Potential gains from trade reform
in the new millennium

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Abstract

This paper seeks to show with new GTAP results that traditional market access reform still has a major contribution to make to economic welfare in both rich and poor countries. Agriculture and textiles have the most to contribute in goods, but there are also huge gains to be made in services. Estimating the effects of trade reform is complicated, however, by the presence of the agricultural tariff rate quotas, by tariffs being bound well above applied rates in numerous cases, and by the complexities of modelling reform in services. Since it is the bound rates that are negotiated down, we show that modelling reform as cuts to applied rates (as GTAPers have done to date) can overstate greatly the likely gains from partial reform in the next WTO round.

Keywords: WTO, millennium round, trade liberalization, CGE modelling

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At the Third Ministerial Meeting of members of the World Trade Organization (WTO), held in Seattle in late 1999, the decision to launch a new comprehensive round of multilateral trade negotiations (MTNs) was postponed, as no agreement could be reached on an agenda. This set-back does not mean an end to all WTO trade negotiations, however, as a number of existing WTO agreements—most notably on agriculture and services—embody a "built-in" negotiating timetable. Talks on these subjects re-started in the first quarter of 2000, and efforts to agree on a broader agenda are ongoing as of this writing. With the US Presidential elections out of the way by the end of 2000, the next comprehensive MTN round is expected to be launched sometime in 2001.

Despite major reforms in the recent past, the potential gains from further conventional trade liberalization 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. There seemed to be little understanding of this fact by many groups in Seattle, where much of the focus was on 'new issues'. Even less well understood are the *relative* contributions to those potential gains from the various sectoral policies in different country groups. Reducing such misunderstandings is a necessary part of building support for launching a new WTO round, and it can help trade negotiators prioritize their efforts.

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. To do that, use is made of the global economy-wide model known as GTAP (Global Trade Analysis Project – see Hertel 1997).

The study first examines the 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, the patterns of changes since the 1960s are used as a basis for projecting the world economy through to 2005. The results, shown across five sectors and across the two key country groups, make it clear that even after the full implementation of Uruguay Round commitments, huge 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 both sets of countries it is poor households that would gain most in terms of the proportionate boost to their living standards. Even the poor in developing countries who are net buyers of food could benefit from agricultural reform, because the boost in earnings of unskilled workers may more than compensate for the rise in the price of the food those people consume.

The structure of protection post-Uruguay Round

There are major gains to be had from a 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;

- Textiles and clothing producers in key developed countries continue to benefit from 'voluntary' restrictions on exports of those products from developing countries (the promised phase-out of which is likely to be followed by safeguard measures);

- Developed-country imports of some manufactures are subject to tariff peaks, and exports are constrained by tariff escalation (whereby the importation of raw material is subject to much lower tariffs than imports of 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 countries' imports (especially for agricultural goods) and for most imports of developing countries, which means applied tariffs can be raised at will so long as they remain below the bound rates previously agreed to; and

- In both rich and poor countries, barriers to services trade and investment, and to foreign involvement in 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 especially.

The extents of the cuts needed are 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 applied rate average for all goods, whereas for textiles and clothing a cut of

about one-half would be needed and for agriculture (including processed food) the cut would have to be a massive four-fifths.

Binding tariffs well above applied rates has also allowed countries to vary applied tariffs below the binding so as to stabilize the domestic market in much the same way as the EU has done in the past 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 also to provide minimum market access opportunities, such that the share of imports in domestic consumption for products subject to import restrictions 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.

More specifically, Anderson (1999) shows that:
- in the presence of TRQs the national welfare cost of agricultural protection can be considerably greater than under a similarly protective tariff-only regime, and that cost tends to rise more when there is (as in the latter 1990s) a fall in international food prices;
- with a TRQ regime, a cut in the out-of-quota bound tariff may have only a fraction of the effect on prices and quantities traded (and possibly none at all) of a cut of the same size under a tariff-only regime, not only when the bound rate exceeds the applied rate but also when the applied rate is above the prohibitive tariff in the presence of a TRQ;
- the effect of a tariff cut on national welfare, by contrast, may be much greater when a TRQ rather than a tariff-only regime is in place, depending on how the quota is being administered before and after that reform; and
- an expansion of the market access (quota) commitment need not expand trade, nor economic welfare, for it is always possible for the quota administrator to allocate the quotas so as to ensure under-fill such that no more or even less imports in total flow in.

