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by

Santiago Fernandez de Córdoba, Sam Laird and David Vanzetti

Centre for Research in Economic Development and International Trade, University of Nottingham

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The Authors
Santiago Fernandez de Córdoba and Sam Laird are Economists, Division for International Trade, UNCTAD and Sam Laird is also Special Professor of International Economics, University of Nottingham. David Vanzetti is a Senior Economist, Division for International Trade, UNCTAD.

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Abstract

Negotiations on industrial tariffs in the current WTO have turned out to be surpisingly more difficult than expected. On the one hand, developing countries, particularly in Africa, are concerned about the effect on their industrial development of developed country efforts to push them into deep cuts in applied tariffs:after the disillusion of the Urguay Round, promises of welfare gains seem like buying one of Akerloff's lemons. On the other hand, a number of the more complex formula proposals for tariff-cutting make it difficult to evaluate the mercantilist equation: how does what one has to do measure up against what one might expect from others? The negotiations present an important opportunity to address the bias in protection against developing countries' exports. The developing countries are promised greater exports and welfare gains from the more ambitious proposals, but computations show that these also imply greater imports, lower tariff revenues, some labour market adjustments and reduced output, threatening key sectors in some developing regions. Preference losses, while moderate in the aggregate, seem quite significant in some cases. Some way of assisting the developing countries in coping with these adjustments would make the negotiations seem a little less like "Trick or Treat?" although proposals for Bank-Fund "facilities" to aleady indebted countries to meet new WTO obligations may not be the highest development priority.

Key words: WTO negotiations, trade, industrial tariffs, development, special and differential treatment, CGE modelling,

Outline

1. Introduction
2. Current proposals in the WTO on industrial tariffs
3. Evaluation of the economic impact of key proposals
4. Adjustment
5. Conclusions

1. INTRODUCTION

The WTO negotiations on industrial tariffs raise a number of important development-related issues. One issues is the extent to which the negotiations address barriers that face the key exports of developing countries as they try to expand and diversify their production and trade.[1] A second issue is the extent to which commitments that are being sought from the developing countries contributes to their economic development. While economists generally agree that, at least in the longer term, trade liberalisation is beneficial to economic development, there is some controversy about the relative importance of openness and institutions as well as the validity of intervention to support industrialisation or in the presence of externalities.[2] A third issue is the extent to which domestic trade liberalisation and possible preference losses in major markets may cause adjustment problems for developing countries, whether in output, employment, or fiscal imbalances. Finally, if the argument for liberalisation prevails, what kind of measures are needed to support the adjustment process, how much would these measures cost, who would pay, and would the financing of trade adjustments necessarily be the highest development priority?

This paper looks first at proposals in the non-agricultural market access negotiations in the WTO. Second, we attempt to evaluate the economic impact of these proposals using a global general equilibrium model (GTAP). Third, we look at some of the literature on adjustment to trade reform. And, finally, we consider the need for supporting policies and other development options.

2. CURRENT PROPOSALS IN THE WTO ON INDUSTRIAL TARIFFS

A wide number of proposals have been made in the WTO negotiating Group on Non-agricultural Market Access (NAMA), of which six proposals had a formula as a core element.[3] Of these, the Chinese, EU, Korean and Japanese proposals has a strong "harmonizing" elements in that higher than proportional reductions in tariffs would be made on the higher rates. In this they bore a resemblance to the Swiss formula used in the

1 This problem has been well documented oveer the years in studies by the IMF, UNCTAD, the World Bank and the WTO.
2 See, for example, Sachs and Warner (1995), Rodrik (2001).
3 See Laird, Fernandez de Córdoba and Vanzetti (2003) for an analysis.

Tokyo Round. The first phase of the US proposal was similar, but the US also proposed universal free trade after 10 years. The Indian proposal was for unspecified linear cuts with a lesser reduction by developing countries, e.g. 50 per cent by developed countries and 33.3 per cent cut by developing countries.

The Cancún Ministerial draft text on non-agricultural products was based that of the Chairman of the Negotiating Group on Market Access: Revised Draft Elements of Modalities (WTO document TN/MA/W/35/Rev.1). The Chairman's text proposed a tariff reduction scheme similar to the 'Swiss'/harmonizing formula with the maximum coefficient function of each country's national average tariff. The basic Swiss formula with a single maximum coefficient would be harmonizing across countries, presenting a problem for developing countries that tend to have higher initial tariffs (and would run counter to the Doha proposal that developing countries would be afforded "less than full reciprocity"), the Chairman proposed that the Swiss formula maximum coefficient would be set according to each country's own average tariff, that is it would tend to harmonise within rather than across countries. This was seen as providing for "less than full reciprocity" to the extent that developing countries have higher initial tariffs. Howwever, all countries with the same average tariffs are treated in the same fashion, irrespective of whether they are developed or developing. The Chairman also identified seven sectors for complete free trade by all countries (except the least developed): electronics & electrical goods; fish & fish products; footwear; leather goods; motor vehicles parts & components; stones, gems, & precious metals; and textiles & clothing.

Canada, the EU and the United States, in a joint contribution during the summer of 2003, prior to Cancún, had argued for a 'single' harmonizing formula rather than a country-based average tariff reduction formula in order to achieve real expansion of market access. They also proposed a provision that there would be an increase in the single coefficient as a result of members fully binding their tariffs and participating meaningfully through reductions in their binding overhang that effectively enhance market access.

Whereas the Chairman's text envisaged exempting LDCs from tariff reduction commitments, the joint text proposed that additional provisions should be included for LDCs and those IDA-only eligible members as well as members with a binding coverage of non-agricultural tariff lines that is less than 35 per cent. These members would be

exempt from making tariff reductions arising from the application of the formula, and, with the exception of LDCs, would be expected to bind 100 per cent of non-agricultural tariff lines at the overall level of the average bound tariffs of all developing countries after full implementation of current concessions.

Nevertheless, the draft Cancún Ministerial text was based on the proposal of the Chairman of the Non-agricultural Market Access Negotiating Group, except that it adopted the Canadian,m EU and US proposals to allow flexibility for countries that currently have very low binding coverage, mainoly in Africa.

In the end, the WTO's Cancún Ministerial Meeting was unsuccessful in finding consensus on non-agricultural market access, although the lack of success may have reflected other issues that are cross-linked through the 'single undertaking' ("nothing is agreed until all is agreed"). Despite the intensive negotiations in the two years following Doha and the various proposals on the negotiating table, no agreement was achieved in Cancún on the modality or formula to be used for tariff reductions. Developed countries generally considered there was not sufficient ambition in the proposed draft presented in Cancún and developing countries believed that it did not sufficiently reflect their interests and concerns. Nonetheless, had the Singapore issues and agriculture been resolved, it seems unlikely that non-agricultural market access would have been a stumbling block.

At the time of writing (May 2004), the state of the non-agriculture market access negotiations is largely unchanged since before Cancún, with the main focus still on finding a tariff-cutting formula that is acceptable to both developed and developing countries. Essentially, Doha requires Member States to reduce tariffs, especially those facing developing countries' exports; however, it also mandates less than full reciprocity from developing countries.

In summary, all the proposals, including those made by China, Republic of Korea, India, South Africa, Malaysia and others, are still on the negotiating table, and countries can put forward new proposals, whether or not based on those already on the table.

3. EVALUATION OF THE ECONOMIC IMPACT OF KEY PROPOSALS

Scenarios

In order to assess the potential impact of the various proposals under consideration in the WTO, we have selected four scenarios that do not entirely correspond to specific proposals, but rather have been chosen to highlight the spread of policy options. These four scenarios we call 'free trade' (full tariff liberalisation in the non-agricultural sector), Hard and Soft WTO and 'simple mix'. The Free trade proposal was presented in December 2002 by the United States in the WTO Working Group on Non-Agriculture Market Access as the second phase of a two-stage implementation process, and may be regarded in a sense as a "benchmark" scenario. The second and third scenarios represent two variations of the proposals included in the Framework for Establishing Modalities in Market Access for Non-Agricultural Products (Annex B of the draft Cancún Declaration, a text by the Chairman of the WTO General Council, not agreed by WTO Members), which in turn draws on the Draft text by the Chairman of the Non-agricultural Market Access (NAMA) Group. This Framework text places the emphasis on a non-linear formula approach to tariff-cutting, to be supplemented by sectoral tariff elimination on products of export interest to developing countries and possibly also by zero-for-zero, sectoral elimination and request-and-offer negotiations. However, the Framework text lacks specific numbers, and here we have analysed some possible variations in the key coefficient (B) in the NAMA Chairman's Draft, including the possibility of different coefficients (and hence different depth of cuts) for different groups of countries. In essence, the Soft scenario introduces important elements of special and differential treatment that are not present in the Hard scenario. The last scenario analysed, 'Simple' mix, draws from the Indian proposal for a linear cut formula with a capping for tariff peaks and escalation, and also has similar elements of special and differential treatment to those in the Soft scenario, except for the formula component. We have also taken account of proposals for sectoral elimination on a non-voluntary or voluntary (opt-out) basis, exceptions for sensitive products, proposals to extend binding coverage, and proposals to address tariff peaks. This spread of scenarios is intended to give an indication of the development dimensions from the kind of ideas that are driving the negotiations.

