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The Cost of Rich (and Poor) Country Protection to Developing Countries

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Abstract

This study confirms that substantial barriers to market access will remain in both rich and poor countries following full implementation of the Uruguay Round agreement. The analysis finds that around 40 percent of the costs of these barriers to developing countries arise from barriers to market access in industrial countries, and 60 percent from barriers in developing countries themselves. The results suggest that there would be large gains to almost all regions from a round of negotiations that increased market access in North and South. In Africa, the potential static gains from multilateral reform appear to exceed those from preferential liberalization, without the well-known disadvantages of a preferential approach.

The Cost of Rich (and Poor) Country Protection to Developing Countries

Although rich country protection has, in general, fallen to very low levels, it remains important in many areas of particular interest to developing countries. Hoekman, Ng and Olarreaga (2001) have recently highlighted the importance of tariff peaks in areas of export interest to developing countries, such as sugar; cereals and fish; tobacco; certain alcoholic beverages; fruits and vegetables; clothing, and footwear.

Protection in developing countries has fallen considerably in recent years. World Bank (2000, 2001ab) show that the average tariff rates imposed by developing countries have roughly halved since the early 1980s, and the variation in tariff rates measured by the standard deviation has also fallen considerably. Over the same period, the incidence of nontariff barriers has fallen dramatically (Michalopoulos 1999). The coverage of restrictions imposed for current account purposes, and the black market premia that reflect the protective impact of exchange rate distortions have also fallen dramatically.

Developing countries have undertaken these reductions in their own protection, at considerable pain and effort, largely with a view to enhancing their own export performance. Accordingly, the persistence of export barriers in the industrial countries, and in the more advanced developing countries, is particularly galling.

Concern about the barriers facing developing countries has fuelled pressures for relief, such as the European Union's Everything but Arms (EBA) initiative for the LDCs. It is also highly relevant to the prospects for new multilateral trade negotiations, in which a major incentive for full participation by developing countries

will be meaningful reductions in the barriers they face in their trading partners—both rich and poor.

Despite major reforms in the recent past, the potential gains from further liberalization of tariff and nontariff barriers are still enormous. And they are becoming more important in relative terms over time, thanks to the fall in other barriers to international trade such as transport and communication costs. The *relative* contributions to those potential gains from the various sectoral policies in different country groups are also important and poorly understood. Reducing such misunderstandings is a necessary part of building support for launching a new WTO round, and can help trade negotiators prioritize their efforts.

As emphasized by Rodrik (2000), trade reform is only one element of successful development policy, and many other institutional reforms are required if a country is to successfully develop and reduce poverty. This paper focuses on the direct implications of trade liberalization for developing countries. The broader dimensions of multilateral trade reform, including the relationship between trade liberalization and rule-making are considered in related papers, including Hertel, Hoekman and Martin (2001), Martin (2001) and World Bank (2001ab). As emphasized by Hoekman (2001), trade liberalization has an important advantage over positive forms of integration that require the development of institutions (Tinbergen 1965) because such institutional development can be extremely costly in developing countries (Finger and Schuler 2001).

The key purpose of the present study is to estimate (a) the extent of both developed and developing countries' import restrictions that will remain after the Uruguay Round is fully implemented, and (b) the potential economic welfare effects on different country groups of reducing those distortions. In particular, we seek to

evaluate the relative importance of remaining trade barriers in both industrial and developing countries. To do that, we use the global economy-wide model known as GTAP (Global Trade Analysis Project – see Hertel 1997 and McDougall, Elbehri and Truong 1998 for comprehensive documentation).

By its nature, the model takes into account two key determinants of the economic benefits of multilateral trade reform, namely, the inter-sectoral structure of protection and the shares of world production, consumption and trade held by different country groups. Using the GTAP model, projections of labor force growth, investment in physical and human capital are used to project changes in the structure of individual regions, and of the world economy from the model base year of 1995 to 2005, the year in which the MFA quotas on textiles and clothing will be abolished. Tariff data are based on 1995 levels and the reductions agreed in the Uruguay Round, while the growth rates of quotas on textiles and clothing are as specified in the Uruguay Round agreement on textiles and clothing up to their abolition in 2005. The results make it clear that even after the full implementation of Uruguay Round market access commitments, sizable welfare gains remain to be realized. In particular, food and clothing producers in developing countries, together with consumers of those products in advanced economies, would benefit hugely from further trade liberalization of those product markets.

In the next section of this paper, we examine the reforms undertaken during the Uruguay Round, and the legacy of protection remaining after the full implementation of the results of these negotiations. Next, we consider the frequently-misunderstood nature of the impacts of international trade reforms on developing countries. Then, we consider the estimated impacts of global trade reform on developing countries, and Africa in particular. Finally, we examine the additional

insights that might be obtained from the burgeoning literature on reducing the trade barriers facing developing countries.

The structure of protection post-Uruguay Round

The structure of protection remaining after the Uruguay Round is such that there are likely to be major gains from further liberalization of world trade, because:

- Agriculture in many developed countries remains very heavily protected from import competition by tariffs and tariff rate quotas and, in some cases, also by large production and export subsidies;
- Protection of textiles and clothing in key developed countries remains high even after the phase-out of the quotas introduced under the Multi-fibre Arrangement.
- Developed-country imports of some manufactures are subject to tariff peaks, and exports are constrained by tariff escalation, with raw materials subject to much lower tariffs than the processed product;
- Restrictions on trade by most developing countries, despite having been reduced in recent years, continue to be severe for a wide range of products;
- Bound tariffs are well above applied tariffs for some developed-country imports (especially agricultural goods) and for most imports of developing countries, meaning tariffs can be raised so long as they remain below the bindings; and
- In both rich and poor countries, barriers to services trade and investment, and on government procurement, have barely begun to be dismantled.

