trade and growth may well be contingent on whether countries adopt appropriate complementary, development policies to allow them to take advantage of the opportunities it creates.

V. Summary and Conclusions

The objective of this study was to evaluate the implications of including manufactures trade liberalization in the WTO 2000 negotiations for the developing countries. Our approach takes into account the dramatic changes in the pattern of trade since the lead-up to the Uruguay Round. Furthermore, we have developed projections of the global economy to the year 2005, when the UR is to be fully implemented. Of particular note is the sharp increase in the importance of manufactures exports for developing countries, as well as the increased role for trade *between* developing countries.

Examination of the data reveals that most of the countries likely to classify themselves as “developing” in the WTO 2000 negotiations are heavily dependent on exports of manufactures. The share of manufactures in developing country exports has increased almost continuously since the early 1980s, when it was around 30 percent, to 70 percent in 1995. We project this increase to continue, with the share approaching 80% by 2005. There has also been a rapid increase in trade in manufactures between developing countries. Close to 40 percent of developing countries exports of manufactures were directed to other developing countries in 1995, and this is also projected to increase, to nearly 45%, by the end of the UR implementation period.

Developing country exports of manufactures face much higher trade barriers than exports from developed countries. Their exports to high income countries face average tariffs of 3.8 percent, a barrier four times as high as those facing developed country exports to these markets. The barriers that developing countries face in other developing countries are even higher at an average of 12.8 percent. Developing country exports were found to suffer disproportionately from tariffs . Over 40 percent of total tariffs (42% for manufacturers) were imposed on developing country exports in 1995—as against a GDP share of 22 percent.

Quantitative analysis of the implications of liberalizing manufactures trade reveals that developing countries stand to make substantially larger gains than developed countries. In fact, we estimate that as much as three-quarters of the gains from manufacturing sector liberalization could accrue to the developing countries. These disproportionately large gains to the developing countries reflect a combination of the greater reductions in export market access that they experience, and the greater efficiency gains from reducing their own protective barriers. They stand in sharp contrast to agriculture and services, where the majority of the welfare gains are predicted to accrue to developed countries.

Overall, the results of this study suggest that it is very important for developing countries to ensure that liberalization of developing country trade is included in the agenda for the WTO 2000 negotiations. The gains to developing countries are relatively large, and broadly based. They also appear to be robust to assumptions about the extent of liberalization achieved in the non-manufacturing sectors currently included in the built-in agenda.

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Figure 1.