The four scenarios, although based on proposals made in the WTO Working Group, have have been slightly modified to best suit the modelling purpose and to permit a better

comparison of their implications. All scenarios include similar reductions in tariffs on resources (coal, oil, gas and unprocessed minerals), services and agriculture. These sectors are responsible for an estimated 30 per cent of the total distortions impeding goods and services trade. As part of the single undertaking in the negotiations some of these distortions are likely to be removed along with reductions in tariffs on non-agricultural goods. If these are not removed resources may flow out of a protected sector, such as textiles, into an even more distorted sector, such as agriculture, worsening the overall efficiency with which resources are used in an economy. For this reason the scenarios include reductions in services and agriculture, but these are the same in each of the scenarios to facilitate comparison of the impacts on the non-agricultural sectors.

The first scenario, free trade, draws from the December 2002 United States of America proposal to the WTO Working Group. It plainly means all tariffs are reduced to zero for all non-agricultural products for all WTO members unanimously. For this scenario all countries bind their non-agricultural tariffs and reduce them to zero.

The second and third scenarios, so-called Hard and Soft WTO, are two variations from the Chairman of the WTO Working Group proposal for non-agricultural tariff reductions. These two scenarios cover the following elements:

1. Tariff reduction formula
2. Sensitive items
3. Binding coverage
4. Level of binding
5. Sectoral elimination.

Both the Hard and Soft approaches are based on the WTO proposed harmonizing formula:

$$T_1 = \frac{B \times ta \times T_0}{B \times ta + T_0}$$

where *ta* is the national average of the base rates, T_0 the initial rate, T_1 the final rate, and *B* is the coefficient, yet to be negotiated, reflecting the level of ambition.

This formula reduces tariffs according to a Swiss formula with maximum coefficient equal to country average, achieving the progressive effect of proportionately greater reductions in higher initial tariffs. This coefficient in the Swiss formula represents the maximum tariff after the application of the tariff reduction formula. In previous applications B and *ta* were represented as a single coefficient common to all members. The Swiss formula was used for industrial products during the Tokyo Round with a maximum coefficient of 16 per cent.

In the WTO Chairman's proposal the B coefficient would be common to all countries. B set at 1 implies the average bound rates become the maximum. The so-called Hard version of WTO proposal builds upon a B coefficient equal to 0.5. Under this scenario, developed and developing countries with the same average initial tariffs would make the same percentage reduction. In this sense, the proposal does not contain any specific and differential component. However, an element of special and differentiated treatment for developing countries derives from the observation that most of them have higher initial tariffs than developed countries.

In contrast to the Hard WTO scenario in which B equals 0.5, the Soft scenario incorporates a B coefficient differentiated between developed and developing countries. B takes two values, 1 for developed countries and 2 for developing countries. This differentiation of the B coefficient is based on the principle of special and differential treatment and less than full reciprocity concept for developing countries mandated in paragraph 16 of the Doha Ministerial Declaration.

Both WTO scenarios and the 'Simple' mix include a special clause for sensitive products, which will be left unbound, and no tariff cut formula would be applied on them. For modelling purposes, sensitive products are defined as the 5 per cent of the all tariff lines generating the most revenue and unbound, or all unbound lines, whichever is less[4]. In

4 For some countries the number of unbound tariff lines are less than 5% of their tariff universe, hence these unbound items are taken as sensitive products.

modelling this scenario it is assumed that tariff lines gathering the greatest amount of tariff revenue are excluded first. These items have either high tariffs, high trade flows or, most likely, a combination of both. For these tariff lines countries neither bind nor cut their tariffs.

Both Hard and Soft scenarios specify that 95 per cent of the tariffs be bound. However, in the former it would be done at twice the applied rate and the later either twice the applied rate or 50 per cent whichever is higher. In the Hard scenario tariffs are bound and then the tariff reduction formula is applied. In the Soft scenario unbound tariffs are bound only and are not subject to reductions.

The Hard WTO scenario includes sectoral elimination. This implies the elimination of tariffs for electronics & electrical goods, fish and fish products, textiles, clothing, footwear, leather goods, motor vehicle, parts and components, stones, gems and precious metals. The Soft scenario includes sectoral elimination for developed countries only and presumes that developing countries will not carry out the elimination of tariffs in these sectors.

The last scenario analysed, 'Simple' mix, draws from a linear cut formula with a cap for tariff peaks and escalation. This capping element harmonizes tariffs and has a similar effect to the Swiss formula. It is therefore particularly useful in reducing tariff peaks and tariff escalation. The capping formula specifies that no tariff will be higher than three times the national average. This scenario does not include sectoral elimination of tariffs.

Like the Soft WTO scenario, in the 'simple' mix scenario 95 per cent of tariffs are bound at either twice the applied rate or 50 per cent, whichever is higher. No tariff cutting formula is applied to tariffs after binding them.

The four scenarios are compared in Table 1.

Table 1: Four tariff-cutting scenarios

Proposal	Description	Formula	Sensitive Products	Binding	Level of Binding	Bind and Cut	Sectoral Elimination	B Coefficient
1 Free Trade	Elimination of non-agricultural tariffs			100%				
2 Hard WTO	Girard Formula	$T_1 = \frac{B \times ta \times T_0}{B \times ta + T_0}$	Top 5% among unbound lines with highest tariff revenue, or all unbound lines, whichever is less[5]. No cut or binding	95% of tariff lines	Twice Applied Rate	Yes	Yes	B=0.5
3 Soft WTO	Girard Formula	$T_1 = \frac{B \times ta \times T_0}{B \times ta + T_0}$	Top 5% among unbound lines with highest tariff revenue, or all unbound lines, whichever is less. No cut or binding	95% of tariff lines	Twice Applied Rate or 50% which ever is less	No	Developed Yes	Developed B=1
							Developing No	Developing B=2
4 $T_1 = a \times T_0$ 'Simple' Mix	Developed a=50%	Harmonizing Capping No tariff higher then 3 times tariffs national average	Top 5% among unbound lines with highest tariff revenue, or all unbound lines, whichever is less. No cut or binding	95% of tariff lines	Twice Applied Rate or 50% which ever is less	No	No	
	Developing a=36%					No	No	

5 For some countries the number of unbound tariff lines are less than 5% of their tariff universe, hence these unbound items are taken as sensitive products.

Average applied tariff changes

Table 2 shows the changes in the average applied tariff in developed and developing countries and the least-developed countries (LDCs) after applying the scenarios defined above. The level of ambition for tariffs cuts declines in going from free trade through the WTO variants to 'simple' mix. For developed countries trade weighted applied tariffs fall from 2.9 per cent to 0 per cent under free trade, 0.4 per cent under Hard WTO, 0.6 per cent under Soft WTO and finally 1.6 per cent under the 'Simple' mix scenario. For developing countries tariffs are revised from 8.1 per cent to 0 per cent, 2.6 per cent, 6 per cent and 6.2 per cent respectively. In all scenarios except "free trade" least-developed country tariffs do not change. These averages only cover industrial products and exclude the changes of 30 per cent assumed for the agriculture and services sectors.

Table 2: Changes in average applied tariffs on non-agricultural products after applying the four scenarios

Scenario	Average	Average
	%	%
Developed countries		
Initial Rate	4.7	2.9
Free Trade	0.0	0.0
Hard	0.6	0.4
Soft	0.8	0.6
Simple	2.3	1.6
Developing countries		
Initial Rate	11.1	8.1
Free Trade	0.0	0.0
Hard	4.1	2.6
Soft	9.7	6
Simple	10.1	6.2
LDCs		
Initial Rate	12.6	13.6
Free Trade	0.0	0.0
Hard	12.6	13.6
Soft	12.6	13.6
Simple	12.6	13.6

Source: Derived from UNCTAD TRAINS database.

Methodology

Simulations are undertaken using the GTAP 5.3b database, modified by the authors to take greater account of preferences and the percentage or *ad valorem* equivalent of specific rates of duty (mainly affecting the agricultural sector which is treated as a single sector in this paper). The original database has 78 countries and regions and 65 sectors that are aggregated as shown in the annex tables for the present study. GTAP is a general equilibrium model that includes linkages between economies and between sectors within economies. Industries are assumed to be perfectly competitive and are characterised by constant returns to scale. Imports are distinct from domestically produced goods as are imports from alternative sources. Primary factors (capital, labour and land) are available in fixed amounts and are fully utilised. That is, there is no unemployment and the labour market adjusts through changes in wages (although we vary this assumption later). Labour and capital can move between all sectors, whereas land is mobile only within the agricultural sectors. The database includes tariffs, export subsidies and taxes, subsidies on output and on inputs such as capital, labour and land. Border measures are specified bilaterally, so the impact of preference erosion can be ascertained. UNCTAD has modified the bilateral tariff data to reflect preferences.

In this type of model, the results are driven by improvements in the terms of trade (e.g. export prices rising faster than import prices) and the efficiency effects of improvements in the allocation of resources between different activities. The results are based on a comparative static analysis, comparing a pre- and post-liberalisation situation, without taking account of transition periods or adjustment costs, such as we discussed earlier. As we shall see, while the overall adjustments may be minor, the effects on specific sectors may be quite significant. We have no information that would allow us to take account of any social benefits or externalities – divergences between social costs and benefits (some of which are so-called "non-trade" concerns) that derive from current intervention in favour of the industrial sector. These factors need to be properly evaluated and taken into account in policy design in the context of any trade or sectoral policy changes resulting from the WTO negotiations or other process.