Models such as GTAP are in principle capable of handling these TRQ-type complications through careful additional programming. However, to generate reliable numbers requires also assimilating a much greater volume of policy data than is required when a simple tariff-only regime exists. Until all those data are collected and added appropriately to the model databases, model results of the effects of a cut in the

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[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, even when the bindings are well above the applied rates.

bound tariff will necessarily over-estimate price and quantity effects but may under-estimate the welfare effects of reform (depending in part on the extent to which TRQs generate more directly-unproductive lobbying effort than equally protective 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 those 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.

The aggregate level of domestic support (AMS) for industrial-country farmers is to be reduced to four-fifths of its 1986-88 level by the turn of the century. That too will require only modest reform in most industrial countries, partly because much of the decline in the AMS had already occurred by the mid-1990s. This has been possible because there are many forms of support that need not be included in the calculation of the AMS, the most important being direct payments under production-limiting programs of the sort adopted by the US and EU. A risk that needs to be curtailed is that the use of such "blue box" instruments, as with exempt "green box" instruments such as quarantine and environmental provisions, may spread to other countries and other commodities as the use of farm income support via trade and direct domestic price support measures is gradually curtailed through the WTO.

Thus, without underrating the Uruguay Round's achievement, including 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.

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. Measuring the extent of distortions to services remains problematic, however, a point to which we return below.

Regional shares of world production, consumption and trade

Notwithstanding the slow multilateral progress in trade policy reform, the world is becoming ever-more integrated. During the 1980s and 1990s especially, domestic policy reforms, the freeing up of financial and foreign exchange markets, and the digital revolution have all contributed to make the global economy even more open and interdependent than it was in the late nineteenth century (Baldwin and Martin

1999; Bordo, Eichengreen and Irwin 1999). The resulting boost to economic growth and integration within and between countries, particularly due to the fall in communications costs, shows no sign of abating. Indicators of the integration trend include increases in exports and imports as a percentage of GDP (doubled since the 1960s), in the tradability of an ever-wider range of services (which now account for more than one-sixth of the world's total goods and services trade), in the share of investment that is foreign (FDI has grown more than twice as fast as exports of goods and services since the mid-1980s), and in the proportion of firm mergers and acquisitions that are across national borders (almost 30 per cent, up from 5 per cent in the early 1980s).[2]

The landscape of production, consumption and trade in the world economy has been changing rapidly as a consequence of these technology and policy developments and of the income and investment growth that has accompanied them. We focus here just on the market patterns as they affect the distribution of gains from further trade reform. Specifically, attention focuses on just two country groups, developed ('high income') and developing ('low income'), and on five product groups (agriculture and processed food, other primary, textiles and clothing, other manufactures, and services).

The patterns of changes since the 1960s are used to project the world economy though to 2005, when Uruguay Round implementation will be complete and when the implementation of commitments to be made during the next WTO round could be getting under way. The projection requires numerous assumptions about growth rates in the underlying drivers of change including factor endowments, technological progress and policy assumptions, as well as a model of the world economy (in this case GTAP). For example, our projections assume both China and Taiwan will have joined the WTO and will have enjoyed accelerated access to North American and West European textile and clothing markets through to 2005, and that all the reform commitments made during the Uruguay Round (including the controversial ones in the Agreement on Textiles and Clothing) will be fully implemented by then. (Our model and projections methodology are detailed in Hertel *et al.* (2000) and summarized in the Appendix.)