Share of merchandise exports from developing countries

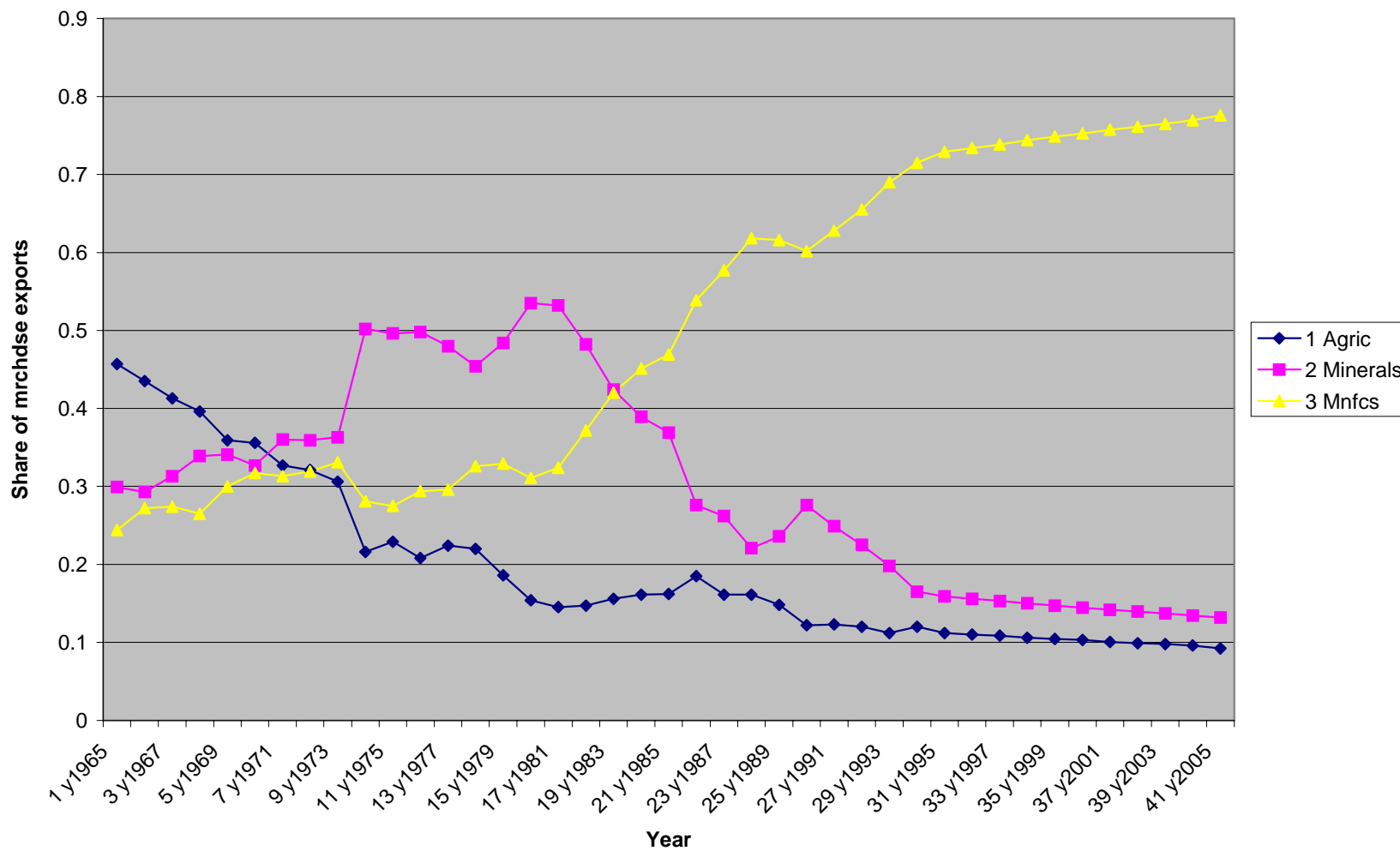


Figure 2

Share of Developing Country Exports to other Developing Countries

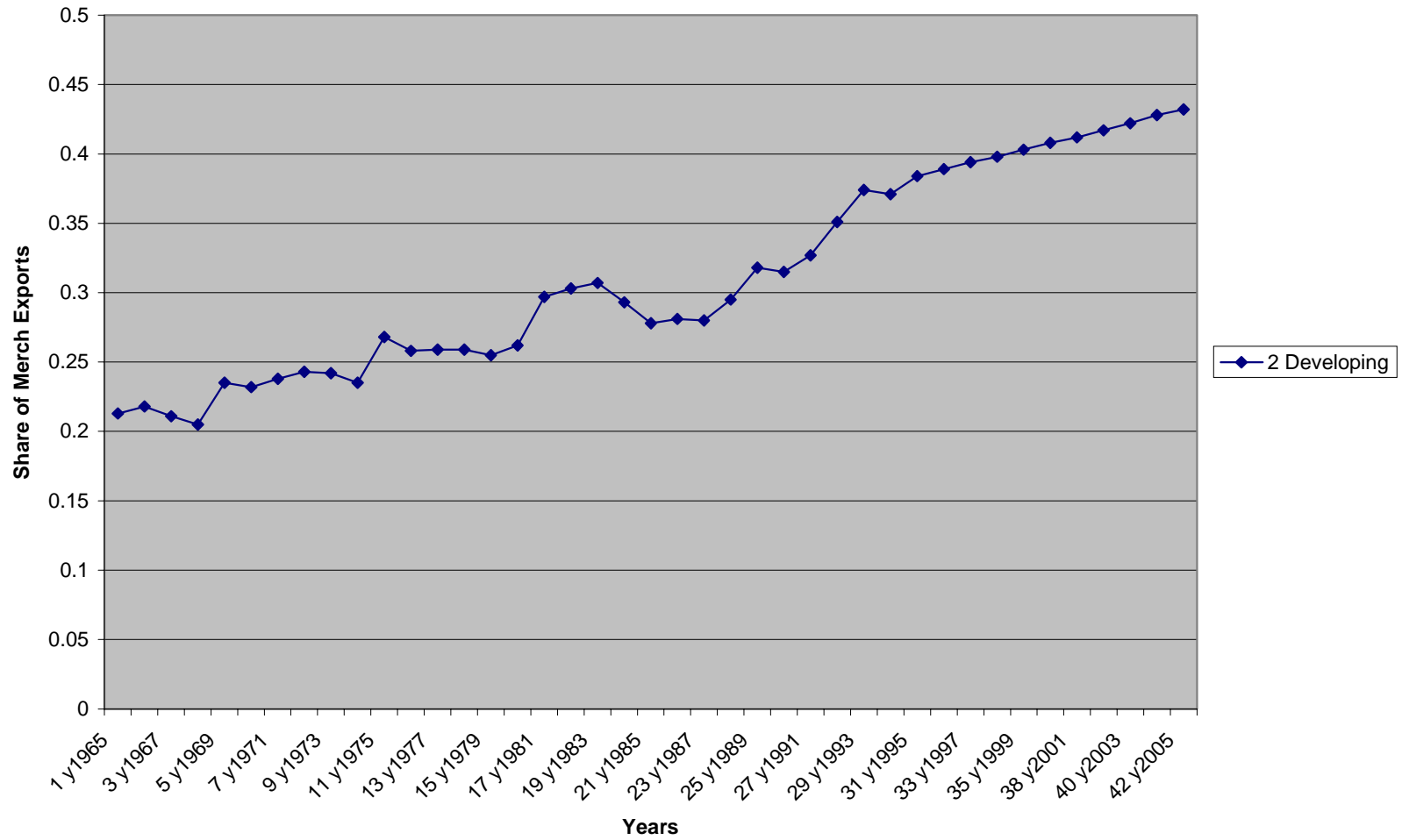


Figure 3

Share of mnfcs in GDP

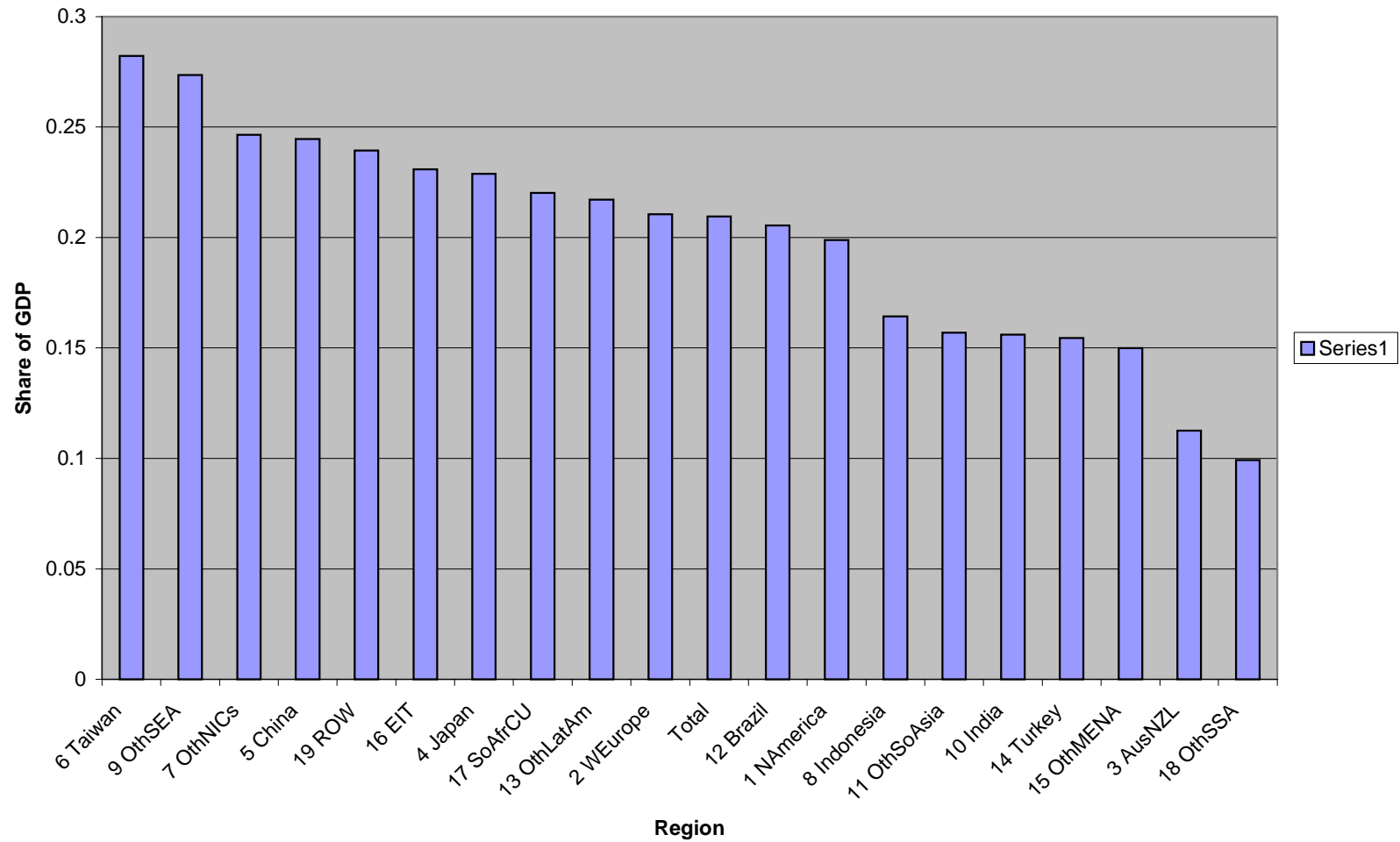


Figure 4

Export Orientation of Manufacturing

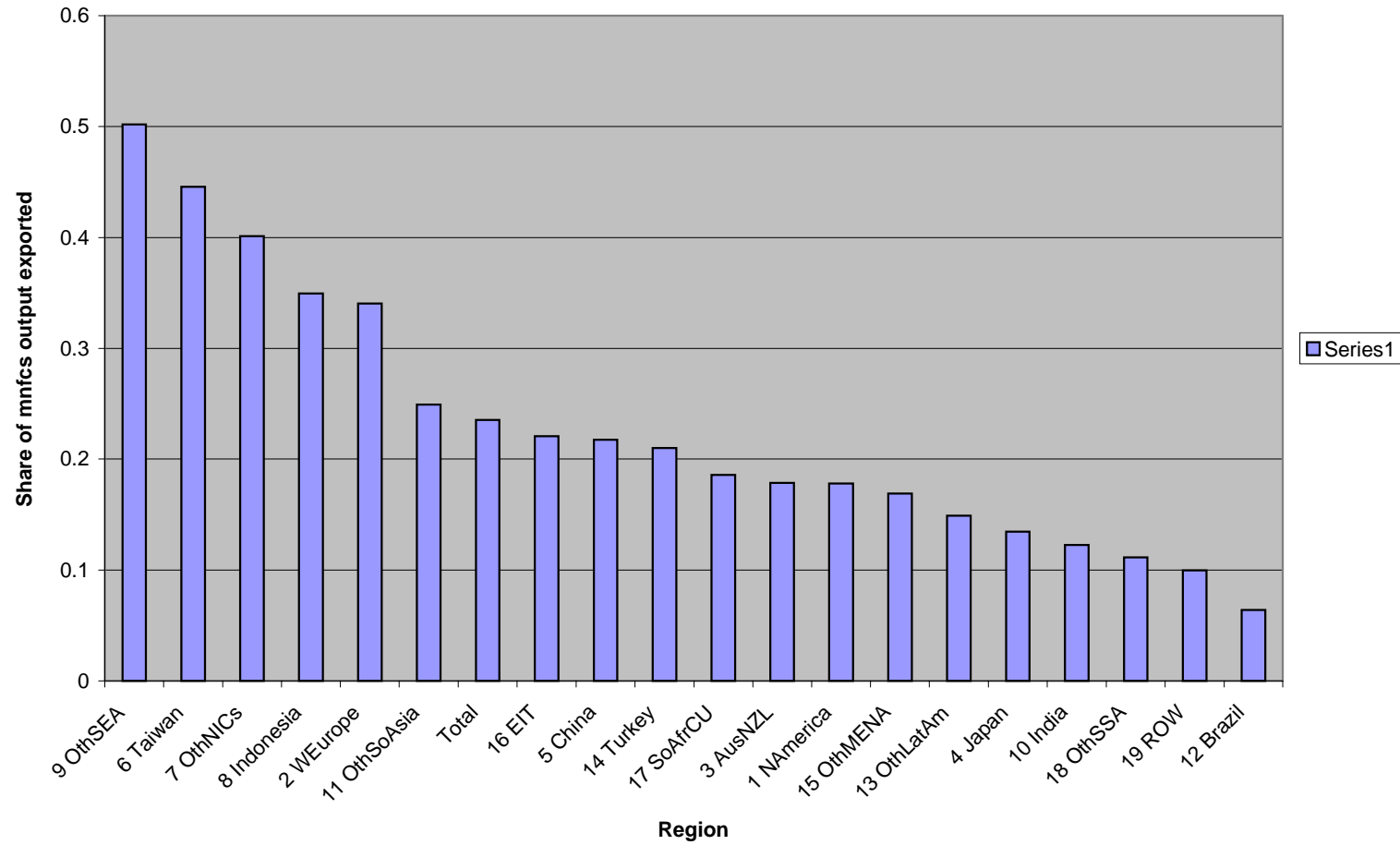


Figure 5.