The quantitative analysis presented in the paper is also limited in that it is not able to take account of all distortions in production and trade. For example, SPS and TBT barriers

appear to be of increasing importance, especially in the agricultural sector. Similarly, the paper is unable to address concerns about market entry, which is not always assured even when formal barriers are lifted. Thus, large marketing companies often have a dominant position in the trade of certain products, capturing some of the benefits that would otherwise be passed to producers in the developing countries. A concerted effort to look at competition rules in this sector could also bring gains to developing countries. Again, in the services sector, our estimates do not necessarily reflect the current situation in all sectors in all countries.

Effects on overall economic welfare

An overall impact of the gains and losses from liberalisation can be captured as welfare, shown in Table 3 for each region under each scenario. Changes in welfare at a national level emanate essentially from two sources: allocative efficiency gains and terms of trade effects. The first reflects the benefits of making better use of resources – in effect, getting something for nothing. Terms of trade effects refer to gains and losses due to changes in prices of imports and exports. These are important nationally, but sum to zero globally because an increase in the price of exports means that importers have to pay more. Under the Simple scenario, the global gains sum to $28 billion with $9.4 billion accruing to developing countries. The large part of the remaining gains accrues to Japan, mainly reflecting the simulated partial liberalisation of the petroleum and coal products sector. Amongst the losing regions, Canada suffers as the value of its preferential access into the United States is eroded, while Sub-Saharan Africa experiences a decline in terms of trade driven by falls in the export prices of services and primary and processed agricultural products, areas that are outside the NAMA negotiations. Sub-Saharan Africa, however, benefits from more ambitious liberalisation as the allocative efficiency gains start to outweigh the terms of trade losses.

Free trade produces a scattering of winners and losers. Under this scenario the major beneficiaries are Japan, which out-competes the United States and the European Union in the services area; China, which benefits from allocative efficiency gains; and Rest of Asia. For Japan, these gains reflect terms-of-trade effects, with rising export prices for the electronics, motor vehicles, other metals and services exports. Sub-Saharan Africa loses in

this scenario because of a deterioration in its terms of trade, particularly falling export prices of services.

The $9.4 billion in welfare gains to developing countries in the Simple scenario represents a small but not insignificant addition of 0.10 per cent to GDP growth each year. After compound growth for ten years the additional gains amount to $96 billion, worth $60 billion in today's terms.[6] This may be seen as a useful if modest contribution to poverty reduction.

Table 3: Change in welfare relative to base

	Free trade	**Hard**	**Soft**	**Simple**
	%	%	%	%
Andean Pact	0.05	0.14	0.13	0.07
Central America & Caribbean	0.08	0.16	0.18	0.20
Canada	-0.16	-0.09	-0.06	-0.04
Central and Eastern Europe	-0.18	-0.23	-0.20	-0.12
China	0.30	0.31	0.36	0.02
European Union 15	0.05	0.04	0.00	0.04
Indonesia	0.27	0.37	0.42	0.13
India	0.20	0.34	0.34	0.15
Japan	0.47	0.41	0.33	0.31
Middle East	0.08	0.10	0.06	0.05
Mercosur	0.01	0.05	0.08	0.06
North Africa	0.25	0.33	0.19	0.17
Oceania	0.09	0.13	0.14	0.16
Other West Europe	0.41	0.42	0.33	0.28
Rest of Asia	1.02	0.80	0.62	0.41
Rest of World	0.21	0.24	0.26	0.21
South Asia	0.46	0.52	0.60	0.21
South East Asia	0.44	0.57	0.55	0.24
Sub-Saharan Africa	-0.08	0.09	-0.08	-0.03
United States	0.00	0.00	-0.02	0.01
South Africa	0.25	0.16	0.18	0.09
World	0.15	0.14	0.11	0.10
Total in $m	**42417**	**40961**	**31947**	**27665**

Source: GTAP simulations.

6 At a 5 per cent discount rate, $59 billion = $96 billion /(1.05)^10.

While trade negotiators obiously have some interst in broad economic and social objectives, as indicated by the Doha Declaration, the immediate interest of negotiators is usually on expected changes in trade flows that might result from the negotiations. Changes in export revenues are a guide to the potential benefits from the negotiations. Although the main reason for exporting goods and services is to purchase imports, an increase in imports is commonly seen as a negative impact because its displaces domestic production. This is a problem if the displaced production is in politically sensitive sectors, by virtue of location, culture or dependence. A third concern is tariff revenues. Many governments rely heavily on tariffs for government revenues, and the need to replace tariff revenue with alternative sources can be a costly burden for governments with limited administrative capacity. A final concern is the labour market. A flood of imports may cause an increase in unemployment or a fall in the wage rate, with undesirable social and political consequences. For these reasons, we also assess each scenario in terms of export revenues, imports, government revenues, sectoral output and wage rates.

Export revenues

The estimated effects on export revenues from the implementation of the four scenarios outlined earlier are shown in terms of percentage increases in Table 4. In general, the more ambitious scenarios generate a greater change in export revenues with some variations across regions (and sectors). Under the less ambitious Simple scenario the change in global export revenues at world prices is $100 billion. Of this, the increase in developing country exports is $51 billion, and of this $35 billion is due to an expansion of Northern markets while a further $17 billion is attributed to South - South trade. That is, 30 per cent of the developing country increase in exports is to other developing country markets. North-North trade is estimated to increase by only $4 billion.

Table 4: Change in export revenue relative to base

	Free trade	Hard	Soft	Simple
	%	%	%	%
Andean Pact	4.1	2.7	1.3	1.1
Central America & Caribbean	8.3	5.0	1.0	1.0
Canada	0.8	0.9	0.9	0.6
Central and Eastern Europe	5.6	4.5	3.2	3.4
China	9.8	10.0	7.7	5.5
European Union 15	1.6	1.1	0.7	0.7
Indonesia	5.2	4.3	2.8	1.3
India	20.5	14.9	5.3	3.9
Japan	6.5	5.4	3.6	2.4
Middle East	2.9	2.2	0.9	1.0
Mercosur	15.0	9.6	4.4	3.7
North Africa	10.0	8.3	2.1	2.0
Oceania	4.7	3.6	2.9	1.5
Other West Europe	1.8	1.8	1.5	1.4
Rest of Asia	8.9	7.5	4.9	3.7
Rest of World	6.4	5.3	3.7	3.1
South Asia	12.0	6.3	4.5	2.7
South East Asia	3.3	2.1	0.9	0.5
Sub-Saharan Africa	4.8	2.5	0.8	0.9
United States	5.6	4.5	3.5	2.4
South Africa	5.7	4.3	2.1	1.2
Total	4.4	3.5	2.2	1.7

Source: GTAP simulations.

Imports

Most countries contemplating liberalisation are concerned about being flooded by imports (Table 5). In fact, in our simulation results, imports tend to follow the pattern of exports, with a large increase in imports, as in China (6.8 per cent under the Simple scenario), being accompanied by an almost corresponding increase in exports (5.5 per cent). The change in imports equals the change in exports globally but not necessarily for each region, where the change in the balance of payments resulting from changes in the current account need to be accommodated by corresponding by changes in the capital account.

As expected, the changes in imports are all positive in the partial liberalisation scenarios. Changes in imports levels in the Andean countries, Central America & Caribbean and Sub-Saharan Africa are quite moderate. However, China, Central and Eastern Europe, India and Japan show quite substantial increases in imports, reflecting the degree of

liberalisation in these regions. The largest increase in imports – nearly 50 per cent – would occur in India under the Free trade scenario.

As a broad generalisation across all scenarios, subject to some exceptions, developing countries' imports will increase proportionately more than those of the developed countries and regions.

Table 5: Change in imports relative to base

	Free trade	**Hard**	**Soft**	**Simple**
	%	%	%	%
Andean Pact	5.0	2.8	0.8	0.5
Central America & Caribbean	11.1	6.0	0.7	0.8
Canada	0.1	0.5	0.8	0.4
Central and Eastern Europe	8.5	6.9	5.2	5.4
China	12.1	11.7	9.1	6.8
European Union 15	0.6	0.5	0.4	0.4
Indonesia	5.6	4.4	2.8	1.1
India	29.2	20.9	6.4	4.6
Japan	6.5	6.6	5.6	4.1
Middle East	5.5	3.5	1.6	1.8
Mercosur	14.4	9.1	3.4	2.8
North Africa	18.2	13.2	2.7	2.4
Oceania	4.7	3.4	2.9	1.2
Other West Europe	2.1	2.3	2.2	2.0
Rest of Asia	10.6	9.0	5.7	4.4
Rest of World	8.1	5.5	4.0	3.4
South Asia	15.6	7.4	4.6	2.4
South East Asia	4.4	2.7	1.0	0.5
Sub-Saharan Africa	7.6	3.1	0.1	0.3
United States	2.5	2.4	2.0	1.2
South Africa	9.9	6.8	2.6	1.0
Total	4.4	3.5	2.2	1.7

Source: GTAP simulations.

Government revenues

Many developing countries are concerned that trade liberalisation will have a significant adverse impact on government revenues because tariff revenues make up a substantial contribution to public revenue. The importance of tariff revenues to government revenues is shown as the ratio of tariff revenue to government revenue in Table 6.[7] Clearly, developing countries are much more dependent on this source. Country level data would reveal even more extreme example for individual countries, especially for small, island, developing states that are highly dependent on trade.