As column 2 of Table 1 shows, after the Uruguay Round is fully implemented (ie, by 2005), bound tariffs for agriculture will average 24 per cent, compared with 12 per cent for textiles and clothing and 6 per cent for other manufactures. Even getting agricultural and textile bound tariffs down to currently applied rates on those products would require big cuts. Yet applied rates for textiles and clothing are 2.5 times, and agriculture's are 3.5 times, those for other manufactures (column 3). Clearly, action is needed in the next WTO round on two tariff fronts: getting bound rates down to applied rates, and lowering rates more for these two outlying industry groups. Both are of vital interest to developing countries in particular.

The extent of the cuts needed is enormous. On the first front, a bound tariff cut for agriculture three times greater than in the Uruguay Round would be needed to bring the average bound rate down to the applied rate average for that sector (compare column 1 and 4). Even for manufactures a cut 40 per cent deeper than in the Uruguay Round would be required to close the gap.

On the second front, the final column of Table 1 shows that a one-third cut in the bound tariffs on 'other manufactures' would bring its average down to each region's average applied rate for all goods, whereas for textiles and clothing a cut of about one-half would be needed. For agriculture (including processed food) the cut would have to be a massive four-fifths. The situation is even worse for the bulk agricultural products that are the focus of the OECD's monitoring and evaluation work. In 1999, average nominal assistance for these commodities was 58 percent which represented a transfer of \$356 billion, or \$11,000 per farmer, to rich country farmers, of which two-thirds was provided through distortions to market prices (OECD 2001).

By binding tariffs well above applied rates, countries have been able to vary applied tariffs below the binding so as to stabilize the domestic market in much the same way as the EU did with its system of variable import levies and export subsidies for farm products. Among other things, this means there has been little of the reduction in fluctuations in international food markets that tariffication was expected to deliver.¹

As if that weren't enough, a third front requires attention. Agricultural-importing countries agreed in the Uruguay Round to provide minimum market access

¹ Francois and Martin (1998) demonstrate, however, that since many agricultural tariffs are specific and farm prices fluctuate from year to year for seasonal reasons, binding those tariffs does lower both the mean and variance of their ad valorem equivalents over time, sometimes even when the bindings are well above the applied rates.

opportunities, such that the share of imports in domestic consumption for products subject rises to at least 5 per cent by the year 2000 under a tariff rate quota (less in the case of developing countries). Even though within-quota imports attract a much lower tariff than out-of-quota imports, such tariff rate quotas (TRQs) have several undesirable features: they legitimize a role for state trading agencies, they generate quota rents, they introduce scope for discriminating between countries, and they can reduce national welfare by much more than similarly protective import tariffs.

A number of these undesirable features of TRQs in food-importing countries – 1,366 of which have been notified to the WTO -- are illustrated in Elbehri *et al.* (1999). Table 2 summarizes some of the data from that study. The low in-quota and very high out-of-quota tariffs mean potentially huge benefits are going to the people fortunate enough to have been allocated quota licenses. In numerous cases quotas are far from being filled, however, one possible reason being that quotas are allocated (inadvertently or deliberately) to imports from high-cost suppliers incapable of making full use of them. And the fact that the quota often represents a high proportion, and sometimes 100 per cent, of actual imports suggests some out-of-quota tariffs are virtually prohibitive.

Thus, without underrating the Uruguay Round's achievement in establishing rules for agricultural trade and securing some farm policy reform, it has to be recognized that very limited progress has been made over the past five years via the WTO in reducing agricultural protection and market insulation. A great deal of farm reform remains to be undertaken relative even to textiles and clothing, let alone other manufactures. Nor are the distortions restricted to OECD countries: Table 1 shows that, despite bigger cuts during the Uruguay Round, developing countries' tariffs remain above those in the OECD in all three groups of goods.

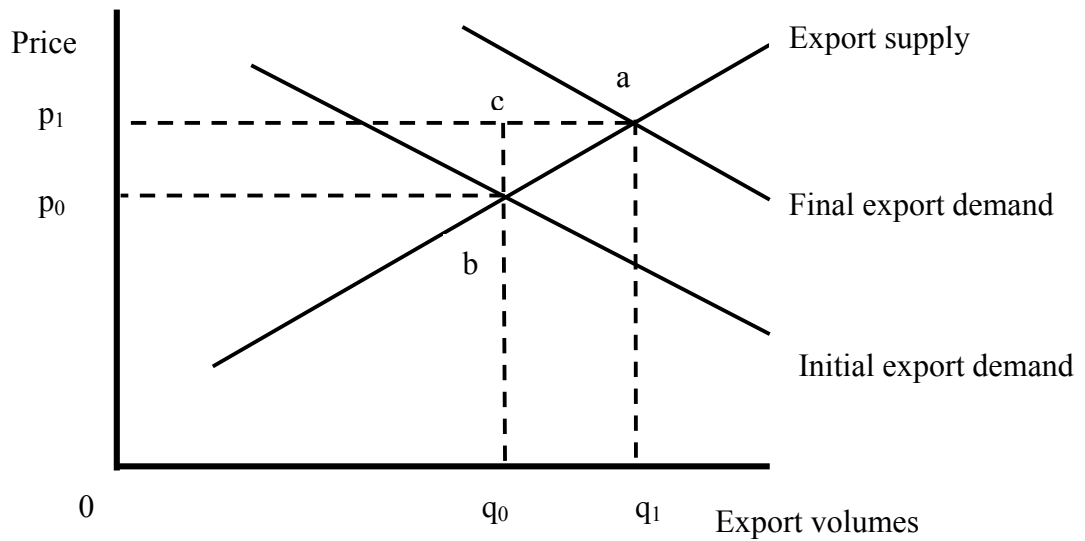
The benefits of liberalizing merchandise trade estimated in this study are particularly conservative in that they omit the effects of liberalizing measures such as excessively protectionist standards, which have been shown to impose sizeable barriers to developing country exports in some cases (Otsuki, Wilson and Sewadeh 2001). Another important omission is the protective effect of antidumping measures, which have been shown to discriminate much more heavily against the exports of developing countries than the industrial countries (Finger, Ng and Sonam 2000). As for services, the Uruguay Round certainly made a useful beginning via the General Agreement on Trade in Services, but very little actual liberalization has been delivered yet. So that too remains a huge area for gains from trade and investment liberalization.