Manufactures share in merch exports

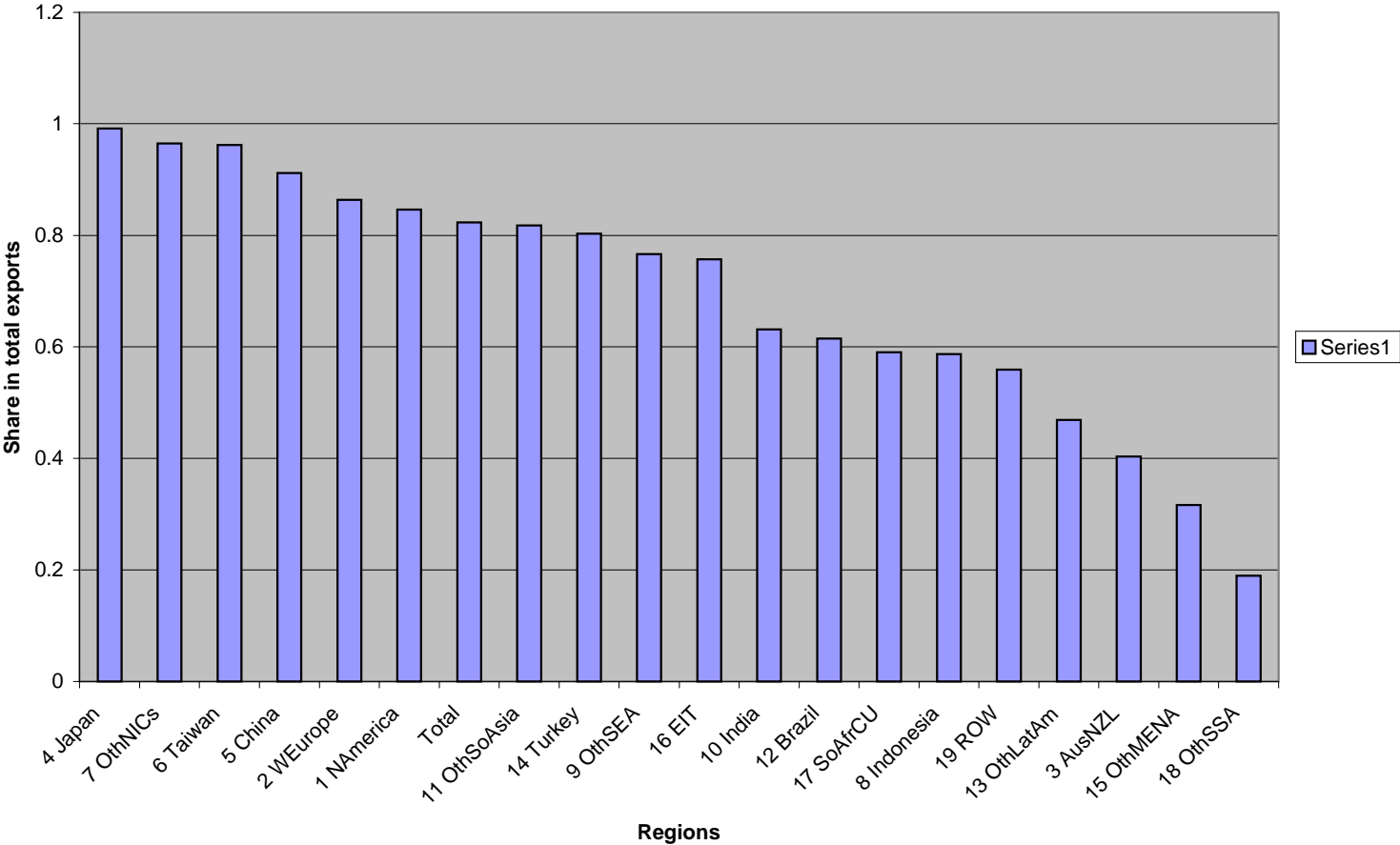


Figure 6

Cumulative GDP Growth: 1995-2005

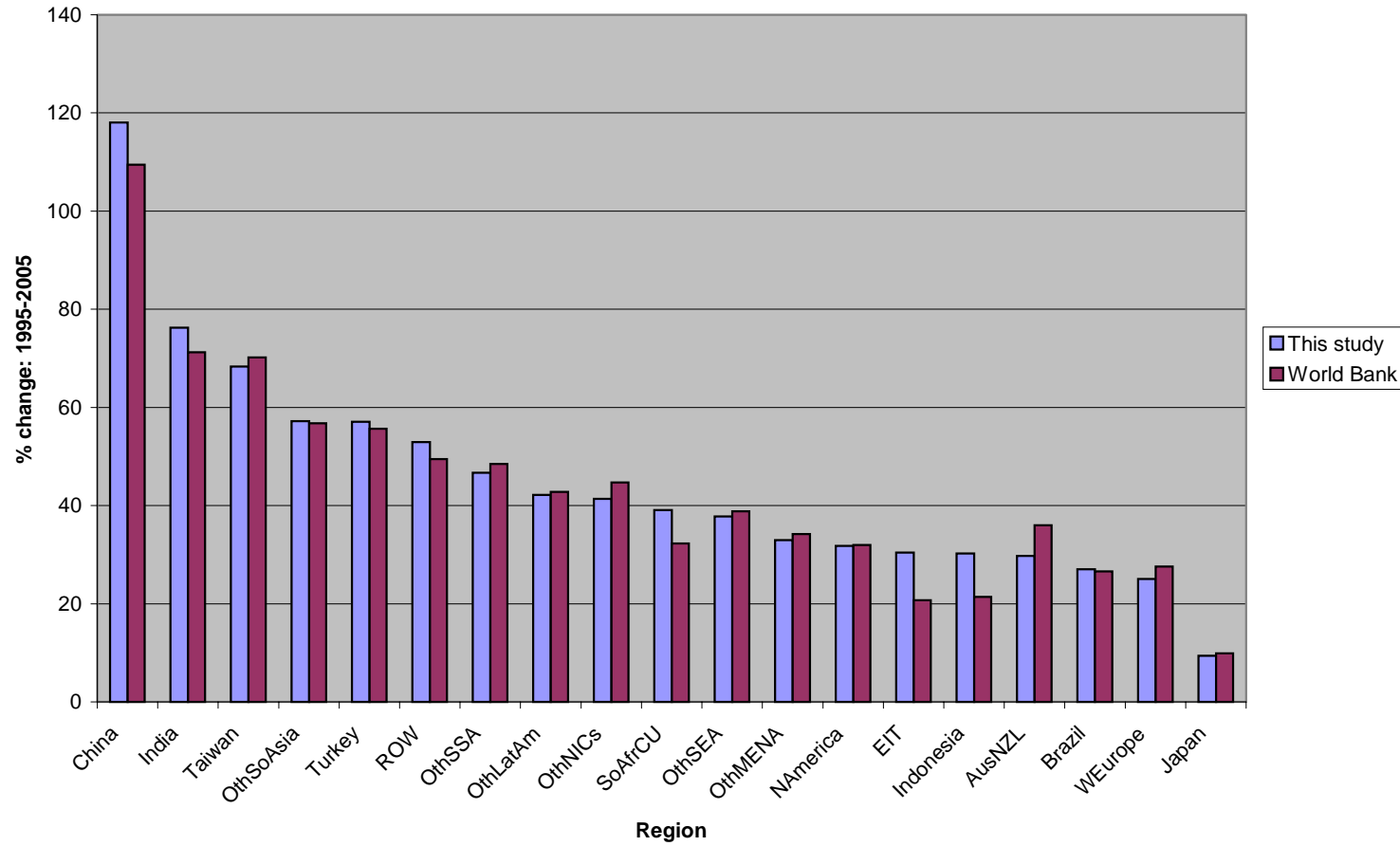


Figure 7

Average MFN tariff on manufactures, by importer: 1995 and 2005

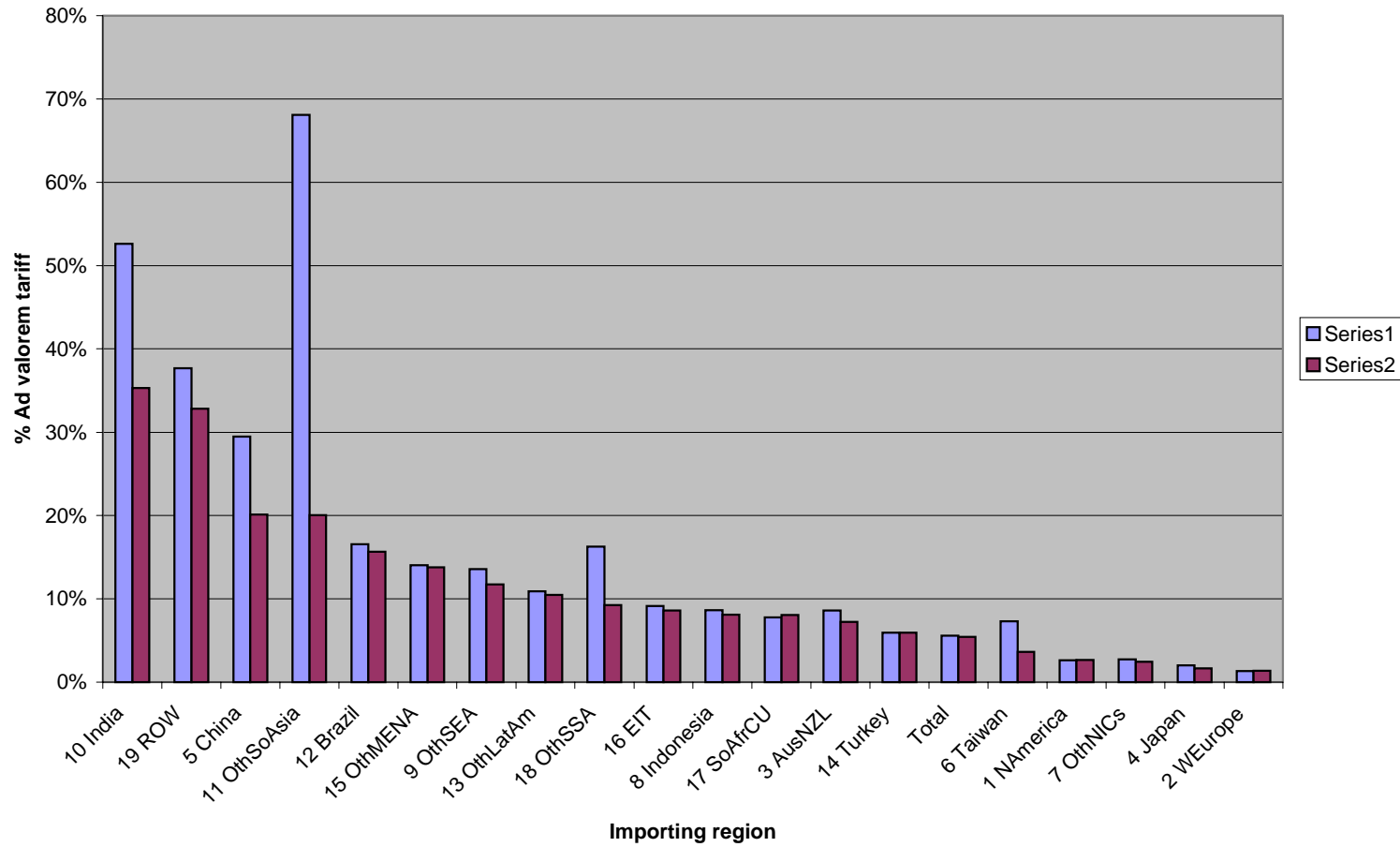


Figure 8

Export orientation of manufactures: 1995 and 2005 compared

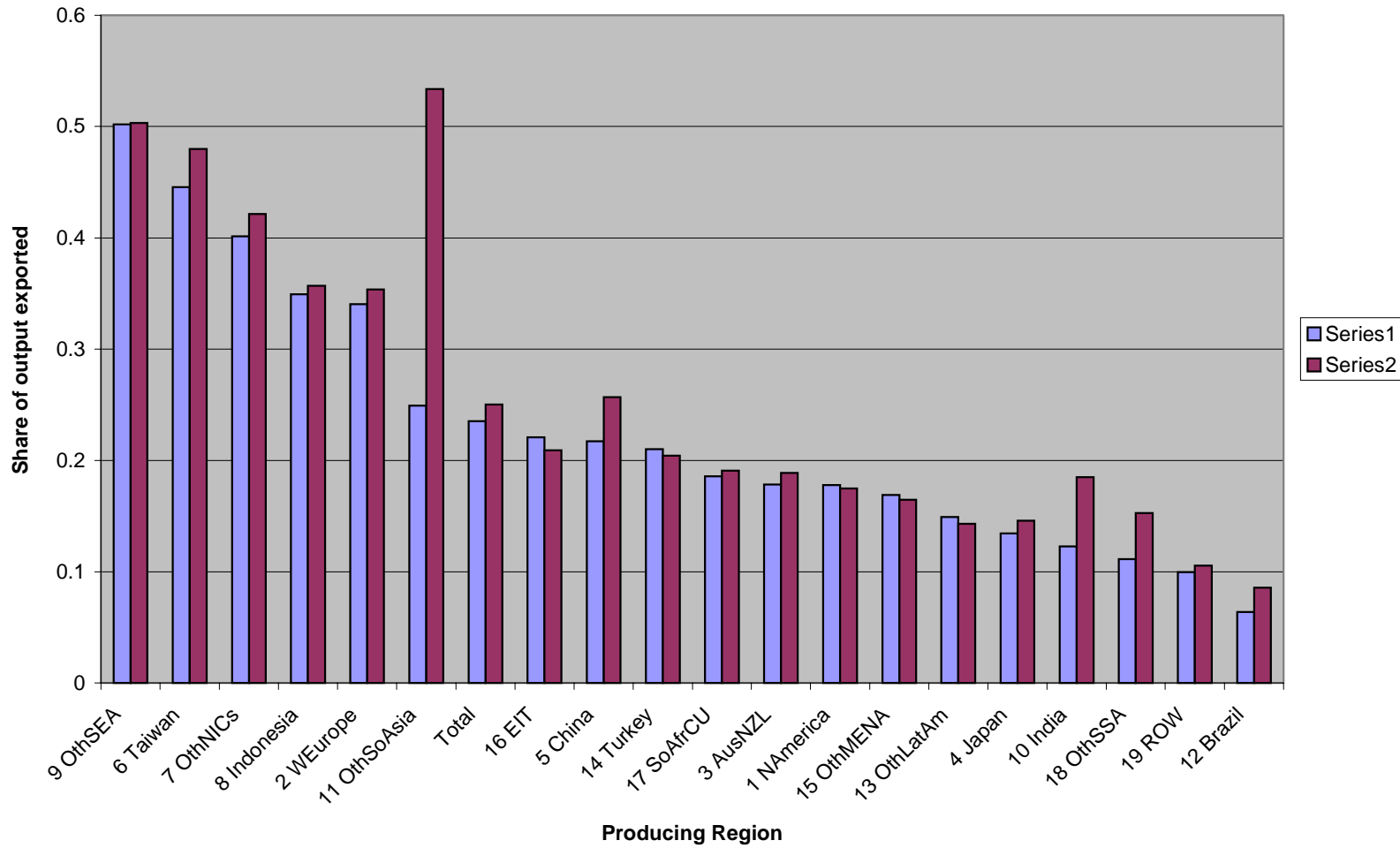


Figure 9

Export Orientation of Developing Countries: 1995 vs. 2005

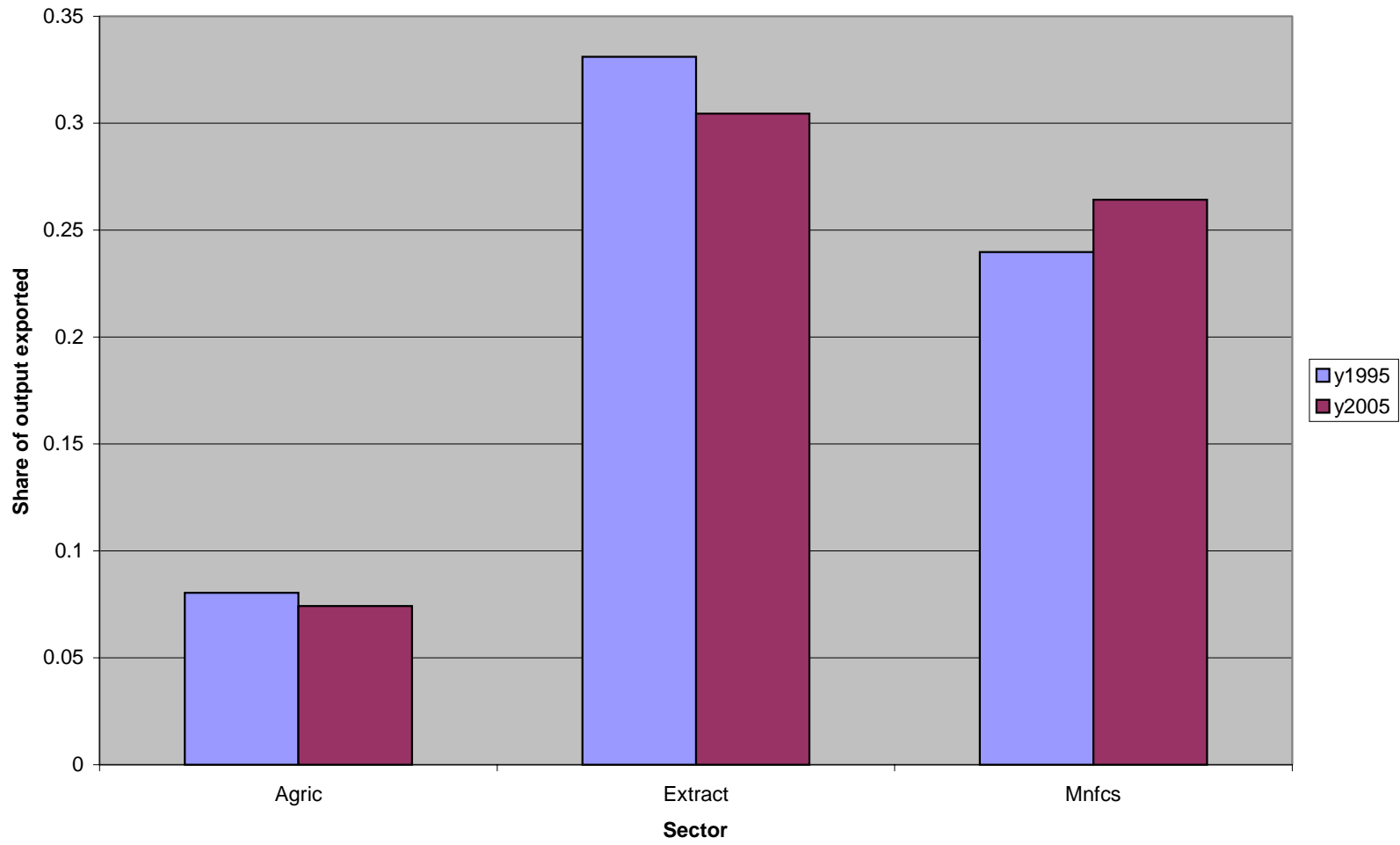


Figure 10

Average 2005, post-UR tariff rate facing manufactures exporters