The free trade scenario implies tariff revenues of $248 billion would be reduced by 76 per cent. Revenues are maintained from tariffs outside the non-agricultural sector.The simulation results indicate that implementation of the Simple scenario would result in an estimated 27 per cent decline in global tariff revenues from $248 billion. The declines vary significantly across regions, from next to nothing in Central America & Caribbean to around 50 per cent in China. On this criterion, both the Soft and Simple scenarios would be preferred by developing countries to the more ambitious alternatives. For developed countries the revenue losses under the Hard and Soft scenarios are similar, whereas the Simple scenario results in fewer revenue losses.

7 These data, from the GTAP database, are broadly consistent with the IMF data presented in Table 1. The GTAP data are based on tariff rates and trade flows and thus may be an overestimate because of smuggling, administrative problems in collection and various exemptions.

Table 6: Initial revenues and change relative to base

	Initial Govern-ment revenues	Initial tariff revenues	Ratio of tariff to total revenue	Free trade	Hard	Soft	Simple
	$m	$m	$m	%	%	%	%
Andean Pact	32738	5024	0.15	-86	-41	-7	-6
Central America & Caribbean	48424	15367	0.32	-86	-42	-5	-4
Canada	125694	4332	0.03	-57	-50	-47	-30
Central and Eastern Europe	63922	15004	0.23	-76	-64	-51	-49
China	118821	24872	0.21	-82	-72	-54	-51
European Union 15	1479046	27858	0.02	-57	-50	-47	-29
Indonesia	14619	2666	0.18	-80	-31	-7	-8
India	50341	11936	0.24	-87	-58	-13	-12
Japan	407959	21679	0.05	-61	-59	-59	-50
Middle East	142323	12341	0.09	-80	-54	-30	-29
Mercosur	174578	16576	0.09	-83	-51	-16	-15
North Africa	27693	10020	0.36	-84	-55	-15	-11
Oceania	79515	3031	0.04	-92	-56	-43	-8
Other West Europe	67423	5550	0.08	-41	-40	-40	-38
Rest of Asia	87896	12978	0.15	-78	-60	-30	-26
Rest of World	110574	11923	0.11	-66	-34	-17	-16
South Asia	10532	3887	0.37	-84	-26	-5	-7
South East Asia	47877	13271	0.28	-85	-45	-10	-10
Sub-Saharan Africa	24943	6733	0.27	-85	-33	-7	-7
United States	1201779	20866	0.02	-83	-74	-70	-40
South Africa	28979	2128	0.07	-84	-59	-18	-10
Total	**4345675**	**248043**	**0.06**	**-76**	**-55**	**-35**	**-27**

Source: GTAP database and simulations.

Sectoral output

Policymakers concerned with structural adjustment will wish to take account of potential changes in value of output in specific sectors, for which the simulation results under the various scenarios are shown by sector and region in Appendix Tables A1-A4. Changes in global output vary from sector to sector as distortions are removed. In absolute terms, the largest falls over the partial liberalisation scenarios are in iron and steel ($2-4 billion) and petroleum and coal products ($5 billion). Among the more significant increases is that in the output of services ($7-9 billion). If the tariff cuts are large enough to significantly

reduce applied rates in developing countries, as in the free trade scenario, there will be a big shift out of motor vehicles into services. The most significant reductions are estimated to occur in China ($2-3 billion).

Perhaps of greater interest are the regional changes in sectoral output. In the Simple scenario, the largest fall in output is in excess of 20 per cent in the leather and petroleum and coal products sectors in Japan. The Rest of World (including Russia and Central Asia) and Rest of South Asia (i.e. excluding India) are projected to suffer a decline in the motor vehicles sector of 12 and 13 per cent, respectively. For the Rest of South Asia (i.e., other than India), this erosion of output rises to 55 per cent under the Hard scenario but falls back a little to 48 per cent under the free trade scenario where reductions are spread more evenly. Indeed, the percentage cuts do not increase regularly across scenarios as the level of ambition rises, because the cuts in applied tariffs take effect unevenly, depending on the gap between bound and applied rates and the inclusion or exclusion of specific sectors under different scenarios.

On the plus side, the highest changes in output following the Simple scenario are around 30 per cent in Indonesian leather, and 25 and 13 per cent in Rest of Asia (mainly, the Republic of Korea and Taiwan Province of China) in lumber and petroleum and coal products, respectively. These changes are similar under a free trade scenario. In absolute terms, the largest positive effect is felt in the Japanese motor vehicles and chemicals, rubber and plastics sectors. The sector needing to make the most adjustment is the Japanese petroleum and coal products. This sector has high duties on these products, imported from the Middle East and Rest of Asia.

Among developing countries, the sectors likely to suffer most dislocation following the Simple scenario are motor vehicles, chemicals, rubber and plastics and other manufactures in China, amounting to $13 billion in forgone output. However, of these sectors, only the motor vehicles sector represents a significant percentage (16 per cent). In the Sub-Saharan African region the changes are modest under the Simple scenario, not exceeding 4 per cent in any sector. Under the Hard scenario the percentage changes would rise to -22 per cent for leather and -8 per cent for textiles and apparel. The largest dollar value falls are in processed agriculture and petroleum and coal products. Almost all the gains are expected to be in services and transport equipment other than motor vehicles.

Real wages

One way of looking at the potential impact of the trade negotiations on the labour market is through estimated changes in real wages. In the standard GTAP model closure, labour is assumed to be fully employed, with costless relocation between sectors. This is obviously an abstraction, but the changes in wage rates gives an indication of the structural changes that are necessary to maintain the existing level of employment. This is useful for comparison between sectors, if not a measure of the absolute costs.

Generally, trade liberalisation has the effect of increasing wages for both unskilled workers and skilled workers (Table 7). The returns to capital also tend to move with wage rates, reflecting the assumed substitutability of factors in production. The wage rates reflect the demand for the good produced by these factors. The results suggest that there is a relative fall in demand for good and services produced by unskilled labour in the developed countries, notably United States (driven by estimated changes in protection in the textiles and clothing sector), and the European Union (motor vehicles and apparel). Nonetheless, real wages increase rather than fall in these regions, even though other countries gain more. Demand for unskilled labour in the leather, textile and apparel sectors in the United States would fall by an estimated 5 per cent, 2 per cent and 4 per cent, respectively, even under the moderate Simple scenario, which illustrates why liberalisation is a political problem for some countries. However, in the United States there is an estimated increase in demand in primary and processed agriculture and electronics. On the other hand, we estimate that wage rates would increase in Japan, where labour costs in the motor vehicles sector is low compared with United States and the European Union. This sector is estimated to expand by 3 per cent in Japan, much more than in its main competitors.

In developing countries the demand for unskilled labour increases significantly in many developing countries, due to increased demand for unskilled labour-intensive products such as textiles. This has implications for poverty reduction, assuming the poor are predominantly unskilled and in agriculture.

Table 7: Change in real unskilled wage rates relative to base

	Free trade	Hard	Soft	Simple
	%	%	%	%
Andean Pact	1.9	0.5	0.2	0.1
Central America & Caribbean	2.7	1.5	0.4	0.4
Canada	0.4	0.3	0.3	0.2
Central and Eastern Europe	3.2	2.8	2.1	2.2
China	2.5	2.7	2.1	1.6
European Union 15	0.3	0.3	0.2	0.2
Indonesia	1.3	1.3	1.1	0.5
India	2.3	2.1	0.7	0.5
Japan	1.3	1.3	1.2	1.0
Middle East	1.5	1.1	0.6	0.6
Mercosur	0.9	0.3	0.1	0.1
North Africa	3.0	2.2	0.6	0.5
Oceania	0.8	0.6	0.5	0.3
Other West Europe	1.5	1.6	1.5	1.4
Rest of Asia	2.6	2.2	1.4	1.1
Rest of World	0.9	0.6	0.5	0.3
South Asia	2.9	1.5	1.0	0.6
South East Asia	2.9	2.0	0.8	0.5
Sub-Saharan Africa	2.3	1.0	0.1	0.1
United States	0.3	0.2	0.1	0.1
South Africa	1.7	1.1	0.5	0.3

Source: GTAP simulations.

To assess the impact of trade liberalisation on employment in developing countries, we re-estimated the Simple scenario holding the real wage of unskilled labour fixed (this allows for the movement in nominal wages) and allowing for adjustment in the level of employment in developing countries (Table 8). The underlying assumption here is that there exists a pool of unspecified size of unemployed workers that can come into the workforce if demand for their services increases. Alternatively, liberalisation might lower the demand for unskilled workers in some countries and overall employment would fall. In many countries, wages are fixed, at least downwards, so that in reality the adjustment occurs in quantity rather than price.[8] The results indicate that in these countries up to 3 per

8 This is simulated in GTAP by making the quantity of unskilled labour endogenous and fixing the real factor price of the endowment (i.e. real wages). An example of modelling employment within GTAP is given by Kurzweil (2002).

cent more labour would be employed, and, as a result, welfare increases. In the cases of Central and Eastern Europe and Sub-Saharan Africa, the welfare results are reversed. The change in global welfare is almost doubled, and most of the gains from increased employment are captured locally. Welfare gains are diminished in the major developed countries that are assumed not to be able to expand their labour use.