Understanding the Welfare Impacts of Reform

The welfare gains from trade reform are widely quoted, but frequently poorly understood. Using models where production is characterized by constant returns to scale, the key impacts of the liberalization of trade policy reforms under consideration can be understood in terms of a relatively simple set of partial-equilibrium diagrams, which can be given a rigorous interpretation using the balance-of-trade function (see Martin (1997)). These diagrams allow the welfare impacts of reform to be broken up into those resulting from increases in allocative efficiency, and those resulting from changes in the country's terms of trade. However, the links between these two sources of welfare change are quite subtle, and warrant close consideration before examining actual estimates. Given our focus of attention on the benefits obtainable from improvements in market access, we examine these impacts first.

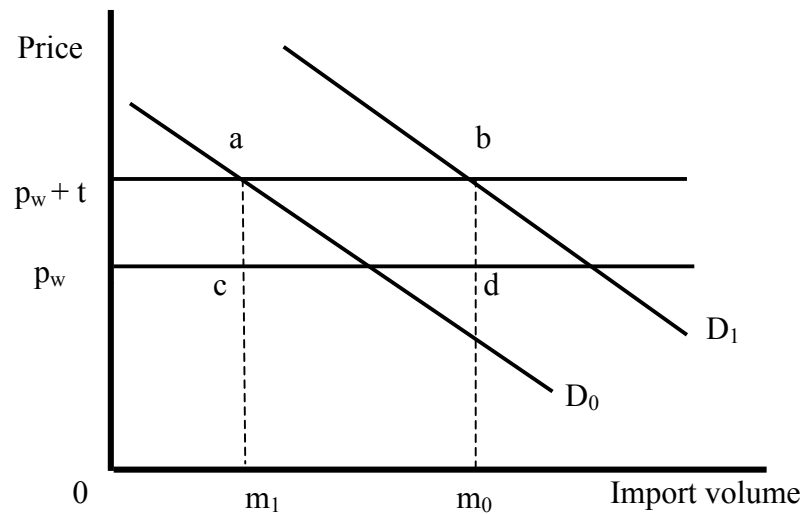
The reduction in the protection imposed on a country's exports shifts the demand curve for its exports to the right, as is shown in Figure 1. The result is an increase in the volume of exports, and an increase in the price received for these exports from p_0 to p_1 . The resulting increase in the price of exports creates welfare benefits to the exporter, measured in Figure 1 by the trapezoid p_1abp_0 . This area can be decomposed into a rectangle p_0bcp_1 associated with the increase in the value of initial-period exports, and a triangle acb associated with the induced increase in export volumes.

Figure 1 - Impacts of a reduction in the tariff facing a country's exports



When the exporting country has substantial trade barriers, there are likely to be some other welfare changes resulting from changes in the volumes of imports subject to distortions. Import volumes are generally likely to increase in part because of a shift of resources into production of exports and nontraded goods, and in part because of an increase in real incomes in the exporting country. Where these imports are subject to distortions, there will be a second-best increase in welfare because each unit of imports costs less on world markets than its value to users behind the tariff wall. In Figure 2, this effect is represented by the shift in the import demand curve for imports from partner countries from D_0 to D_1 , and the consequent gain in welfare is shown by the area $abdc$.

Figure 2 - *Impacts on import volumes passing across tariff barriers*



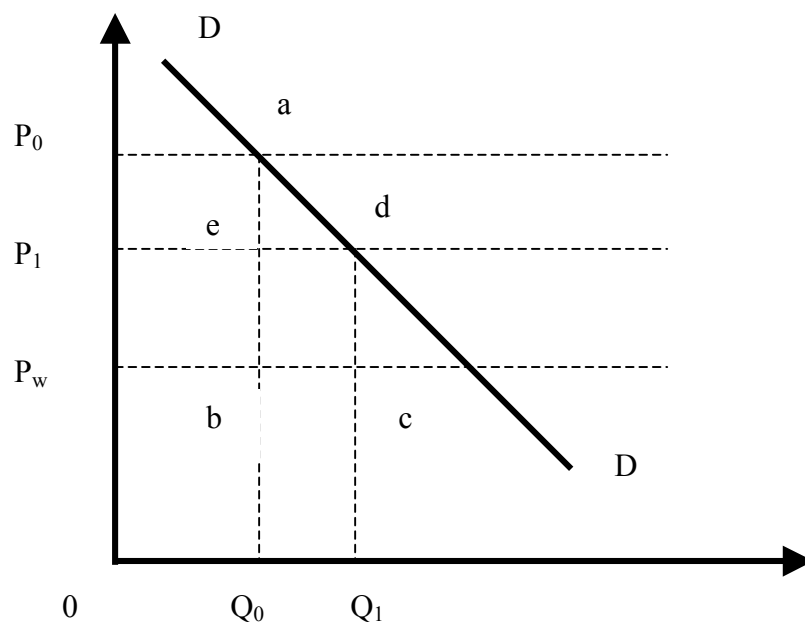
When the increase in access is on products directly supplied to the liberalizing market, there are likely to be increases in the country's import demands for several reasons. First, the rise in domestic prices resulting from the increases in prices for exports is likely to switch demand towards imported goods. Second, there will be changes in the volumes of imports resulting from changes in real incomes. While there is some controversy in the literature as to whether these should be included in measurements of welfare (Anderson and Martin 1996), they are included in money-metric measures of the type used in the GTAP model. However, in a multi-country, multi-commodity world, the sign as well as the magnitude of these impacts is likely to need to be evaluated empirically. Liberalization of commodities that are imported by the country of interest will result in a terms of trade loss to that country. If this product is also protected, there may well be a second-round loss as the volume of imports passing over the country's protective barriers declines (see Martin 1997 for the analytics of this case).

When a country reduces its own barriers, either autonomously or as part of a broader multilateral reform package, the direct impacts of this reform can also be demonstrated using a simple, diagrammatic approach, such as that in Figure 3. In this

figure, the demand for imports of a particular good is shown by the downward-sloping excess demand curve, DD. The initial level of protection is represented by the difference between the initial domestic price, P_0 , and the world price, P_w . When tariff protection is reduced, the domestic price falls to P_1 . An immediate consequence of this liberalization is an increase in the volume of imports, from Q_0 to Q_1 .