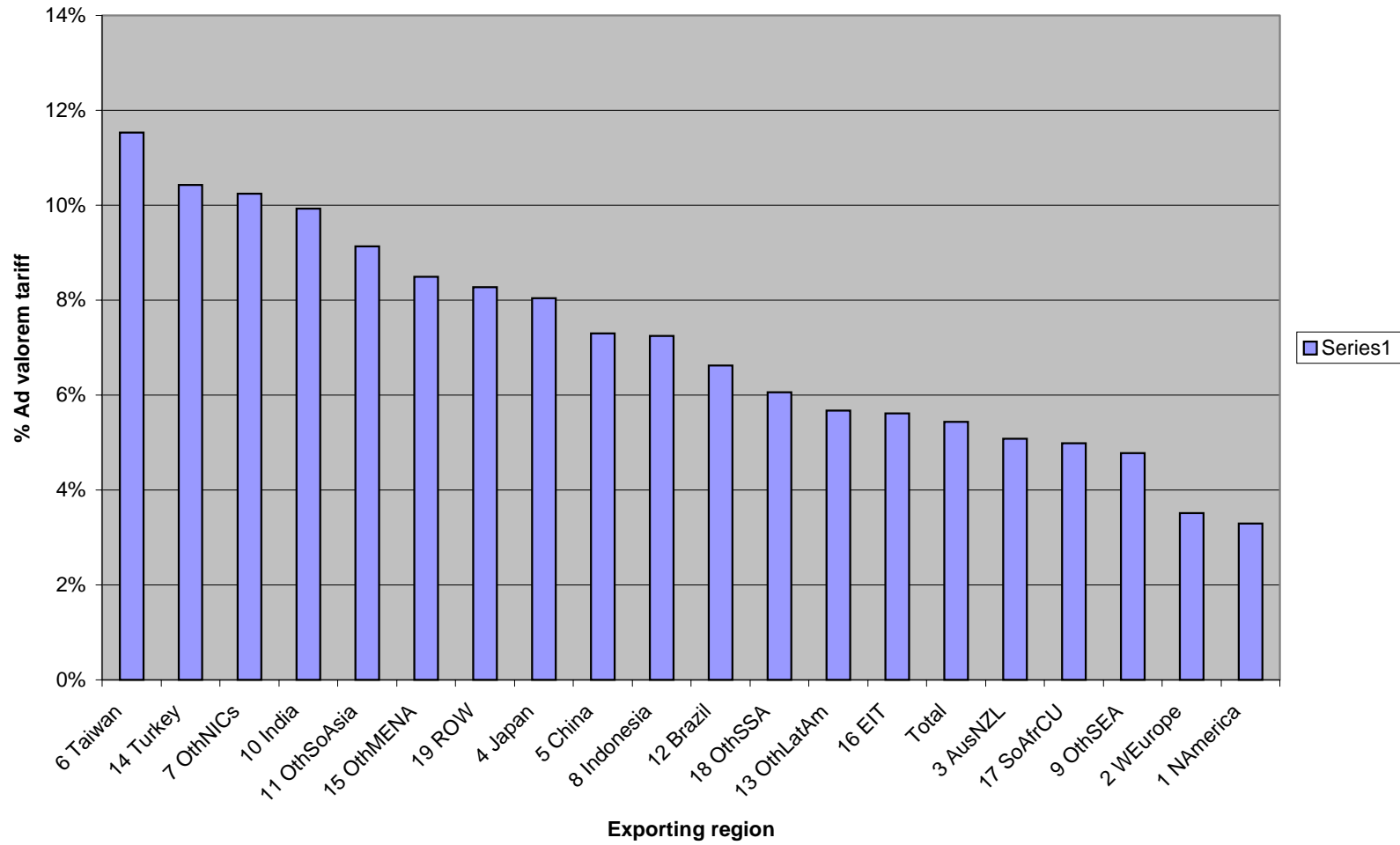


Figure 11

Change in world exports, by sector

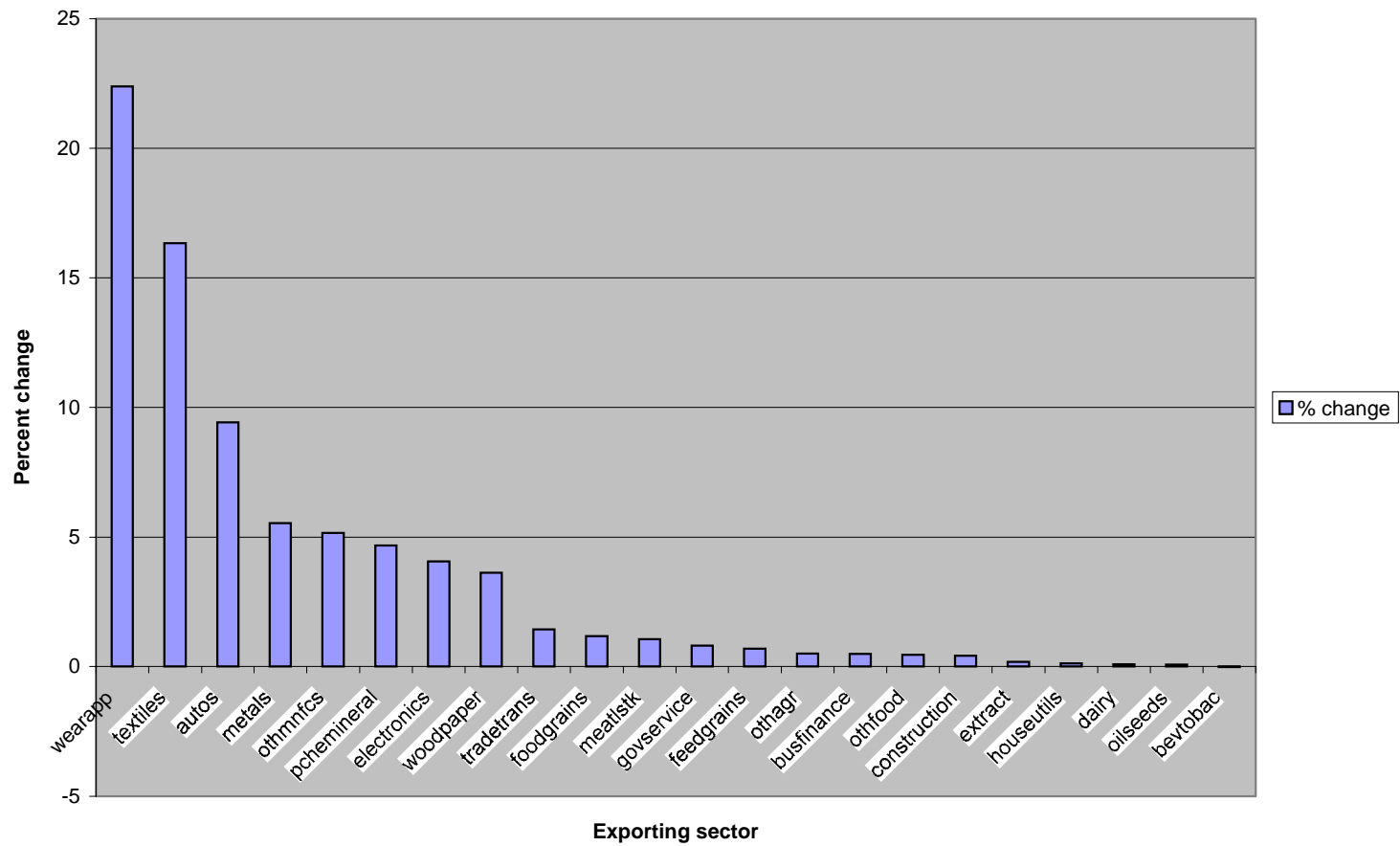


Figure 12

Change in regional exports following 40% Tariff Manufactures Tariff Cut

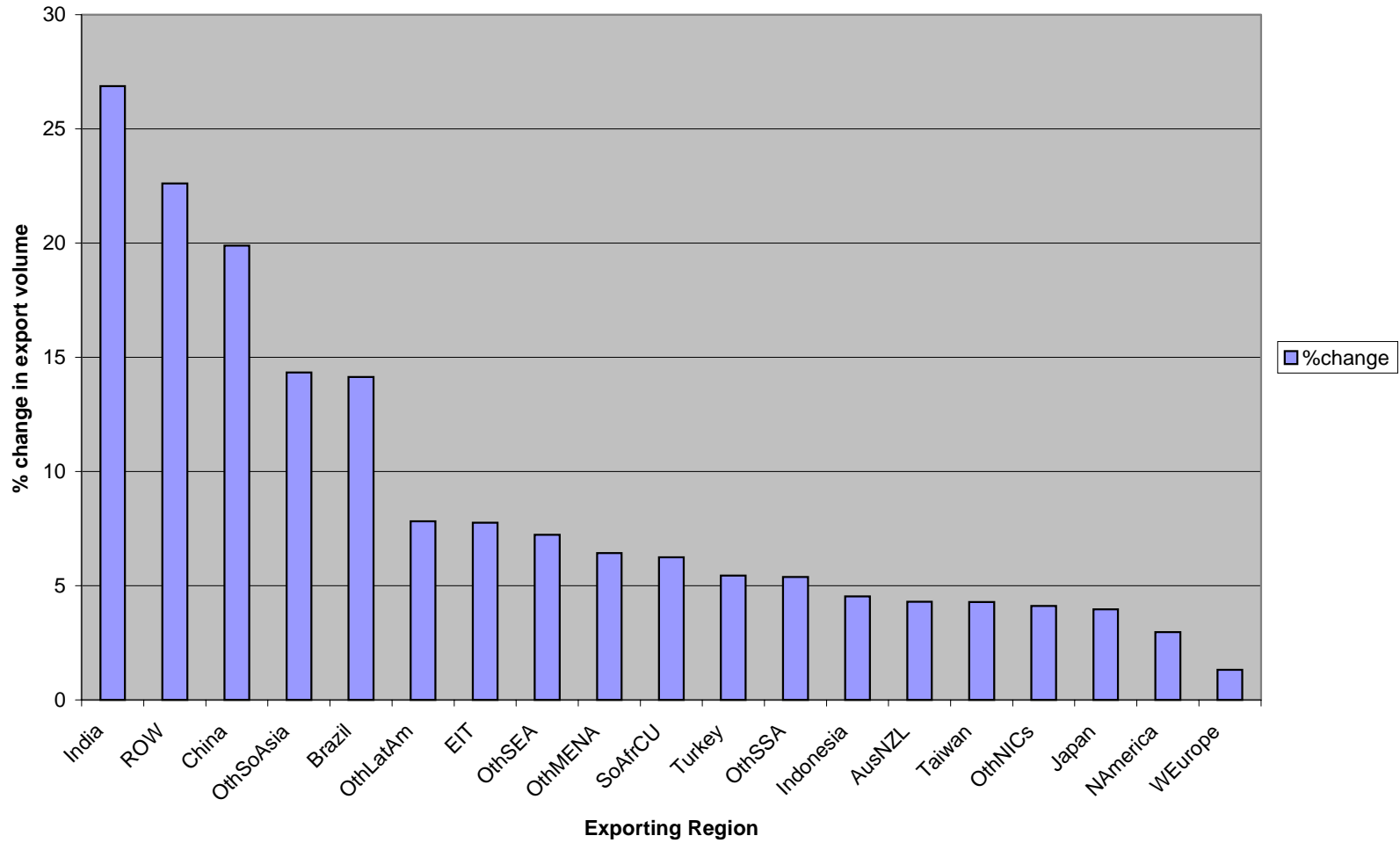


Figure 13

Efficiency and welfare gains owing to manufactures tariff liberalization

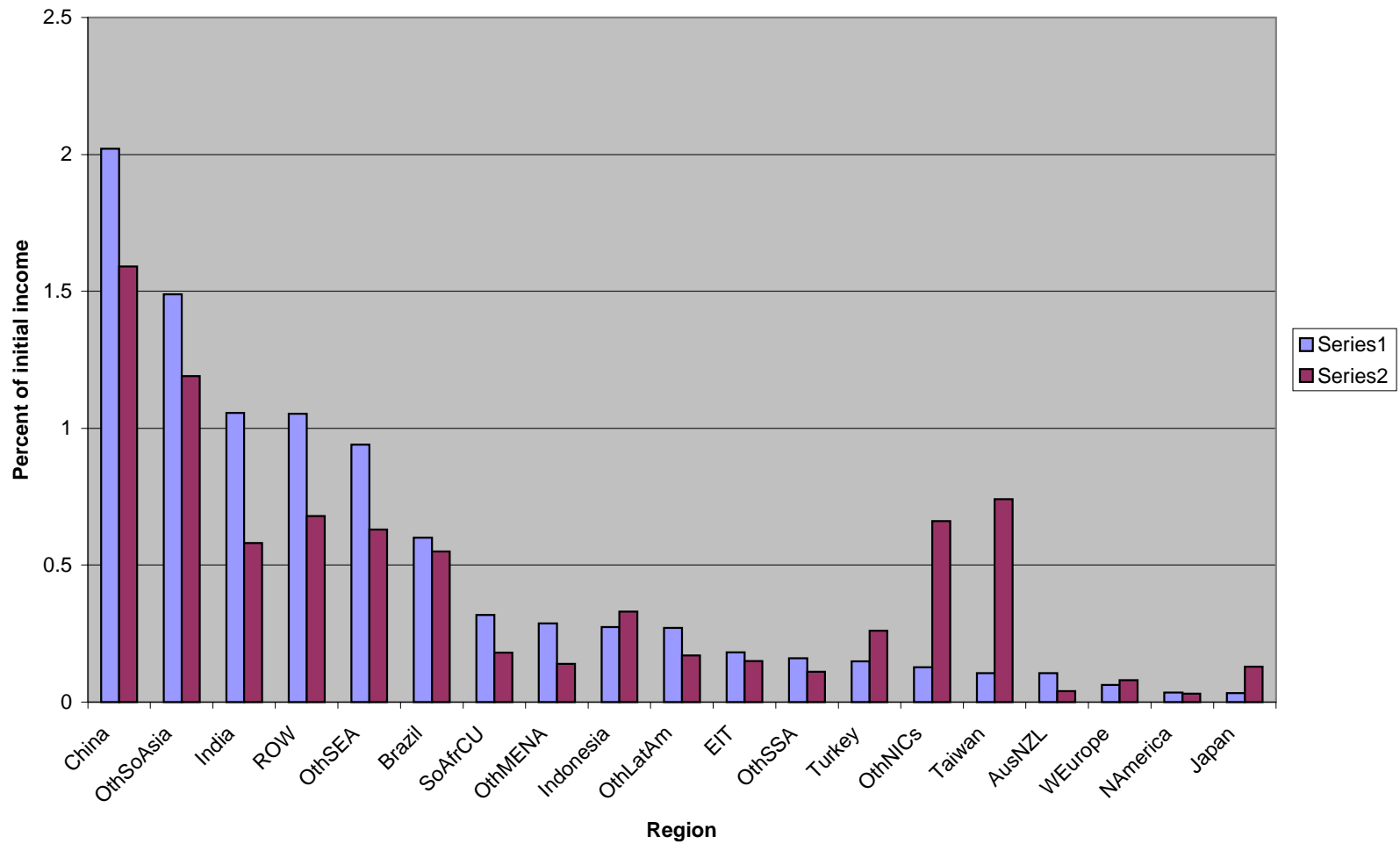


Figure 14

Real income gain per \$1 manufactures value-added

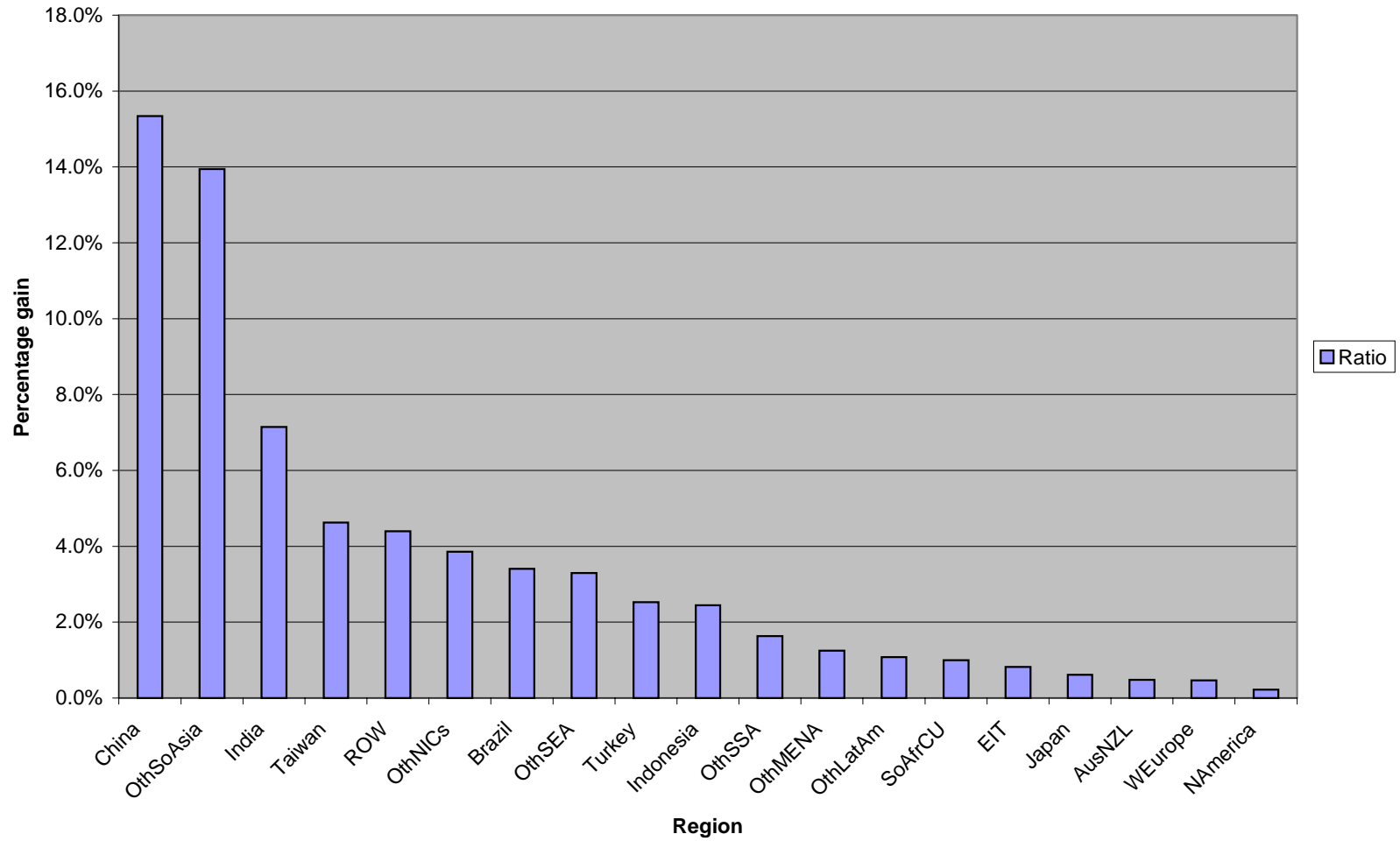


Figure 15

Share of Developing Country Gains in Liberalization