Table 8: Impact of flexible labour force, Simple scenario

	Use of unskilled labour with flexible labour force	**Welfare with fixed labour force**	**Welfare with flexible labour force**
	%	$m	$m
Andean Pact	0.27	201	449
Central America & Caribbean	0.51	1027	1650
Canada	0.00	-229	-206
Central and Eastern Europe	3.27	-431	3734
China	2.16	246	8431
European Union 15	0.00	3096	2400
Indonesia	0.41	259	447
India	0.46	641	1171
Japan	0.00	12948	12822
Middle East	0.91	300	2506
Mercosur	0.21	742	1627
North Africa	0.67	355	1043
Oceania	0.00	777	819
Other West Europe	0.00	1118	1194
Rest of Asia	1.95	2963	7879
Rest of World	0.52	1736	3747
South Asia	0.00	250	209
South East Asia	0.77	1045	1912
Sub-Saharan Africa	0.15	-62	94
United States	0.00	558	293
South Africa	0.54	126	447
Total		**27665**	**52655**

Source: GTAP simulations. The Simple scenario with flexible labour force assumes endogenous unskilled labour and fixed real wages in developing countries. Use of unskilled labour does not change in the standard Simple scenario.

These results illustrate that the use of endowments such as labour and capital has a far greater impact on welfare than the allocative efficiency gains or terms of trade effects. While the economy-wide effects of liberalisation may be to increase demand for labour,

these effects are not uniform across sectors. Changes in unskilled labour use in the most sensitive sectors are shown for each region in Table 9. The largest negative changes are in Japan (minus 7 per cent). In general, the labour use changes are moderate, but this reflects the level of aggregation of both countries and sectors. A finer disaggregation would reveal greater changes, both positive and negative.

Table 9: Use of unskilled labour in selected sectors, Simple scenario

	Motor vehicles %	**Petroleum and coal products** %	**Leather** %	**Textiles** %	**Wearing apparel** %
Andean Pact	-1.34	0.44	0.02	0.31	0.48
Central America & Caribbean	-0.37	0.94	1.52	2.62	3.08
Canada	0.06	-0.09	-2.18	-1.27	-2.24
Central and Eastern Europe	3.99	3.15	4.20	1.84	3.29
China	-2.95	2.21	5.09	2.32	4.40
European Union 15	0.26	0.22	0.35	-0.28	-0.69
Indonesia	0.41	1.16	5.94	0.52	0.76
India	0.76	1.58	2.32	1.04	2.17
Japan	0.80	-7.64	-7.27	1.01	-0.85
Middle East	0.95	2.26	-1.30	0.20	-0.43
Mercosur	0.27	0.26	-0.05	0.16	0.17
North Africa	-1.59	1.64	0.60	0.39	0.41
Oceania	-0.69	0.01	-0.75	-0.96	-0.19
Other West Europe	0.06	-0.45	0.00	-0.23	-0.87
Rest of Asia	2.05	6.08	3.54	3.16	2.36
Rest of World	-3.88	0.92	0.00	0.97	0.66
South Asia	-3.76	0.97	-0.85	0.44	1.50
South East Asia	0.50	1.73	0.09	0.88	1.41
Sub-Saharan Africa	0.15	0.51	-0.36	-0.30	0.08
United States	-0.02	-0.01	-1.06	-0.55	-1.03
South Africa	0.52	0.59	-1.92	0.23	1.19

Source: GTAP simulations. Simple scenario with flexible unskilled labour force.

4. ADJUSTMENT

The cost of moving resources

While the aggregate results for welfare and employment from the above analysis give little rise for concern, several possible problems were identified. These include the large increase in imports in some developing countries, pointing to possible balance of payments problems, large declines in output in some countries and sectors, and large tariff revenue losses. While preference erosion does not seem particularly important in the aggregate regional and products groups examined, other work in progress by the authors suggest that for some countries and some sectors, there could also be important trade and output shifts as a result of prefence erosion. Conceptually, this is similar to other sectoral adjustments that may arise from the gernal liberalisation currently being negotiated, although preference donors may feel a particular responsibility to set up some kind of buffer mechanism to facilitate the adjustment.

Perceived high transitional costs may be one of the reasons for the hestitation of some developing countries to take on board some of the more ambitious liberalisation proposals. To some extent, they distrust the promises of large welfare gains, particularly in the wake of the Uruguay Round where a number of international organisations predicted welfare gains of up to $500 billion. Many are asking: "Where is the cheque?" With the backloading on textiles and clothing and some doubts about the extent of liberalisation in agriculture – areas of particluarl concern to the developing countires – as well as high cost of implementation of a number of WTO agreements, it may well be that the cheque is still in the post!

As far as the transitional or adjustment costs are concerned, there is relatively little documented evidence about the scale and nature of these costs or the adjustment process of local economies in the aftermath of trade liberalisation, despiute some 15 years of unilateral reforms in developing and transitional economies. For informed policy-making, governments need a better understanding of the costs to their economies following changes in their tariffs.

Adjustment costs may be defined as the cost of moving resources from one sector to another that occur in the immediate period after changes in policies. Changes in relative prices, or regulations, make some firms or sectors uncompetitive, leading to a decline in output and, inevitably, use of inputs. In most sectors, labour is the major input, either directly or indirectly through its embodiment in intermediate inputs, that is, output from other sectors. The problems in moving labour from one sector to another involve: (i) job search and relocation costs; (ii) retraining to provide the necessary skills; and (iii) temporary loss of income. These costs are mainly a function of the length of unemployment, which may be longer or shorter depending on the capacity of the local economy to adapt to trade liberalisation and the ability of the workers to find a new job. It is generally accepted, although evidence is indicative rather than conclusive, that adjustment costs are higher where intra-industry trade is relatively low because in these circumstances labour cannot merely switch within firms or industries (Azhar and Elliott, 2001). Moving capital from one sector to another is more problematic, and it is inevitable that some or all assets will be revalued downwards or written off altogether. It may also be easier to shift capital equipment from one unprofitable line of production to another in the same sector rather than between sectors.

Estimates of these costs of adjustment vary tremendously. Studies by Magee (1972) and Baldwin, Mutti and Richardson (1980) quoted in a WTO review of adjustment costs suggest that they amount to less than 4 per cent of the benefits from trade in the long run and benefits may exceed costs even in the short run (Bacchetta and Jansen, 2003, p. 16). Other estimates by de Melo and Tarr (1990) on the heavily protected US textiles, clothing, steel and motor vehicles sectors suggests cost would amount to 1.5 per cent of the gains from liberalisation even during the adjustment period. The basis for these estimates is the earnings losses of the displaced workers and the duration of unemployment.[9] More recently, a study of the US-Canada FTA suggests that 15 per cent of the losses in employment in particular sectors in Canada can be attributed to tariff changes (Trefler 2001, cited in Bacchetta and Jansen 2003).

9 Magee assumed a duration of unemployment of 16 weeks, 60 per cent higher than the nationwide average. However, other studies found much higher levels, closer to 40 weeks.

Unfortunately, empirical evidence from developing countries is scarce, although there is plenty of anecdotal evidence about unemployment following liberalisation. The most commonly reported case is of the Mozambique cashew processing industry (Welch, McMillan and Rodrik, 2002). Reforms initiated by the World Bank in the 1990s led to the unemployment of 85 per cent of the 10,000 process workers. Net gains to farmers were estimated to small, merely a few dollars per year, and these were offset by increased cost of unemployment in urban areas. While this decline in employment in one sector is dramatic, what is not documented is the fate of these workers and the impact of reforms on other sectors of the economy.

In contrast to the Mozambique example, a World Bank study found that in eight out of nine developing countries undergoing trade reforms employment in the manufacturing sector was higher one year after the initial reforms were implemented (Papageorgiou et al., 1990). Harrison and Revenga (1995) observed increasing employment following liberalisation in Costa Rica, Peru and Uruguay (quoted in Bacchetta and Jansen, 2003, p. 18).

Perhaps the most comprehensive analysis of developing country labour markets following trade liberalisation and other forms of globalisation has been undertaken by Rama (2001). He surveys over 100 papers and concludes that: (i) wages grow faster in economies that integrate with the global economy, although they may fall in the short run. Openness tends to increase the returns to skilled labour and women, thus increasing inequality but narrowing the gender gap. Both of these effects have social consequences; (ii) unemployment tends to be higher following liberalisation, but in the long run is no higher in open economies; and finally (iii) the major threats to labour come from a financial crisis rather than competition from abroad. If these observations are correct, the policy implications for developing countries stress improving education and macroeconomic stability while integrating into the world economy. Some labour market policies, such as income support and unemployment insurance, have proved beneficial in some countries.

The question arises how best to mitigate these adverse effects. One obvious approach is to phase-in policy changes so that labour and capital has more time to adjust. Paying compensation to potential losers may be useful in reducing resistance to reform. Social

policies should be established to mitigate these adjustment costs that emerge from the trade liberalisation process. Funding education, health and physical infrastructure such as ports, roads and telecommunications will make potential export sectors more productive and better able to compete on the international market. There is no single best approach to these issues and each country needs to understand its local political and economic environment to find the most appropriate policies.

Finally, given the general acceptance, with the usual caveats, of the proposition that there are gains to be made from trade liberalisation, then it needs to be considered that the decision not to be move forward represents a cost – an opportunity forgone – to be set against the transitional adjustment costs. In other words, existing intervention is not free. Let us note merely that such intervention is essentially justified because it is believed that it can bring about benefits through "kick-starting" industrialisation (infant industry/economy, economies of scale, etc., arguments), offsetting declining terms of trade for commodities, etc., increasing export earnings, lifting the savings rate, and so on. On the other hand, it is now more frequently considered that such policies may have had a negative impact on the agricultural sector and the rural poor. Moreover, tariffs on raw materials from the minerals, fisheries, agriculture and forestry sectors, or on intermediate goods, such as steel or textiles, tend to raise the cost of manufactured products, making them hard to sell overseas, and these effects of such tariffs can only be partly offset by temporary admission or duty-drawback schemes. Thus, to the extent that imports are used in the production of exports goods, tariffs are a tax on exports. It is recognition of these potential long-term gains that is driving the reform process in the developing countries and, no doubt, such policies would be pursued more vigorously if institutions and supporting programmes were in place to facilitate the adjustment process.