The welfare increase resulting from the reduction in protection is represented by the area abcd in Figure 3. This gain includes a “welfare triangle” ade associated with the decline in the price of imports as the quantity increases, and a second-best rectangle ebcd identifiable with increases in the volume of imports at final prices. An important point evident from careful inspection of Figure 3 is that the welfare gains from any given tariff reduction (say one percentage point) are larger the higher is the initial level of protection.

Figure 3. Implications of reductions in a country’s own protection rate.



While the diagrammatic treatment outlined above is useful for building intuition about the impact of trade reform measures, there are many simultaneous

interactions to consider and we use the GTAP global general equilibrium model to capture them. We consider both the elimination of tariff protection, and the abolition of rich-country quotas against developing-country exports of textiles and clothing. To represent these changes, we first project the structure of the world economy forward to 2005 using procedures outlined in the Appendix, and then abolish the protection that remains following the Uruguay Round.

Potential gains from further trade reform

Given the distortions² expected to remain in product markets by 2005 following Uruguay Round implementation, what would be the size and distribution of gains from moving to free trade as of 2005? Table 3 summarizes the model's estimated economic welfare benefits from such a reform or, equivalently, it summarizes the annual costs of continuing the distortions to merchandise trade. These are bare-bones comparative-static welfare estimates of the type measured in Figures 1 to 3. As noted previously, they do not include the adverse impacts of protection created by antidumping and safeguard measures, nor the protectionist use of standards. Further, they make no allowance for possible dynamic gains from trade expansion. The results suggest that if all such merchandise trade distortions were removed globally, an aggregate welfare gain of more than \$250 billion per year could be expected. And this does not include any gains from services trade and investment liberalization, from economies of scale and reductions in imperfect competition, or from dynamic effects of reform on investment. High-income countries reap the majority of those gains, but

² Due to limitations with the software used for aggregating the source data on tariffs, it was not possible to incorporate the effects of tariff preferences in the protection estimates in the model. This will clearly result in some over-statement of the benefits of liberalization to those countries that receive preferences. A fuller treatment of this question should be possible with the software (WITS) and data (TRAINS) nearing completion as part of a joint UNCTAD/World Bank project.

only just. Certainly low-income countries benefit much more as a percentage of GDP, given that they account for less than one-quarter of global GDP (Table 3).

Almost half (48 per cent) of the estimated global economic welfare gains (ignoring environmental effects) would come from agricultural and processed food policy reform in high-income countries. This is despite the fact that such products in those countries contribute only 4 per cent of global GDP and only six per cent of world trade. Another one-sixth of those global welfare gains would come from reform of farm and food policies of developing countries (defined here as in the WTO to include newly industrialized countries such as Korea).

Textiles and clothing reforms appear small by comparison with agricultural reform: their potential global welfare contribution is barely one-tenth that of agriculture's (7 per cent compared with 65 per cent). This big difference reflects three facts: one is that projected tariffs for agriculture are roughly 40% higher than those for textiles and clothing in 2005 (Table 1). Secondly, the WTO also aims to discipline the massive domestic subsidies provided to agriculture in the OECD countries. Finally, textiles and clothing contribute only 1.5 per cent to the value of world production, compared with 8 per cent for farm and food products.

However two assumptions are crucial in generating the results reported in Table 3. One is that China and Chinese Taipei are assumed to have joined the WTO and to have enjoyed the same accelerated access to OECD markets under the UR Agreement on Textiles and Clothing (ATC) as other developing countries that already are WTO members. The other crucial assumption is that high-income countries fully implement the ATC. There are, of course, real risks that the industrial countries might attempt to renege on their commitments to abolish these measures, although the almost painless abolition of Voluntary Export Restraints (VERs) under the Uruguay

Round, and the virtual elimination of new quotas under the ATC (Reinert 2000) provide some encouragement. Dropping either of those assumptions greatly reduces the estimated gains from Uruguay Round implementation (see the earlier Anderson *et al.* (1997a,b) analysis), and therefore would raise the potential gains from textile and clothing reform in the next and subsequent WTO rounds.

Even so, agricultural protection will remain far more costly to the world economy than barriers to textiles and clothing trade – and more than twice as costly as protection to other manufactures, despite the latter having much bigger shares in the value of world production, consumption and trade than farm and processed food products.

The distribution of the gains across regions that would result from full trade liberalization is also presented in Table 3. As always, most of the gains accrue to the liberalizing region. For example, all but one-tenth (11.6/122.1) of the gains from high-income countries removing distortions to their trade in farm and food products accrues to those high income countries themselves. Even so, that agricultural trade reform contributes more than one-quarter of the total welfare gains to developing countries from developed countries liberalizing their merchandise trade (11.6/43.1). As for developing countries liberalizing their own farm and food policies, three-quarters of the benefits from their farm reform would stay with the developing countries themselves (31.4/42.6), and those policies contribute almost half of the gains from those countries' overall merchandise trade reform (31.4/65.1). These large shares reflect not only the significant distortions in those countries but also the fact that the food and agricultural sector is such a large part of the economy of developing countries.

WTO members were right, therefore, to insist that agricultural reform must

continue into the new century without a pause. In particular, developing countries as a group have a major stake in the process of farm policy reform continuing: according to the model results in Table 4 farm and food policies globally contribute 37 per cent (42.6/114.7 or, equivalently, 16.7/45.1) of the cost to developing economies of global goods trade distortions. Textile and clothing policies also harm them greatly, and nearly as much as farm policies.³ Having said that, it needs to be stressed that distortions in other manufacturing markets are non-trivial too, especially for developing countries where they could boost welfare by \$50 billion per year if removed globally (slightly more than the \$43 billion from agricultural reform). It also needs to be stressed that the majority (more than three-fifths) of the gains from liberalization – even when considering broad groups of countries as in Table 4 – come from each country group’s own reforms rather than from the other group’s reforms.⁴

The regional distribution of gains

While there is considerable interest in the distribution of gains by developing countries as a whole, most attention focuses on the impacts of trade reforms on individual countries, or groups of countries. Table 4 spells out the impacts of reform on the 19 countries and regions identified in the analysis. The table considers only two reforms—agricultural and manufacturing—since the results in Table 3 suggest that this aggregation will be sufficient for most purposes.