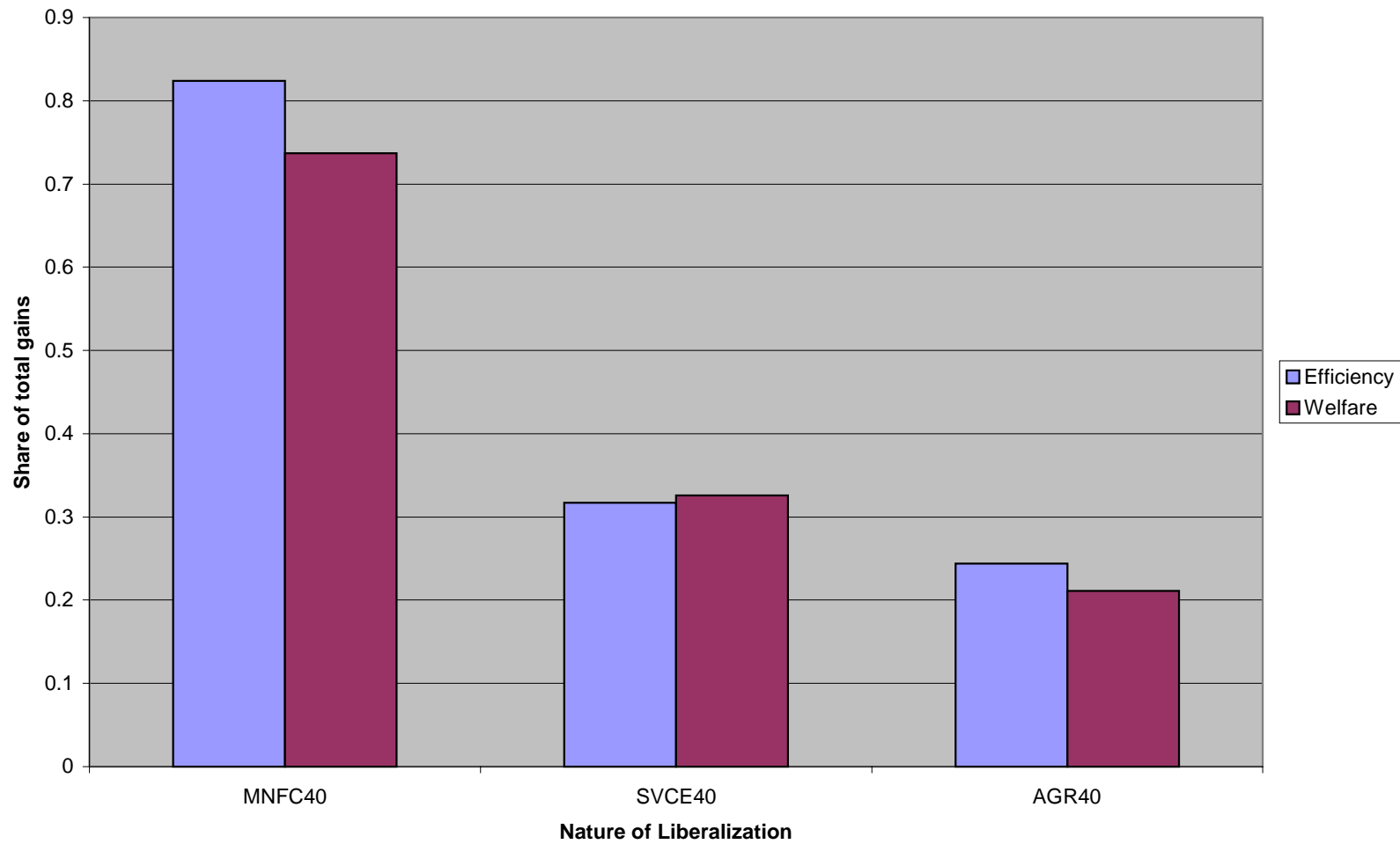


Figure 16

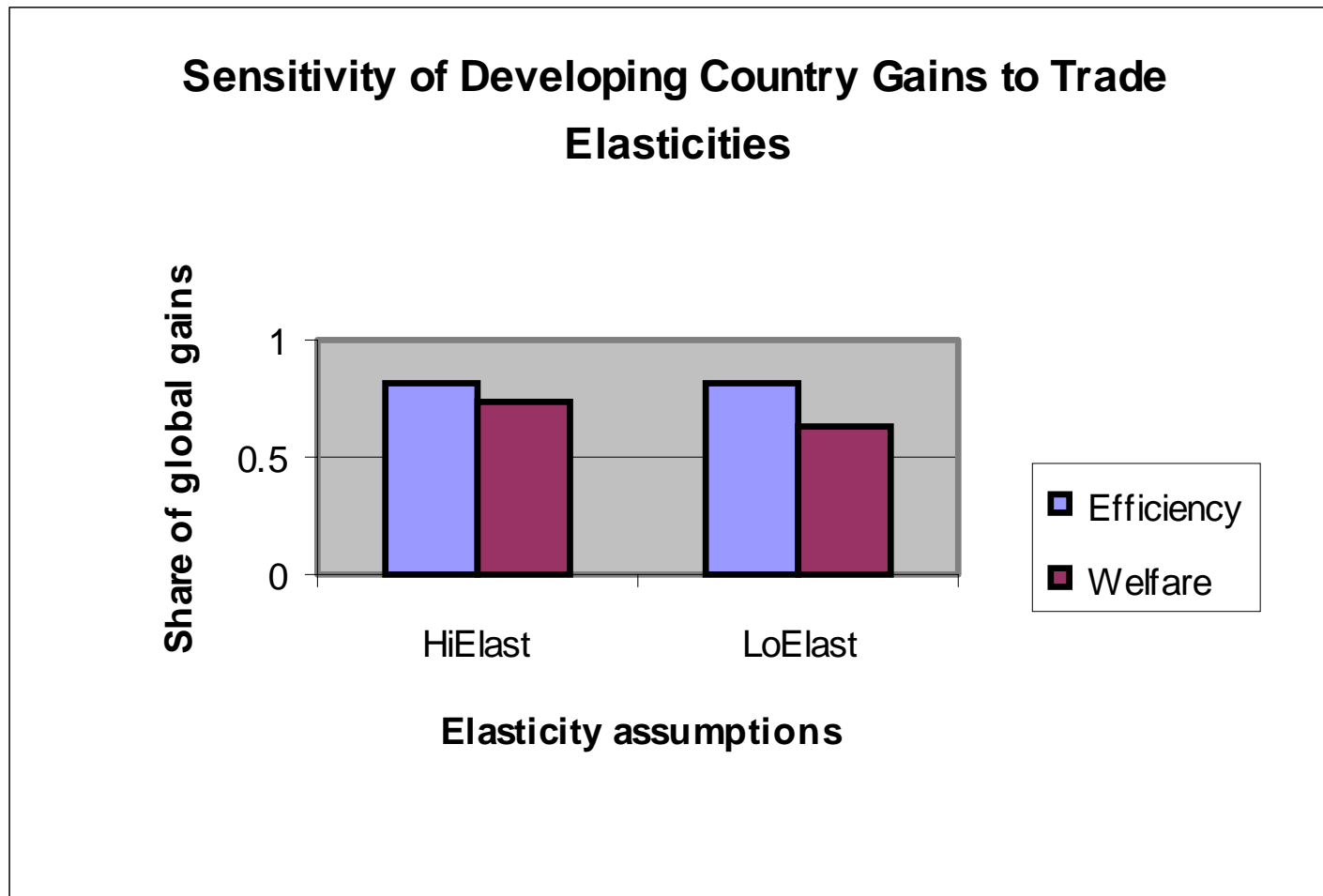


Table 1. Trade Balances: 1995 (FOB exports - CIF imports)

	Agric	Minerals	Mnfcs	Svces	Total
Developing	2306	133633	-221289	71237	-14112
HighIncome	-33434	-159297	49822	157021	14112
Total	-31129	-25664	-171466	228258	0

Note: Sectoral trade balances don't sum to zero due to international transport service margins

Source: GTAP Version 4 database, McDougall et al., 1999

Table 2. Destinations for Manufactures Trade, 1995

	Industrial	Developing	Total