Fiscal imbalance

Many developing countries are concerned that trade liberalisation will have a significant adverse impact on government revenues because tariff revenues make up substantial contribution to public revenue. As we have seen, tariff revenue losses are often in the order of 50 per cent (100 per cent in the case of "free trade"), so this seems to be a point to

take into consideration. The question is the extent to which this will make a substantial difference to overall government revenues. In the OECD countries certainly there should not be a problem, since tariffs typically make up around 1 per cent or less of overall government revenues and these countries have well developed tax systems to facilitate any need for revenue replacement from alternative sources. However, as Table 10 shows, the situation is quite different for the developing countries where the share of tariffs in total government revenue rises to as much as 76 per cent in Guinea. Less extreme examples are Cameroon and India where tariff revenues represent some 28 and 18 per cent of government revenues, respectively. Ten countries collect more than half their revenues from tariffs and 43 countries collect more than a quarter.

Table 10: Tariff revenues as percentage of government revenues (latest)

	%		%		%		%
Albania	15.5	Ecuador	11.3	Lithuania	1.1	Sierra Leone	48.6
Algeria	10.9	Egypt, Arab Rep.	12.6	Luxembourg	0	Singapore	1.6
Argentina	4.3	El Salvador	6.2	Macao, China	0	Slovak Republic	1.2
Australia	2.6	Estonia	0.1	Madagascar	51.9	Slovenia	1.7
Austria	0	Ethiopia	26	Malawi	16.3	Solomon Islands	57.1
Azerbaijan	8.5	Fiji	21.5	Malaysia	12.7	Somalia	52.5
Bahamas, The	55.9	Finland	0	Maldives	28.3	South Africa	2.9
Bahrain	5.9	France	0	Mali	12	Spain	0
Bangladesh	22.6	Gabon	17.4	Malta	4.2	Sri Lanka	11.3
Barbados	11.2	Gambia, The	42.8	Mauritania	30.1	St. Kitts & Nevis	37
Belarus	6.1	Georgia	5.6	Mauritius	25	St. Lucia	26.5
Belgium	0	Germany	0	Mexico	4.1	St. Vincent and the Grenadines	40.3
Belize	49	Ghana	26.8	Moldova	5.8	Sudan	29
Benin	56	Greece	0.1	Mongolia	7.6	Suriname	22.9
Bhutan	1.9	Grenada	18.2	Morocco	15.9	Swaziland	51.9
Bolivia	5.1	Guatemala	15	Myanmar	4.1	Sweden	0.1
Botswana	12.4	Guinea	76.6	Namibia	37.1	Switzerland	1
Brazil	2.9	Guinea-Bissau	37.1	Nepal	27.2	Syrian Arab Republic	9.9
Bulgaria	2	Guyana	9	Netherlands	0	Tajikistan	15.9
Burkina Faso	14.3	Haiti	21.4	Netherlands Antilles	39.2	Tanzania	8.6
Burundi	20.2	Honduras	42.4	New Zealand	1.7	Thailand	10.4
Cameroon	28.3	Hungary	2.9	Nicaragua	7.1	Togo	35.4
Canada	1.3	Iceland	1.3	Niger	36.4	Tonga	48.4
Cayman Islands	42.2	India	18.5	Nigeria	6.6	Trinidad and Tobago	5.7
Central African Republic	39.8	Indonesia	3.1	Norway	0.5	Tunisia	11.5
Chad	15.3	Iran, Islamic Rep.	7.4	Oman	2.8	Turkey	0.9
Chile	5.3	Ireland	0	Pakistan	12.2	Uganda	49.8
China	9.5	Israel	0.6	Panama	10.7	Ukraine	4.5
Colombia	7.3	Italy	0	Papua New Guinea	27.3	United Arab Emirates	0
Comoros	54	Jamaica	7.2	Paraguay	10.3	United Kingdom	0
Congo, Dem. Rep.	31.9	Japan	1.3	Peru	9.1	United States	1
Congo, Rep.	7.8	Jordan	16.8	Philippines	17.2	Uruguay	2.9
Costa Rica	4.6	Kazakhstan	7	Poland	1.8	Vanuatu	36.2
Cote d'Ivoire	41.8	Kenya	13.8	Portugal	0	Venezuela, RB	7
Croatia	6.5	Korea, Rep.	6.4	Romania	3.1	Vietnam	18.1
Cyprus	3.8	Kuwait	2.8	Russian Federation	13.7	Yemen, Rep.	10.3
Czech Republic	1.4	Kyrgyz Republic	3	Rwanda	31.1	Zambia	15.8
Denmark	0	Latvia	1.2	Samoa	50.2	Zimbabwe	20.5
Djibouti	6	Lebanon	28.1	San Marino	1.4		
Dominica	19.6	Lesotho	47.7	Senegal	36.5		
Dominican Republic	42.8	Liberia	34.6	Seychelles	42.6		

Source: World Bank 2003.

One consequence then of the current WTO negotiations is that many developing countries would have to raise taxes on income, value added, capital gains, property, labour, and consumption or raise non-tax revenues to compensate. This could be an advantage in the longer term, since, in principle, broad-based taxes, if applied equally across all sectors, would promote a more efficient allocation of scarce domestic resources (in the absence of externalities which may include various social goals). However, such a move may be costly and the implementation of such a shift often entails the upgrading of the revenue service. Indeed, one of the main reasons for the use of tariffs is the relative ease of collection as goods cross national frontiers.

In some cases, the switch to domestic taxes may be achieved relatively easily. For example, in some small countries, where most goods are imported, imposing, say, a sales or consumption tax (including an excise tax, such as many countries apply on petroleum, tobacco and alcohol) may well operate in practice operate essentially against imports. In this case, the essential difference is that the new, domestic tax would not be subject to WTO negotiations, while revenues would be unchanged and come from the same source.

Another issue is the cost of raising taxes through tariffs verses alternative measures. Theoretical evidence suggests that reducing trade taxes and replacing them with a consumption tax is generally welfare-enhancing (Keen and Lightart, 1999). This is because trade taxes discriminate between traded and non-traded goods, whereas as consumption taxes applying to domestically produced and imported goods are usually considered to be less distortionary.

Estimates using the Global Trade Analysis Project (GTAP)[10] database and UNCTAD tariff data tend to confirm the desirability of switching away from trade taxes, although the data say nothing about the cost of making the switch (such as, re-training of officials, new computer equipment, programming, etc., after the preparation and passage of new tax laws.) The data indicate that in 27 out of 34 countries the distortionary costs of tariff revenues, at the margin, exceed the cost of output tax revenue and thus a switch from one source of revenue to another would be beneficial. For example, in China and Korea (Rep.) the cost of raising $1 in tariff revenue was estimated at $1.56 and $1.49,

[10] GTAP http://www.gtap.agecon.purdue.edu/.

respectively, whereas $1 in output tax costs $1.27 and $1.13, respectively. On the other hand, in Japan the cost of raising $1 of tariff revenue is $1.12 compared with $1.44 for output taxes, reversing the implications. In general, higher taxes are related to higher cost of raising revenue. In high-taxation countries, e.g. Denmark and Sweden, the cost of tariff revenue exceeds the costs of output, income or consumption taxes. However, in developing countries with high tariffs it would be more efficient in the longer term to switch to broad-based taxes, although there there would be costs involved in making the transition.

In addition to removing distortions, several factors may compensate governments for reductions in tariffs:

- Where tariffs are reduced rather than eliminated and/or where non-tariff barriers are reduced, tariff revenues may rise as a result of increased trade, and this appears to have been the case in a number of countries at the early stage of implementation of World Bank trade reform programmes. The explanation is related to the responsiveness (elasticity) of imports to tariff changes.
- A reduction in rates may reduce evasion (smuggling) to a significant degree. If tariffs fall, then it may no longer be worthwhile evading normal trade procedures.

The conclusion is that while reductions in government revenues are a concern for developing countries in particular and even more so for some such countries, there are compensating factors that can partially or in some cases completely offset the revenue reductions for some level of reform. On the other hand, complete tariff elimination necessarily implies the elimination of the tariff revenue source. The main issues then are the speed and cost of implementing new tax laws and the associated changes in fiscal administration.

Regarding preferences….

As noted earlier, we do not compute any major losses to the developing countries under the various scenarios we have examined but there are some moderate welfare losses under several scenarios for Sub-Saharan Africa (and in one scenario a very small welfare loss to the United States, linked to inter-sectoral shifts). Nevertheless, using a partial equilibrium

model for detailed study in agriculture, the authors show important losses for some African countries linked to preference erosion in the EU, particularly in the sugar sector.