Table 4 reveals that the gains from overall industrial country liberalization are very widely distributed. All regions in the model, except for the Middle East and North Africa (-\$1.07 bill.) and China benefit. The largest gains, by far, go to the

³ It should be recognized that these results ignore the effect of tariff preference erosion. In so far as a developing country receives such preferences at present in OECD markets, the above results slightly overstate the potential gains from their reforms.

European Union, which benefits enormously from the liberalization of its agricultural policies (\$60.81 bill.). Most developing country regions are found to benefit from reform of primary commodity trade in the industrial countries. The two sub-Saharan African regions in the model, in particular, are found to benefit from the reform. This indicates that the benefits to Africa from increased market access for their exports will outweigh the losses resulting from higher prices for commodities, and particularly agricultural commodities, that they import. This is valuable reassurance given the concerns of the net food importing countries about rising food prices following successful implementation of agricultural reform. However, some regions and countries within regions, are likely to suffer as a result of increases in the world prices of key agricultural goods and policy action to deal with these problems needs to be planned.

All developing country regions are found to benefit from industrial country liberalization of manufactures trade. Adding these gains to those from primary commodity reform gives an indication of the total impact of industrial country liberalization on developing countries. For all regions except the Middle East and North Africa, the total impact is positive. The largest developing-country gainers are the two Latin American regions of Brazil and Other Latin America, which gain a total of almost \$18 billion, mostly from agricultural trade reforms. India; China; Taiwan, China; and the Economies in Transition are also substantial gainers. The Sub-Saharan African countries collectively gain about \$2.5 billion per year.

Table 4 also shows the distribution of the \$65 billion in total gains to developing countries from their own liberalization. In most cases, the gains to developing country regions from developing country liberalization are larger than the

⁴ Notice that in the case of manufactures liberalization by high-income countries, elimination of those

gains from industrial-country reform. However, there are some exceptions, including China where developing country reform, including China's own reforms, generates negative welfare impacts. These contrast with the gains of close to \$30 billion estimated by Ianchovichina and Martin (2001) as resulting from the reforms associated with WTO accession, and highlight the point made in relation to Figure 3—that reforms beginning at a high level of protection generate the largest efficiency gains. The only other region to lose from developing country reform is the Middle East and North Africa.

When all developing countries liberalize together, there are efficiency gains from reducing own protection, gains from improved market access in each other's markets; potential terms of trade losses associated with increased export supplies and import demands; and potential terms of trade losses associated with increased competition in third markets. The losses to the Middle East and North Africa are primarily driven by terms-of-trade losses, and reflect increased competition in third markets for some of their exports.

Sources of Developing Country Impacts

The primary impact of rich country protection on developing countries is through changes in the prices that developing countries receive for their exports, and pay for their imports. However, as is clear from the second section of the paper, and from Martin (1997), other second-best impacts may need to be taken into account, particularly in highly distorted economies. This is important from an analytical point of view, since a first-order assessment of terms-of-trade impacts can be made with only information on price changes and countries' net trade positions, while second-

very low tariffs actually generates a small loss to these economies. This is because the efficiency gain from reducing those low tariffs is more than offset by a decline in the region's terms of trade.

best welfare evaluation requires a representation of the economy's behavioral response to the policy change.

To examine this question more closely, Table 5 provides estimates of the extent to which countries and regions gain (or lose) arise from changes in the terms-of-trade, or in allocative efficiency when the industrial countries liberalize their trade policies. For the industrial countries that are undertaking the liberalization, the allocative efficiency impacts are generally the most important, except in Australia/New Zealand, where the terms-of-trade impacts of agricultural trade reform loom large. However, in developing countries, the terms-of-trade impacts tend to dominate the allocative efficiency impacts for this shock, whose primary impact on developing countries is through their terms of trade. The allocative efficiency impacts are typically positive in those cases where reform stimulates activities that are taxed under the country's own trade regime, and negative in those where it stimulates the subsidized sectors.

In summary, it appears that the direct terms-of-trade impacts of increased market access dominate the second-best allocative efficiency impacts for most developing country regions. This is a similar finding to that of Hertel and Martin (2000) for global trade reform. However, it is in sharp contrast with the finding of Fukase and Martin (2000) that the induced efficiency impacts for Vietnam of improved market access to the US market accounted for around a third of the total gains even though the primary impact of this shock was through the terms of trade.

Results from Other Studies

Despite the attention focussed on the issue of market access, very few studies have estimated the welfare impacts of increases in this access—although many have

estimated the impacts on export values. However, several studies of post-Uruguay Round liberalization are available to provide a benchmark against which our aggregate welfare results may be compared. This body of literature is surveyed by the World Bank (2001). From this survey, it appears that our estimate of the global welfare impacts of liberalization is in the middle of the range.

The study by Dessus, Fukasaku and Safadi (1999) for the OECD Development Centre reports much smaller static gains (\$82 billion) from global trade liberalization under similar assumptions to those that we have used. The difference cannot be explained in terms of the base year— the OECD results are reported in 2010. The likely main explanation for the difference is use of the standard GTAP trade elasticities, which are intended to represent a 3 – 5 year period, in the OECD study. In this study, we adopt larger values, intended to capture longer run substitution possibilities (see appendix).

The Australian Department of Foreign Affairs (1999) study uses a methodology very similar to ours, except that it uses different estimates of the magnitude of barriers to trade. This study estimates the global gains from complete liberalization of merchandise trade to be around \$250 billion per year. An interesting feature of the Australian study is its estimate of the potentially large gains from liberalization of services trade at around \$500 billion per year. The results presented do not allow the gains from improved market access in industrial countries to be identified. A recent study by Dee and Hanslow (2000) examines the implications of liberalizing market access for both merchandise and services trade. It estimates the gains from each to be around \$133 billion per year, of which roughly \$80 billion accrues to developing countries.