Industrial	70.2	29.8	100
Developing	60.4	39.6	100
Total	67.4	32.6	100

Source: GTAP Version 4 database, McDougall et al., 1999.

Table 3. Tariffs on merchandise trade, by commodity, source and destination, 1995

Exporting region	Importing Region		
	High Income	Developing	World
Manufactures	%	%	%
High Income	0.8	10.9	3.8
Developing	3.4	12.8	7.1
World	1.5	11.5	4.7
Agriculture			
High Income	15.9	21.5	17.5
Developing	15.1	18.3	16.4
World	15.6	20.1	17.1
Minerals/Energy			
High Income	0.1	1.3	0.4
Developing	0.4	5.2	2.4
World	0.2	3.0	1.1

Source: GTAP 4 Database, McDougall, et al., 1999.

Table 4. Implied tariff collections, by commodity, source and destination, 1995

Supplying region	Destination Region		
	High Income	Developing	World
Manufactures	\$bn	\$bn	\$bn
High Income	16	93	109
Developing	23	57	80
World	40	150	190
Agriculture			
High Income	37	20	57
Developing	16	14	30
World	53	34	87
Minerals/Energy			
High Income	0.2	1.2	1.4
Developing	0.5	3.9	4.4
World	0.7	5	5.8
All Merchandise			
High Income	54	114	167
Developing	40	75	115
World	94	189	282

Source: GTAP 4 Database, McDougall *et al.* (1999).