Table 3 summarizes the global composition of production, consumption and trade as projected by us to 2005. What is clear is that the two most heavily protected goods sectors, agriculture and textiles, together account for less than one-tenth of global production and one-sixth of household consumption expenditure even at protection-distorted prices. The shares are even lower in high-income countries, but somewhat larger in poorer countries. Services, on the other hand, account for two-thirds of the global economy (three-quarters in high-income countries, one-half in low-income countries). As for international trade, agriculture and textiles each account for only 7 or 8 per cent of all product trade. Textiles are far more important as export earners in poor countries than in rich countries, and agriculture would be too were it not for the subsidies provided to farm production and exports in high-income countries.

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[2] See World Bank (1999) and UNCTAD (1999, Figure III.4).

Potential gains from further trade reform

Given the above production, consumption and trade patterns and the distortions 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 4 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. It suggests 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, and from dynamic effects of reform on investment. High-income countries reap the majority of those gains, but only just. Certainly low-income countries benefit much more as a percentage of GDP, given that they account for no more than one-fifth 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 two facts: one is that projected distortions to prices for agriculture are roughly twice those for textiles and clothing in 2005 (Table 1); the other is that textiles and clothing contributes only 1.5 per cent to the value of world production, compared with the 8 per cent share for farm products (Table 3).

However, two assumptions are crucial in generating the results reported in Table 4. One is that China and Taiwan are assumed to join the WTO soon and to enjoy 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. The latter is far from certain to happen though, particularly once China joins WTO and especially if it were to phase out its 'voluntary' export restraints (VERs) on textiles and clothing by 2005. Dropping either of those assumptions reduces very substantially 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 would 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 clear from Table 4. 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 countries. Even so, that farm 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, but nowhere near 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 complementary groups of countries as in Table 4 – come from each country group's own reforms rather than from the other group's reforms.[4]

Refining the estimates

What about services trade and investment reforms? Measuring their magnitude and effects remains problematic. Various brave attempts have been made to quantify them recently (e.g. Francois 1999, DFAT 1999, Dee and Hanslow 2000, Findlay and Warren 2000), and our own efforts continue. All those attempts suggest the welfare gains from reforming this sector are huge, probably much bigger than from goods trade reform,[5] but the range of estimates at this stage is very wide. This remains a hugely under-invested area for quantitative analysis. Even if better statistics on bilateral services flows were available, we would need much more consensus on how to represent the distortions to those flows in models such as GTAP before we could expect policy practitioners to take estimates of their effects seriously.

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[3] It should be recognised 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.

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

[5] See, for example, Francois and Wooten (1999) on maritime services alone.

In the goods area, further work on including the effects of agricultural tariff rate quotas is needed, particularly for estimating the effects of partial (i.e. realistic) as distinct from total reforms. More generally, the GTAP data base badly needs a set of bound tariffs in addition to the applied rates currently in the data set for analysing partial reforms. This is because negotiations and agreements refer to the bound rates. Given that they are so much above applied rates (Table 1), GTAP results for reforms such as 'a one-quarter cut in tariffs' will overstate the effects hugely. Indeed for a large number of countries and commodities, a one-quarter reduction could have no trade effect because the bound rates are more than one-third above applied rates. This is one of the reasons modellers of the Uruguay Round reforms overstated the gains that could be expected – for which they have had to suffer some criticism.

Another reason for overstating the gains from the Uruguay Round, again particularly for developing countries, was because preferential tariff as under the Generalized System of Preferences and the Lome Convention are not included in the GTAP data base. It is surprising that UNCTAD has not made the compilation of those data a priority. Once that were done, it would be relatively easy to incorporate it. How large an impact it would have on the results is a moot point. It may be very minor in aggregate, even though it is non-trivial for many tiny developing countries.

Finally, more focus on the adjustments involved in trade reform is required (Francois 1999a). Even comparative static models give an indication of the degree of shrinkage that would follow when a highly protected sector is liberalized. Dynamic models can do better through indicating also the path of adjustment. Estimates of that sort, and of the gross benefits and costs to various market participants, typically are going to interest policy makers much more than just the net national economic welfare benefits as summarized above. Providing convincing numbers in this way may well be a necessary, if not a sufficient, condition for larger government funding of CGE modelling.

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 (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 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]

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

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[6] 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.

[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.

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). They find 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.