World Bank (2001a) estimates the benefits from global liberalization of merchandise trade to be \$344 billion per year. This result is higher than that reported in this paper for a number of reasons, including use of the GTAP 5 database for 1997, in which agricultural protection estimates are generally higher.

All of the studies examined thus far have focussed on increases in market access undertaken on an MFN basis. Another relevant comparison is with increases in market access given on a preferential basis on which there have been many initiatives as part of the confidence-building measures for least developed countries at the WTO. Thirty countries have made such market opening offers, with two countries, Norway and New Zealand, offering to drop all barriers to LDC exports, and the EU proposing liberalizing everything but arms.

A recent study by Ianchovichina, Mattoo and Olarreaga (2001) provides estimates of the benefits of this type of market access to Sub-Saharan Africa. They conclude that elimination of tariffs on exports from Sub-Saharan African countries to the Quad (Canada, EU, USA and Japan) countries would increase real incomes in the region by roughly one percent per year, an increase in the same order of magnitude as our estimate for non-discriminatory liberalization. This suggests that the gains from nondiscriminatory, multilateral discrimination are of the same order of magnitude as those obtainable from preferential access to the Quad. Given the choice, there is a number of reasons to prefer the nondiscriminatory reform. Under the preferential approach to liberalization, some of the gains come at the expense of other developing countries whose exports are displaced. Further, the multilateral approach avoids locking poorer countries in to the production of commodities in which market access is valuable because of high protection in the importing country, rather than because of comparative advantage in the exporting country.

A number of studies have added a productivity term estimated from the relationship between trade openness and growth, and find that these greatly increase the measured gains from trade. Dessus, Fukasaku and Safadi (2000, for example, report an increase in their global welfare gains from \$80 billion to \$1200 billion when this term is introduced. World Bank (2001a) incorporates dynamic impacts at the sectoral level and finds an increase from \$344 billion per year to \$759 billion. Serious questions about the direction of causality in this relationship have been raised by Rodrik (2000). However, Dollar and Kraay (2001) find that correction for the resulting endogeneity actually increases the estimated coefficient in their augmented growth regression. While it seems likely to us that there are large benefits from increased openness when other policy pre-conditions are in place, the wide variation in the currently available estimates gives rise to concern about their robustness.

Conclusions

A key conclusion of this study is that, despite a great deal of liberalization in the Uruguay Round and through countries' unilateral trade reforms, a much protection remains in both industrial and developing countries. Protection levels are generally low in the industrial countries, except in agriculture and in textiles and clothing, which are areas of particular interest to developing countries. Although they have declined substantially, protection levels remain higher in developing countries than in industrial countries.

In this situation, a key question is whether developing countries should focus on increasing their access to industrial country markets, or whether the greatest gains are obtainable through reductions in their own protection levels. The approach used in this study allows the relative benefits obtainable from these sources to be identified and measured. The results suggest that there are large benefits obtainable from

increases in access to industrial country markets for goods, with an aggregate potential gain to developing countries from this source of \$43 billion per year. Put another way, this is the cost to developing countries of industrial countries' post-Uruguay Round protection. The cost of developing countries own protection, taken as a group, is even higher, at \$65 billion per year.

These overall welfare results obtained in the model-based analysis are within the (broad) range of estimates obtained from similar modeling studies of post-Uruguay Round trade liberalization. A review of the literature concludes also that the gains identified in this study could be augmented considerably by liberalization of trade in services.

The results of this study provide support for approaches to liberalization that both expand market access to developing countries' exports, and liberalize trade policies in developing countries themselves. While the majority of the gains from such a reform would come from liberalization in the developing countries' themselves, around 40 percent of the gains to developing countries would come from increases in market access in industrial countries. Clearly, the results of this study suggest that there would be great benefits to developing countries from a round of trade negotiations that reduced barriers in both North and South.

Appendix: GTAP projections to 2005

Methodology: We employ the widely used GTAP model of global trade (Hertel 1997) that is implemented using GEMPACK (Harrison and Pearson 1996), together with Version 4 of the GTAP data base that is comprehensively documented in McDougall *et al.* (1998). GTAP 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 simplifying assumptions of perfect competition and constant returns to scale in production activities.⁵ 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 world trade patterns. However, Gehlhar's work showed that projections over a period of one decade were substantially improved by doubling the trade elasticities. This result has been supported by recent estimates by David Hummels (2000), who estimates Armington elasticities comparable in magnitude with the doubled estimates. Accordingly, for this work, we have doubled the size of the standard GTAP trade elasticities.

Overall rates of economic growth: Following earlier projections work with the GTAP model (Gehlhar, Hertel and Martin 1994, Hertel *et al.* 1996, Anderson *et al.* 1997a,b, Arndt *et al.* 1997), we assemble external projections for population, skilled and unskilled labor, investment and capital stock (see Appendix Table A). 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 other variables. Our forecasts for these fundamental drivers of change over the 1995-2005 period are reported in Hertel *et al.* (2000). 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 end-point. 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 according 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. The latter two countries seem to be growing at rates that cannot be explained with normal rates of productivity growth. Sectoral variation in productivity growth builds on the econometric work of Bernard and Jones (1996) and Martin and Mitra (2000). Bernard and Jones (1996) found that the annual rate of productivity growth over the 1970-87 period in OECD agriculture was about 40% faster than that of manufacturing. Similarly, services TFP growth was about half that in manufacturing, while they did not measure 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.

⁵ Alternative versions of the GTAP model feature imperfect competition (see Francois 1998), but these are very demanding of additional information and unstable for projections purposes.

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 agricultural and other 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 farmland and 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, we compared our projected GDP growth rates over this period with those from the World Bank's Development Prospects Group. By and large they are quite close. This is 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. We have opted not to do either of these, and so our forecasts are higher for these three regions. 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 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. China's WTO offer was obtained from the World Bank and is based on their offer as of August 1999. It is compared to their applied tariffs for 1997 and, where the bindings are lower, the offer is taken as a change in policy. Otherwise, the 1997 applied rates are used. Our treatment of Taiwan's offer is based on their announced target of 4% average tariffs for manufactures. We reduce all bilateral tariffs by an equi-proportionate amount sufficient to achieve this target in the updated database.