Despite the potential for preference erosion, particularly for LDCs and other countries which benefit from deeper preferences than other developing countries, for developing countries as a whole seem to gain from MFN liberalisation in all of our scenrios. This is for a number of reason, including the fact that they gain from the erosion of prefences in existing regional trade agreements. Moreover, in spite of the preferential access enjoyed by many developing and least developed countries, average tariffs on exports from these regions to developed countries may be higher than those facing developed countries themselves. This reflects the varying composition of imports with different tariffs rather than higher tariffs on the same item. Table 11 shows non-agricultural trade weighted applied tariffs, levied by developed and developing countries on exports from each other. These data include preferential rates. As may be observed, on average imports into developed are levied tariffs of 2.1 per cent on exports from other developed countries and 3.9 per cent on exports from developing countries. One the other hand, developed countries also face higher tariffs in exporting to developing countries (9.2 per cent) than do other developing countries (7.2 per cent). The most significant sectors contributing to the higher tariffs on developing country exports is petroleum and coal products, where developing countries face an average tariff in developed countries of 45 per cent, and textiles and apparel.

Table 11: Weighted average applied tariffs by group

	Developed	**Developing**	**Least developed**
	%	%	%
Source			
Developed	2.1	9.2	11.1
Developing	3.9	7.2	14.4
Least developed	3.1	7.2	8.3
Total	2.9	8.1	13.6

Source: Derived from UN COMTRADE database.

5. CONCLUSIONS

The aggregate results in our study are quite moderate, suggesting that there is little to worry about in respect of any structural adjustment costs, and this is consistent with findings by some other authors, as discussed in the next section.[11] However, as we have seen, these generally modest overall results conceal important changes in trade and output in individual sectors. Some countries will achieve important gains in some key sectors, but in other countries some sectors face important adjustments. Moreover, the estimated tariff revenue losses could have a strong negative impact on government revenues in a number of countries, and new tx policies would need to be put in place in a number of developing countries. Although preferences are included in the modified database and would be eroded as a result of MFN liberalisation, our estimates do not produce any negative effects on trade for any of the developing regions in the model, but Sub-Saharan Africa shows a very small decline in welfare under some scenarios. Of course, the results in some specific countries with our regional groups could be different and there may also be some variations in specific sectors.

In an important variation from the standard GTAP model in which employment is maintained while wages adjust, we allowed for the possibility of bringing the unemployed into the labour force. This is shown to have an impact far greater than the efficiency gains that result from an improved allocation of resources.

Finally, a number of developing countries could face difficulties in implementing the more ambitious tariff reductions proposed in this round of negotiations. While these bring greater longer term gains in welfare and exports, they also imply greater imports, greater revenue losses and declines in output which are likely to precede the gains. If developing countries wish to pursue the more ambitious proposals, then consideration needs to be given to developing appropriate support measures to facilitate the implementation of the

[11] Other studies, which introduce assumptions of imperefect competition and encompass services generate much larger results (Brown, Deardorff and Stern, 2001). In the present study we also include services and agriculture, as explained below, but we retain the more conservative assumptions of perfect competition and constant returns to scale.

final agreement and to minimize the burden of adjustment. Some recent experiences of national reforms also suggests that economic and social costs may be unpredictable and some caution seems to be indicated.

To reduce adjustment costs and other risks, an obvious approach is to phase in adjustment so that capital is replaced at the rate of depreciation and labour is relocated or retrained over a manageable time frame, and this would be quite normal in the implementation phase in multilateral trade negotiations. The IFIs have also indicated that they may be able to provide financial assistance to help developing countries cope with any BOP problems (the IMF) or to put in place programmes (social safety nets, training, etc.) and institutions to facilitate the adjustment process (The World Bank). Here, the problem is that many of these countries are already highly indebted, and it is not obvious that further trade liberalisation is necessarily the highest development priority for further borrowing at this time (compared, for example, with health programmes to combat AIDS). Moreover, in the trade area, research and experience suggest that in Sub-Saharan Africa the greatest trade response may be through measures to build physical infrastructure.

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Table A1: Change in output following free trade (per cent)

	USA	Canada	Central America	Andean Pact	Mercosur	European Union	Other West Europe	Central and Eastern Europe	Middle East	North Africa	Sub Saharan Africa	South Africa	China	Japan	India	Other South Asia	Indonesia	Other South East Asia	Rest of Asia	Oceania	All other regions	World
Unprocessed agriculture	0	1	0	1	1	0	-1	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	-0.20
Processed agriculture	1	0	0	1	1	0	1	0	-1	0	-1	1	0	-1	0	-1	-1	0	-1	4	0	-0.05
Fisheries and forestry	0	0	-1	0	0	0	0	-1	-1	0	0	2	0	0	0	0	1	0	0	1	-1	0.01
Coal, oil, gas & other minerals	0	0	-1	1	1	0	0	0	0	0	0	0	-1	-1	-3	-3	-1	-1	-2	-1	0	-0.08
Petroleum and coal products	0	0	-1	1	0	2	0	-2	4	1	-11	0	-2	-21	6	-13	1	4	13	1	0	-0.84
Lumber	0	1	-4	-1	0	0	-1	-3	-4	-5	-3	1	-1	-1	-1	-1	3	1	14	0	-9	-0.34
Paper products	0	1	-2	-1	0	0	0	-1	-1	-5	-5	0	-2	0	-3	-5	0	-1	0	0	-1	-0.04
Textiles	-1	-4	3	-1	-1	-1	-2	-4	-4	-6	-7	-1	2	3	3	1	5	3	6	-3	1	0.36
Wearing apparel	-2	-6	0	4	-1	-3	-2	-3	-3	2	-6	11	7	-2	15	23	12	15	2	-7	3	0.58
Leather	-1	-5	-3	-4	1	1	0	0	-13	-5	-14	-7	11	-13	10	2	21	14	5	2	-3	1.86
Chemicals, rubber and plastics	0	0	-2	-2	-1	0	0	-2	0	-4	-5	-1	-3	4	-2	-5	0	0	0	-1	-1	0.13
Iron and steel	0	0	-1	-4	-1	1	1	-2	-3	-10	-5	3	-3	1	-5	-14	-6	-6	-3	-1	2	-0.35
Non ferrous metals	1	1	-1	6	2	0	3	-2	0	-4	1	-2	-4	0	-19	-8	-4	-3	0	1	1	-0.34
Non metallic manufactures	1	-1	-5	-3	-1	1	0	-2	-2	-6	-7	-2	0	1	-3	-10	0	-4	-2	-1	1	-0.16
Fabricated metal products	1	0	-4	-3	-2	1	0	-2	-2	-9	-9	-1	0	1	5	-10	-4	-3	0	0	-3	-0.06
Metal manufactures	1	1	-1	-7	-5	1	0	2	-2	-5	-7	0	-2	0	-3	-8	2	3	-2	-1	-1	0.04
Other Manufactures	1	1	-8	-3	-2	1	-3	-1	1	-9	-2	3	1	1	-4	-5	-3	0	0	1	0	0.08
Motor vehicles	0	0	7	-23	1	0	0	2	-4	-25	21	-10	-18	5	-6	-47	-11	-12	3	-5	-11	0.05
Transport other than motor vehicles	-1	0	6	0	0	-2	-4	-1	0	1	20	1	2	6	-1	-19	4	1	2	0	-1	0.30
Electronics	1	2	9	-4	-3	0	0	3	1	2	-6	0	3	-1	7	4	1	0	-1	1	-1	0.13
Services and other activities	0	0	0	1	0	0	0	0	0	2	1	0	0	0	1	1	0	0	0	0	1	0.01
Total	0.03	0.03	0.12	-0.26	-0.10	0.04	0.03	-0.13	-0.05	-0.61	-0.45	-0.12	-0.17	0.11	-0.24	-0.46	0.14	0.08	0.19	0.07	-0.17	0.00

Source: GTAP simulations.

Table A2: Change in output following Hard scenario (per cent)

	USA	Canada	Central America	Andean Pact	Mercosur	European Union	Other West Europe	Central and Eastern Europe	Middle East	North Africa	Sub Saharan Africa	South Africa	China	Japan	India	Other South Asia	Indonesia	Other South East Asia	Rest of Asia	Oceania	All other regions	World
Unprocessed agriculture	1	2	0	1	1	-1	-2	0	0	0	0	1	0	-2	0	0	-1	0	-1	2	0	-0.23
Processed agriculture	1	0	0	0	1	0	1	0	-1	0	-1	1	0	-1	-1	-1	-1	0	-1	6	0	-0.08
Fisheries and forestry	0	1	-1	0	1	0	1	-1	-1	1	0	2	0	0	0	0	0	-1	0	2	-1	-0.01
Coal, oil, gas & other minerals	0	0	0	1	1	1	0	0	0	1	0	0	-2	-2	-6	-2	-2	-1	-7	-1	0	-0.10
Petroleum and coal products	0	0	1	1	0	1	-1	-1	4	3	-6	0	-2	-22	9	-3	2	2	14	1	1	-0.83
Lumber	0	1	-2	-1	0	0	-2	-4	-2	-3	-2	1	-1	-1	0	0	0	-1	26	0	-12	-0.30
Paper products	0	0	0	0	0	0	0	-1	0	-2	-1	0	-2	0	-1	-2	-1	0	0	0	0	-0.02
Textiles	-3	-10	3	-3	-2	-2	-5	-7	-5	-6	-8	-2	4	4	4	3	6	7	13	-8	3	0.61
Wearing apparel	-6	-19	1	2	-2	-8	-10	-8	-5	7	-9	30	18	-5	23	15	19	25	6	-15	10	-0.12
Leather	-7	-22	-6	-7	0	-1	-6	-1	-19	-11	-22	-24	17	-32	10	-8	49	18	16	3	-8	1.50
Chemicals, rubber and plastics	0	-1	0	0	0	0	0	-2	0	-1	-1	-1	-4	5	-1	-2	-1	-1	0	0	0	0.12
Iron and steel	0	0	-1	-1	-1	1	0	-2	-2	-6	1	5	-4	1	-3	-8	-3	-5	-4	-2	2	-0.45
Non ferrous metals	1	1	-1	4	0	0	12	-1	-2	-3	-2	0	-5	0	-22	-4	-6	-6	-2	-1	1	-0.36
Non metallic manufactures	0	-1	-2	-1	0	1	-1	-2	-2	-3	-1	-2	0	0	-1	-3	-1	-3	-3	0	2	-0.09
Fabricated metal products	0	1	0	-1	-1	1	-2	-2	-1	-6	-3	-1	-1	0	5	-3	-2	-2	-1	0	-2	-0.02
Metal manufactures	1	1	-2	-4	-6	1	-1	3	-3	-6	-4	-1	-3	-1	-3	-5	0	2	-2	-1	0	-0.04
Other Manufactures	1	0	-7	-2	-1	2	-4	-1	2	-7	-2	4	-1	0	-6	-3	-4	-1	-1	2	1	0.08
Motor vehicles	0	0	2	-21	-1	0	0	5	-4	-32	12	-16	-24	7	-7	-55	-8	-9	2	-5	-14	0.07
Transport other than motor vehicles	-1	1	4	0	0	-2	-6	1	2	11	33	4	1	7	0	-10	-1	-2	1	-2	0	0.09
Electronics	1	3	8	-8	-6	1	0	4	1	-1	-8	-5	4	-1	4	-1	-2	-1	-2	0	-3	0.18
Services and other activities	0	0	0	0	0	0	0	1	0	2	1	0	0	0	1	0	0	0	0	0	0	0.03
Total	0.02	0.03	0.11	-0.22	-0.13	0.01	0.01	-0.11	-0.10	-0.37	-0.31	-0.09	-0.12	0.12	-0.07	-0.13	0.25	0.07	0.22	0.07	-0.13	0.00