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 to those from the World Bank's International Economic Analysis and Prospects Division. 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 of 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.[8] 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

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[8] 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.

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.

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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
ARGICULTURE					
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
TEXTILES & CLOTHING					
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
OTHER MANUFACTURES					
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

	In-quota ad valorem Tariff, %	Out-of-quota ad valorem Tariff, %	Maximum quota rents ($US billion)	Quota fill ratio, %	Quota as a % of total imports
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 shares of GDP, private household consumption and exports, post-Uruguay Round in 2005

	Agriculture + food processing	Minerals and fuels	Textiles and clothing	Other manu-factures	Services	All products
(per cent)						
SECTORAL SHARES OF REGIONAL GDP:						
High income countries	5	3	0.8	19	72	100
Low income countries	19	9	4.4	16	52	100
ALL COUNTRIES[a]	8	4	1.5	18	68	100
REGIONAL & SECTORAL SHARES OF GLOBAL GDP:						
High income countries	4	2	0.6	15	58	80
Low income countries	3	1	0.7	3	8	16
ALL COUNTRIES[a]	8	4	1.5	18	68	100
SECTORAL SHARES OF REGIONAL HOUSEHOLD CONSUMPTION						
High income countries	10	0	2.6	11	75	100
Low income countries	29	2	4.9	14	50	100
ALL COUNTRIES	**15**	**1**	**2.6**	**12**	**70**	**100**
REGIONAL & SECTORAL SHARES OF GLOBAL H'HOLD CONSUMPTION						
High income countries	8	0	1.6	9	59	79
Low income countries	7	0	1.0	3	11	21
ALL COUNTRIES	**15**	**1**	**2.6**	**12**	**70**	**100**
SECTORAL SHARES OF REGIONAL EXPORTS:						
High income countries	8	3	3	68	18	100
Low income countries	7	11	16	51	16	100
ALL COUNTRIES	**8**	**6**	**7**	**62**	**17**	**100**
REGIONAL & SECTORAL SHARES OF GLOBAL EXPORTS:						
High income countries	6	2	2	45	12	65
Low income countries	2	4	5	17	5	35
ALL COUNTRIES	**8**	**6**	**7**	**62**	**17**	**100**

[a] Includes 'Former Soviet Union and Central Europe' and 'Rest of the World', hence is not just the weighted sum of rows 1 and 2, in the case of GDP; for other indicators these countries are included with developing countries.

Source: Hertel *et al.* (2000), calculated using the GTAP data and model.

Table 4: Sectoral and regional contributions to the economic welfare gains[a] from completely removing trade barriers globally, post-Uruguay Round, 2005

(a) in 1995 US$ billions

Liberalizing Region: Benefitting region:	Agriculture And Food	Other Primary	Textiles & Clothing	Other Manufactures	Total
High Income					
High Income	110.5	-0.0	-5.7	-8.1	96.6
Low Income	11.6	0.1	9.0	22.3	43.1
Total	**122.1**	**0.0**	**3.3**	**14.2**	**139.7**
Low Income					
High Income	11.2	0.2	10.5	27.7	49.6
Low Income	31.4	2.5	3.6	27.6	65.1
Total	**42.6**	**2.7**	**14.1**	**55.3**	**114.7**
All Countries					
High Income	121.7	0.1	4.8	19.6	146.2
Low Income	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: Benefitting region	Agriculture and Food	Other Primary	Textiles & Clothing	Other Manufactures	Total
High Income					
High Income	43.4	0.0	-2.3	-3.2	38.0
Low Income	4.6	0.1	3.5	8.8	16.9
Total	**48.0**	**0.0**	**1.3**	**5.6**	**54.9**
Low Income					
High Income	4.4	0.1	4.1	10.9	19.5
Low Income	12.3	1.0	1.4	10.9	25.6
Total	**16.7**	**1.1**	**5.5**	**21.7**	**45.1**
All Countries					
High Income	47.9	0.1	1.9	7.7	57.5
Low Income	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 decomposition software [Harrison *et al.* (2000)].

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 (AusNZl)	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).

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