In the case of mining and manufactures protection, this approach does not generate large changes in tariffs for most regions. The exceptions are South Asia and China. However, the Agreement on Textiles and Clothing is anticipated to have a large impact on trade as it implements accelerated growth of quotas established under the previous Multi-fiber Agreement, culminating in their abolition at the end of the UR implementation period. China and Taiwan, as non-members of the WTO, remain constrained by the old, MFA quotas. Thus their accession brings important changes in the textiles and clothing trade. While it is unlikely that their accession will culminate in the complete elimination of China and Taiwan's clothing quotas by the year 2005, we assume that this will follow soon after, and that it will largely be complete before any cuts under a new WTO Millennium Round would take place. For this reason, we include their abolition in our baseline analysis as well.

Agriculture and services are more problematic. In the case of services, we believe that there is little in the UR commitments which can be effectively quantified and so we have not implemented policy changes there. On the other hand, quite a bit of quantification has been undertaken for agriculture. It must be pointed out that our base year, 1995, represents a period 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 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, and

we have implemented in our baseline projections to 2005.⁶ As a result, the estimated average MFN tariff on food products, by importer in 2005, show the rest of world (ROW), Japan, Taiwan and South Asia all having very high rates of protection. Western Europe shows relatively low protection rates, since its intra-EU trade is very significant and not subject to tariffs. The agricultural-exporting regions of Australia/New Zealand, Brazil and North America show the lowest tariff equivalents when averaged across all food products.

Structural Changes 1995-2005: The projected export orientation of manufactures rises over this period in most developing countries where the combination of deep tariff cuts and removal of the textile and apparel quotas results in a strong increases in the share of manufactures output destined for export markets. In contrast, agriculture, with no further substantial liberalization over the projections period, becomes somewhat more inward-oriented. The same is true of other primary industries, which were very outward-oriented at the beginning of the projections period (1995). This is the result of relatively rapid growth in the developing countries fueling the demand for basic raw materials. The 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. The trend towards increased reliance on manufacturing exports is also projected to continue. We project that by 2005, nearly 45% of developing country merchandise exports will be to other developing countries and 80% of total developing country merchandise exports will be manufactures.

⁶ Since China and Taiwan's offers are not linked to the UR base year, it would make sense to include their agricultural cuts in our baseline. However, we do not have solid estimates of their current protection rates and, at least in China's case, some of the bindings are clearly well above current protection levels. Therefore, we do not change their agricultural protection rates in the baseline simulation either.

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Table 1: Depth of Uruguay Round tariff cuts and post-UR bound and applied tariffs on imports, by sector and region

	Depth of UR cut in bound tariff rate t (as % of $1 + t$)	Post-UR bound tariff rate (%)	Post-UR applied tariff rate (%)	Depth of cut needed in bound tariff rate t (as % of $1 + t$) to bring it down to sector's post-UR applied rate	Proportional cut needed in bound tariff rate t (as % of t) to bring it down to region's post-UR average applied rate
<i>AGRICULTURE</i>					
OECD countries	1.5	15	14	0.9	83
Developing economies	4.7	60	18	26.3	78
All WTO members	2.6	24	14	8.1	82
<i>TEXTILES & CLOTHING</i>					
OECD countries	1.4	11	8	2.7	76
Developing economies	4.1	24	21	2.4	45
All WTO members	1.6	12	10	1.8	53
<i>OTHER MANUFACTURES</i>					
OECD countries	1.0	4	3	1.0	35
Developing economies	2.7	20	13	5.8	34
All WTO members	1.3	6	4	1.9	35

Source: Finger and Schuknecht (1999).

Table 2: In-quota and out-of-quota tariff rates and estimated maximum TRQ quota rents, selected agricultural products and OECD countries, 1996

	<i>In-quota ad valorem Tariff, %</i>	<i>Out-of-quota ad valorem Tariff, %</i>	<i>Maximum quota rents (\$US billion)</i>	<i>Quota fill ratio, %</i>	<i>Quota as a % of total imports</i>
European Union					
Wheat	0	87	0.0	21	2
Grains	35	162	0.4	74	26
Sugar	0	147	2.4	100	87
Dairy	24	91	1.1	99	80
Meats	19	128	2.3	100	73
Fruits & vegetables	11	51	0.0	78	20
United States					
Sugar	2	129	1.0	97	76
Dairy	11	70	0.6	77	95
Meats	5	26	0.0	67	102
Canada					
Wheat	1	49	0.0	27	218
Grains	1	58	0.0	5	2400
Dairy	7	262	0.3	100	75
Meats	2	27	0.0	124	72
Japan					
Wheat	0	234	3.4	109	95
Grains	0	491	10.8	109	84
Dairy	29	344	2.8	93	91
Korea					
Rice	5	89	0.0	100	53
Grain	3	326	1.9	148	61
Oilseeds	8	545	0.0	157	62
Dairy	21	106	0.0	85	106
Meats	40	42	0.4	97	77
Fruits & vegetables	47	305	0.0	99	83

Source: Elbehri, Ingco, Hertel and Pearson (1999).