Source: GTAP simulations.

Table A3: Change in output following Soft scenario (per cent)

	USA	Canada	Central America	Andean Pact	Mercosur	European Union	Other West Europe	Central and Eastern Europe	Middle East	North Africa	Sub Saharan Africa	South Africa	China	Japan	India	Other South Asia	Indonesia	Other South East Asia	Rest of Asia	Oceania	All other regions	World
Unprocessed agriculture	1	2	0	1	1	-1	-2	0	0	0	0	1	0	-2	0	0	-1	0	-1	2	0	-0.19
Processed agriculture	1	0	0	-1	1	0	1	0	0	-1	-1	0	0	-1	-1	-1	-1	1	-1	6	-1	-0.06
Fisheries and forestry	0	1	0	0	0	0	1	-1	0	0	0	2	0	0	0	0	-1	0	0	2	-1	-0.01
Coal, oil, gas & other minerals	0	0	0	0	0	1	0	0	0	1	0	0	-1	-2	-2	-2	-2	-1	-4	-1	0	-0.10
Petroleum and coal products	0	0	1	1	0	1	-1	-1	4	3	1	0	-1	-22	3	2	2	3	13	0	1	-0.87
Lumber	0	1	-1	0	0	0	-2	-3	-2	-2	-1	0	-2	-1	-1	-1	-1	0	23	0	-10	-0.25
Paper products	0	0	0	0	0	0	0	-1	0	0	0	0	-2	0	-1	-1	-1	0	0	0	0	-0.01
Textiles	-4	-10	9	2	0	-3	-3	-6	-4	-4	-2	0	4	2	3	3	6	9	9	-8	5	0.62
Wearing apparel	-8	-18	9	4	0	-7	-6	-6	-7	-4	-1	17	16	-6	16	14	16	18	10	-16	14	-0.34
Leather	-9	-22	1	-1	0	-2	-3	2	-9	-2	-8	-14	14	-31	4	-11	45	11	12	-3	0	1.66
Chemicals, rubber and plastics	0	-1	0	0	0	0	0	-2	0	0	0	-1	-3	4	-1	-1	-1	0	0	-1	0	0.09
Iron and steel	0	0	-2	-1	0	1	0	-2	-1	0	1	3	-4	1	-2	-4	-2	-3	-3	-1	2	-0.37
Non ferrous metals	1	1	-2	1	-1	0	4	-1	0	0	0	-1	-4	0	-6	-3	-5	-4	-2	0	0	-0.24
Non metallic manufactures	0	-1	-1	-1	0	1	-1	-2	-2	0	0	-1	0	0	-1	-1	-1	-1	-2	0	1	-0.05
Fabricated metal products	0	0	-1	0	0	1	-1	-2	-1	-1	0	0	-1	0	-1	-1	-2	-1	-1	0	-2	0.00
Metal manufactures	1	1	-3	-1	-3	1	-1	2	-3	-1	0	0	-3	0	-2	-3	-2	-1	-2	-2	0	-0.07
Other Manufactures	0	0	-1	-1	0	1	-3	-1	0	-1	0	1	-1	0	-2	-3	-3	-1	0	0	1	0.04
Motor vehicles	1	1	-4	-9	0	0	0	2	0	-15	1	-4	-20	5	0	-15	-1	-1	1	-3	-12	0.05
Transport other than motor vehicles	1	2	-1	-1	-2	0	-3	1	0	7	3	2	0	0	-1	-5	-4	-2	-2	-2	-1	0.08
Electronics	1	3	0	0	0	1	1	4	1	1	0	-1	3	0	-4	0	-4	-2	-2	-1	2	0.10
Services and other activities	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.02
Total	0.01	0.03	0.00	-0.09	-0.01	0.00	0.01	-0.13	-0.04	-0.14	-0.09	-0.04	-0.12	0.06	-0.02	0.08	0.22	0.05	0.14	0.06	-0.10	0.00

Source: GTAP simulations.

Table A4: Change in output following Simple scenario (per cent)

	USA	Canada	Central America	Andean Pact	Mercosur	European Union	Other West Europe	Central and Eastern Europe	Middle East	North Africa	Sub Saharan Africa	South Africa	China	Japan	India	Other South Asia	Indonesia	Other South East Asia	Rest of Asia	Oceania	All other regions	World
Unprocessed agriculture	1	2	0	1	1	-1	-2	0	0	-1	0	1	0	-2	0	0	0	1	-1	1	0	-0.12
Processed agriculture	1	0	0	-1	1	0	2	0	-1	-1	-1	0	0	-1	-1	-1	0	1	-1	5	0	-0.07
Fisheries and forestry	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	1	-1	-0.07
Coal, oil, gas & other minerals	0	0	0	0	0	0	0	0	0	0	0	0	-1	-2	-1	-1	-1	0	-3	-1	0	-0.08
Petroleum and coal products	0	0	1	1	0	1	-2	-1	4	2	1	0	-1	-22	3	3	2	3	13	0	1	-0.85
Lumber	0	1	-1	0	0	0	-1	-4	-1	-2	-1	0	0	0	0	0	0	0	25	0	-9	-0.23
Paper products	0	0	0	0	0	0	0	-1	0	0	0	0	-1	0	0	0	0	0	0	0	0	0.01
Textiles	-2	-5	8	0	0	-1	-1	-4	-2	-1	-1	-1	0	3	1	1	0	1	4	-3	2	0.09
Wearing apparel	-4	-8	11	1	0	-3	-3	0	-4	-1	-1	3	7	-2	6	6	1	2	2	-1	1	-0.15
Leather	-5	-10	3	-1	-1	1	0	3	-7	-1	-3	-10	8	-24	6	-5	29	-4	6	-3	-2	0.89
Chemicals, rubber and plastics	0	-1	0	0	0	0	1	-2	0	0	0	-1	-2	4	0	-1	0	0	0	-1	0	0.10
Iron and steel	0	-1	-2	-1	0	1	1	-3	-1	-1	1	2	-2	1	-1	-3	-1	-2	-2	-2	3	-0.27
Non ferrous metals	1	1	-2	1	0	0	2	-1	0	0	1	-1	-2	0	-3	-1	-2	-2	-1	-1	1	-0.19
Non metallic manufactures	0	-1	-1	0	0	0	-1	-2	-2	0	0	0	0	0	0	0	0	-1	-1	0	1	-0.01
Fabricated metal products	0	0	-1	0	0	0	-1	-2	-1	-1	0	0	0	0	1	0	-1	0	-1	0	-2	0.00
Metal manufactures	0	1	-3	0	-3	1	-1	2	-2	-1	1	0	-2	0	-2	-1	-1	0	-1	-2	1	-0.04
Other Manufactures	0	0	-1	0	0	0	-4	-1	0	-1	0	1	1	1	-1	-1	-2	-1	-1	-1	1	0.03
Motor vehicles	0	0	-4	-5	0	1	0	2	0	-7	-1	0	-16	3	0	-13	0	-1	0	-2	-12	-0.01
Transport other than motor vehicles	0	2	-2	-1	-1	0	-2	0	1	3	3	2	1	1	0	-3	-2	0	-2	-3	0	0.07
Electronics	1	2	-1	0	0	0	1	3	1	0	1	-1	4	-1	-3	0	-2	-1	-1	-2	2	0.12
Services and other activities	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.03
Total	0.00	0.01	0.00	-0.07	-0.02	0.02	0.02	-0.13	0.00	-0.07	-0.07	0.00	-0.10	0.01	-0.02	0.02	0.06	-0.01	0.12	0.08	-0.09	0.00

Source: GTAP simulations.

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