Table 5. The cost structure of the manufacturing sectors of High Income and Developing countries (import shares of total costs in parentheses)

Input	High Income - Total share	Developing - Total share
	%	%
<u>Primary Factors:</u>		
Labor	25.4	13.1
Capital	12.2	15.7
<u>Intermediate Inputs:</u>		
Agric	0.6	2.5
	(0.2)	(0.5)
Minerals	3.5	7.2
	(1.8)	(1.8)
<u>Manufactures</u>	37.5	45.6
	(9.0)	(14.4)
<u>Services</u>	20.7	16.0
	(1.0)	(0.7)
All Inputs	100	100
	(11.9)	(17.4)

Source: GTAP 4 Database, McDougall *et al.* (1999).

Table 6. The structure of private household consumption in High Income and Developing countries (import shares of total costs in parentheses)

Good	High Income	Developing
	Total share	Total share
Agriculture	11.8 (1.2)	30.4 (2.6)
Minerals	1 (0)	9 (0.1)
Manufactures	17.5 5.3	24.0 (6.4)
Services	70.6 (1.5)	44.7 (2.4)
All goods	100 (8.0)	100 (11.5)

Source: GTAP 4 Database, McDougall *et al.* (1999).

Table 7. Cumulative Percentage Growth Rates over the Period 1995-2005 (Annual growth in parentheses)

Regions	Population	Unskilled Labor	Skilled Labor	Capital	Total Factor Productivity*
North America (NAmerica)	11 (1.05)	14 (1.29)	39 (3.33)	39 (3.33)	low
Western Europe (WEurope)	1 (0.10)	0 (0.03)	29 (2.60)	9 (0.83)	high
Australia/New Zealand (AusNZI)	10 (0.97)	11 (1.09)	66 (5.20)	20 (1.84)	low
Japan	2 (0.20)	-3 (-0.29)	32 (2.83)	4 (0.37)	low
China	9 (0.83)	12 (1.17)	43 (3.66)	139 (9.08)	very high
Taiwan	8 (0.73)	13 (1.21)	51 (4.18)	56 (4.52)	very high
Other NICs (OthNICs)	9 (0.84)	8 (0.73)	66 (5.18)	23 (2.09)	high
Indonesia	14 (1.31)	21 (1.96)	126 (8.47)	20 (1.82)	low
Other Southeast Asia (OthSEA)	19 (1.73)	26 (2.36)	84 (6.29)	33 (2.87)	low
India	17 (1.59)	23 (2.11)	73 (5.65)	116 (8.01)	medium
Other South Asia (OthSoAsia)	23 (2.10)	33 (2.92)	77 (5.87)	40 (3.39)	medium
Brazil	13 (1.26)	22 (2.04)	70 (5.46)	-7 (-0.69)	high
Other Latin America (OthLatAm)	18 (1.63)	23 (2.11)	89 (6.55)	27 (2.41)	medium
Turkey	15 (1.44)	22 (2.02)	104 (7.41)	35 (3.06)	high
Other Middle East & North Africa (OthMENA)	27 (2.43)	37 (3.17)	109 (7.64)	11 (1.07)	low
Economies in Transition (EIT)	3 (0.27)	6 (0.60)	69 (5.37)	36 (3.09)	low
South Africa Customs Union (SoAfrCU)	23 (2.06)	29 (2.59)	162 (10.11)	-1 (-0.10)	low
Other Sub-Saharan Africa (OthSSA)	33 (2.87)	37 (3.19)	88 (6.50)	25 (2.23)	medium
Rest of World (ROW)	18 (1.65)	21 (1.90)	83 (6.22)	50 (4.15)	medium

* The low, medium, high, and very high growth assumptions for total factor productivity (TFP) in manufacturing correspond to annual growth rates of 0.3%, 1%, 2%, and 3%, respectively. TFP growth in other sectors is based on a proportion of this rate. These proportions are: 1.4 (agriculture), 0.5 (services) and 0.0 (mining).

Appendix Tables:

Appendix Table A1. List of regions included in developing country aggregate

NAmerica	& North America
WEurope	& Western Europe
AusNZL	& Australia-New Zealand
Japan	& Japan
China	& China
Taiwan	& Taiwan
OthNICs	& Other NICs
Indonesia	& Indonesia
OthSEA	& Other Southeast Asia
India	& India
OthSoAsia	& Other South Asia
Brazil	& Brazil
OthLatAm	& Other Latin America
Turkey	& Turkey
OthMENA	& Other M East and N Africa
EIT	& Economies in Transition
SoAfrCU	& South Africa Customs Union
OthSSA	& Other Sub-saharan Africa
ROW	& All other regions

Table A2. Mapping from GTAP version 4 regions to the 28 regional groupings used for the analysis

aus	Australia	& AusNZL
nzl	New Zealand	& AusNZL
jpn	Japan	& Japan
kor	Korea	& OthNICs
idn	Indonesia	& Indonesia
mys	Malaysia	& OthSEA
phl	Philippines	& OthSEA
sgp	Singapore	& OthNICs
tha	Thailand	& OthSEA
vnm	Viet Nam	& OthSEA
chn	China	& China
hkg	Hong Kong	& OthNICs
twl	Taiwan	& Taiwan
ind	India	& India
lka	Sri Lanka	& OthSoAsia
ras	Rest of South Asia	& OthSoAsia
can	Canada	& NAmerica
usa	United States of America	& NAmerica
mex	Mexico	& NAmerica
cam	Central America and Caribbean	& OthLatAm
ven	Venezuela	& OthLatAm
col	Colombia	& OthLatAm
rap	Rest of the Andean Pact	& OthLatAm
arg	Argentina	& OthLatAm
bra	Brazil	& Brazil
chl	Chile	& OthLatAm
ury	Uruguay	& OthLatAm
rsm	Rest of South America	& OthLatAm
gbr	United Kingdom	& WEurope
deu	Germany	& WEurope
dnk	Denmark	& WEurope
swe	Sweden	& WEurope
fin	Finland	& WEurope
reu	Rest of European Union	& WEurope
eft	EFTA	& WEurope
cea	Central European Associates	& EIT
fsu	Former Soviet Union	& EIT
tur	Turkey	& Turkey
rme	Rest of Middle East	& OthMENA
mar	Morocco	& OthMENA
rnf	Rest of North Africa	& OthMENA
saf	South African Customs Union	& SoAfrCU
rsa	Rest of southern Africa	& OthSSA
rss	Rest of sub-Saharan Africa	& OthSSA
row	Rest of World	& ROW

Table A3. Descriptions of 19 Sectors used in the Analysis

foodgrains	& rice, wheat, coarse grains and
feedgrains	& coarse grains
oilseeds	& oilseeds
meatlstk	& ruminants and non-ruminants an
dairy	& dairy
othagr	& other farm products
othfood	& other processed foods
bevtobac	& beverages and tobacco
extract	& mining, fish, forestry
textiles	& textiles
wearapp	& wearing apparel
woodpaper	& wood and paper products
pchemineral	& petcoal, crp, nmm
metals	& metals and metal products
autos	& motor vehicles and parts
electronics	& electronic equipment
othmnfcs	& oth trans equipment, mach and
houseutils	& housing and utilities
tradetrans	& trade and transport services
construction	& construction services
busfinance	& business and financial service
govservice	& government services

Table A4. Detailed mapping of sectors into four aggregate categories (extracted from the GTAP, version 4 mapping file)

pdr	Paddy rice	& foodgrains
wht	Wheat	& foodgrains
gro	Cereal grains nec	& feedgrains
v_f	Vegetables, fruit, nuts	& othagr
osd	Oil seeds	& oilseeds
c_b	Sugar cane, sugar beet	& othagr
pfb	Plant-based fibers	& othagr
ocr	Crops nec	& othagr
ctl	Bovine cattle, sheep and goats	& meatlstk
oap	Animal products nec	& meatlstk
rmk	Raw milk	& dairy
wol	Wool silk-worm cocoons	& meatlstk
for	Forestry	& extract
fish	Fishing	& extract
col	Coal	& extract
oil	Oil	& extract
gas	Gas	& extract
omn	Minerals nec	& extract
cmt	Bovine cattle, sheep and goat,	& meatlstk
omt	Meat products nec	& meatlstk
vol	Vegetable oils and fats	& othfood
mil	Dairy products	& dairy
pcr	Processed rice	& foodgrains
sgr	Sugar	& othfood
ofd	Food products nec	& othfood
b_t	Beverages and tobacco products	& bevtobac
tex	Textiles	& textiles
wap	Wearing apparel	& wearapp
lea	Leather products	& othmnfcs
lum	Wood products	& woodpaper
ppp	Paper products, publishing	& woodpaper
p_c	Petroleum, coal products	& pchemineral
crp	Chemical, rubber, plastic prod	& pchemineral
nmn	Mineral products nec	& pchemineral
i_s	Ferrous metals	& metals
nfm	Metals nec	& metals
fmp	Metal products	& metals
mvh	Motor vehicles and parts	& autos
otn	Transport equipment nec	& othmnfcs
ele	Electronic equipment	& electronics
ome	Machinery and equipment nec	& othmnfcs
omf	Manufactures nec	& othmnfcs
ely	Electricity	& houseutils
gdt	Gas manufacture, distribution	& houseutils
wtr	Water	& houseutils
cns	Construction	& construction
t_t	Trade, transport	& tradetrans
osp	Financial, business, recreatio	& busfinance
osg	Public admin and defence, educ	& govservice

dwe

Dwellings

& houseutils