Table 3: Sectoral and regional contributions to the economic welfare gains^a from completely removing trade barriers globally, post-Uruguay Round, 2005

in 1995 US\$ billions

Liberalizing Region:	<i>Benefitting region:</i>	Agriculture And Food	Other Primary	Textiles & Clothing	Other Manufactures	Total
High Income						
	<i>High Income</i>	110.5	-0.0	-5.7	-8.1	96.6
	<i>Low Income</i>	11.6	0.1	9.0	22.3	43.1
	Total	122.1	0.0	3.3	14.2	139.7
Low Income						
	<i>High Income</i>	11.2	0.2	10.5	27.7	49.6
	<i>Low Income</i>	31.4	2.5	3.6	27.6	65.1
	Total	42.6	2.7	14.1	55.3	114.7
All Countries						
	<i>High Income</i>	121.7	0.1	4.8	19.6	146.2
	<i>Low Income</i>	43.0	2.7	12.6	49.9	108.1
	Total	164.7	2.8	17.4	69.5	254.3

(b) in per cent of total global gains

Liberalizing Region:	<i>Benefitting region:</i>	Agriculture and Food	Other Primary	Textiles & Clothing	Other Manufactures	Total
High Income						
	<i>High Income</i>	43.4	0.0	-2.3	-3.2	38.0
	<i>Low Income</i>	4.6	0.1	3.5	8.8	16.9
	Total	48.0	0.0	1.3	5.6	54.9
Low Income						
	<i>High Income</i>	4.4	0.1	4.1	10.9	19.5
	<i>Low Income</i>	12.3	1.0	1.4	10.9	25.6
	Total	16.7	1.1	5.5	21.7	45.1
All Countries						
	<i>High Income</i>	47.9	0.1	1.9	7.7	57.5
	<i>Low Income</i>	16.9	1.0	4.9	19.6	42.5
	Total	64.8	1.1	6.8	27.3	100.0

^a No account is taken in these calculations of the welfare effects of environmental changes associated with trade liberalization, which could be positive or negative depending in part on how environmental policies are adjusted following trade reforms. Nor are services distortions taken into account.

Source : Hertel *et al.* (2000), produced with the help of new software developed by Ken Pearson.

Table 4. Gains from Merchandise Trade Liberalization, 1995 \$billion

	Rich Country Liberalization			Developing Country Liberalization.			Global Libn	
	Total	Primary	Manufactures	Total	Primary	Manufactures	All merchandise	
	\$bil	\$bil	\$bil	\$bil	\$bil	\$bil	\$bil	%
North America	2.57	11.37	-8.80	19.41	8.51	10.91	21.99	0.2
Western Europe	50.29	60.81	-10.52	20.68	2.02	18.66	70.97	0.7
Australia/New Zealand	7.69	8.25	-0.55	1.83	1.23	0.60	9.53	2
Japan	36.02	29.98	6.04	7.69	-0.33	8.02	43.71	0.8
China	5.01	-4.63	9.64	-10.79	-3.60	-7.19	-5.78	-0.4
□aiwán, China	3.04	0.77	2.27	3.48	-1.18	4.66	6.52	1.5
Other NIEs	0.93	-2.89	3.82	20.61	13.15	7.46	21.54	2.7
Indonesia	0.63	0.16	0.47	1.38	0.22	1.16	2.00	0.9
Other SE Asia	0.43	-0.90	1.33	10.25	5.67	4.59	10.69	2.6
India	3.69	0.68	3.01	5.14	1.90	3.24	8.83	1.8
Other S. Asia	1.37	0.12	1.25	5.22	3.02	2.20	6.59	4.6
Brazil	3.11	1.44	1.67	13.29	4.59	8.71	16.41	2
Other Latin America	14.83	14.25	0.57	4.47	2.75	1.73	19.30	2.4
Turkey	0.12	-0.59	0.71	1.94	0.60	1.33	2.05	0.9
Middle East & N. Africa	-1.07	-2.81	1.74	-0.71	-0.35	-0.36	-1.78	-0.2
Economies in Transition	4.49	1.21	3.28	1.90	2.30	-0.40	6.40	0.7
S. African C. Union	0.86	0.76	0.10	0.51	0.38	0.13	1.36	0.9
Other Sub-Saharan Africa	1.72	1.58	0.14	1.49	1.23	0.27	3.22	1.4
Rest of world	3.92	2.62	1.30	6.87	3.24	3.63	10.79	3
<i>Developing</i>	43.08	11.77	31.31	65.06	33.90	31.17	108.14	
<i>Industrial</i>	96.58	110.41	-13.83	49.61	11.43	38.18	146.19	
<i>LMICs</i>	39.11	13.89	25.22	40.97	21.92	19.05	80.08	
Total	139.65	122.18	17.48	114.68	45.33	69.35	254.33	

Note: The definition of developing countries in this table follows WTO practice of self-declaration. The Low and Middle Income (LMIC) group is based on World Bank income criteria and excludes Taiwan, China and the Other NIEs.

Table 5. Terms-of-Trade and Allocative Efficiency Effects of Rich Country Liberalization (\$US 1995 billion)

Industrial country libn	Total	Terms-of-Trade	Allocative Efficiency
North America	2.57	0.97	3.54
Western Europe	50.29	-46.21	95.12
Australia/New Zealan	7.69	7.48	0.32
Japan	36.02	-9.74	46.89
China	5.01	7.14	-1.62
Taiwan, China	3.04	3.31	0.04
Other NIEs	0.93	1.43	-0.81
Indonesia	0.63	0.69	0.07
Other SE Asia	0.43	1.83	-1.39
India	3.69	3.43	0.33
Other S. Asia	1.37	1.18	0.13
Brazil	3.11	2.85	0.30
Other Latin America	14.83	13.26	1.46
Turkey	0.12	0.42	-0.30
Other ME & N. Africa	-1.07	-0.17	-0.91
Economies in Transition	4.49	5.90	-1.20
S. African C. Union	0.86	1.05	-0.22
Other Sub-Saharan Africa	1.72	2.46	-0.58
Rest of world	3.92	2.33	1.06
<i>Developing</i>	43.08	47.08	-3.66
<i>Industrial</i>	96.58	-47.50	145.87
Total	139.65	0.00	142.21

Note: The approach taken is that of Huff and Hertel (2001). The decomposition presented omits the effects of changes in the marginal utility of income and hence does not precisely add.

Appendix Table A: Projected Cumulative Percentage Growth Rates, 1995 to 2005
(annual growth rates (%) in parentheses)

Regions	Population	Unskilled Labor	Skilled Labor	Physical 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 a multiple of this rate 1.4 (agriculture), 0.5 (services) and 0.0 (mining).

Source: Hertel *et al.* (2000).

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