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ABSTRACT

How Can South Asia and Sub-Saharan Africa Gain from the Next WTO Round?

If South Asia and sub-Saharan Africa are to become constructively engaged in the next attempt by World Trade Organization (WTO) members to liberalize trade multilaterally, they need to be convinced that there will be sufficient gains from trade reform to warrant the inevitable costs of negotiation and adjustment. This Paper provides new estimates of the likely economic effects on their economies of further liberalizing world trade post-Uruguay Round. The results show that the developing countries of South Asia and sub-Saharan Africa have much to gain from taking part in the next round. Those gains will be far greater the more those countries are willing to embrace reform at home so as to enable their firms to take greatest advantage of the opportunities provided by the opening up of markets abroad.

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How Can South Asia and Sub-Saharan Africa Gain From the Next WTO Round?

Kym Anderson and Shunli Yao

At the Fourth Ministerial Meeting of the World Trade Organization (WTO) in Doha in November 2001, members agreed to launch the next comprehensive round of multilateral trade negotiations. The attempt to do so at the previous Ministerial in Seattle in late 1999 was aborted, not least because developing country members believed they had not benefited sufficiently from the preceding Uruguay Round. That belief still persists, and the developing countries of South Asia and Sub-Saharan Africa in particular remain sceptical that a new round of negotiations will benefit them – notwithstanding the substantial focus on their concerns in the Doha Ministerial Declaration (WTO 2001d). So sensitive are those concerns that the Declaration does not even refer to a new round, referring instead to a Doha Development Agenda.

If those numerous developing countries in South Asia and Sub-Saharan Africa are to become constructively engaged in this next attempt to liberalize trade multilaterally, they need to be convinced that there will be sufficient gains from trade reform to warrant the inevitable costs of negotiation and adjustment. To that end, this paper provides new estimates of the likely economic effects on their economies of further liberalizing world trade after Uruguay Round implementation is completed.

The paper begins by describing briefly the global economy-wide model known as GTAP, and then using it to provide two base projections of the world economy in 2005. By that time all Uruguay Round commitments are scheduled to be fully implemented, and most of the commitments made by China and Taiwan in their WTO accession negotiations will have been implemented. It is also the nominated date for

concluding this next round of negotiations. The first base projection assumes that none of the Uruguay Round commitments are implemented, while the second assumes all are fully implemented and China joins the WTO. The comparison between these two scenarios gives a sense of the size of the contribution to structural change that is generated by economic growth generally as compared with trade policy reform in particular.

Having established that second 2005 projection of the global economy, we then use the GTAP model to examine the consequences of removing the distortions to merchandise trade that will still be in place in 2005 post-Uruguay Round. We know from documentation at the WTO (2001a) and from recent GTAP modelling efforts that there will still be much to gain globally from further reform. The effects are considered first without and then with South Asia and Sub-Saharan Africa taking part. The purpose of the comparison between those two scenarios is to show the extent to which the economic benefits to those poor countries from the next WTO round depends on their own as distinct from other regions' liberalizations.

The final part of the paper discusses the limitations of the GTAP model in capturing all the gains from trade, and draws out implications for South Asia and Sub-Saharan African policy makers.

1. The global, economy-wide GTAP model and database

To examine the potential effects of trade liberalizations on South Asian and Sub-Saharan African countries, use is made of the projections version of the GTAP (Global Trade Analysis Project) applied general equilibrium model based in Purdue University (Hertel 1997). The GTAP model is a standard, multi-region model that is currently in use by several hundred researchers in scores of countries on five continents. The Version 4 data base builds on contributions from many of these individuals, as well

as the national and international agencies in the GTAP Consortium (McDougall, Elbehri and Truoung 1998). Perfect competition and constant returns to scale are assumed for all sectors of each economy in the version used here (but see qualifications in the final section of the paper).

The model utilizes a sophisticated representation of consumer demands that allows for differences in both the price and income responsiveness of demand in different regions depending upon both the level of development of the region and the particular consumption patterns observed in that region.

On the supply-side, differences in rates of factor accumulation within and between countries interact with different sectoral factor intensities to drive Rybczynski-type changes in the sectoral composition of output. The GTAP production system distinguishes sectors by their intensities in four primary factors of production: agricultural land, labour time, physical capital, and human capital. Thus in a region where physical capital is accumulating rapidly, relative to other factors, we can expect the capital intensive sectors to expand at the expense of labour-intensive sectors.

The GTAP framework is built on a complete set of economic accounts for 1995 for each of 45 economies/regions spanning the world (see McDougall et al. 1998). It incorporates an exhaustive description of inter-industry linkages between the 50 sectors in the model. In addition to differences in intermediate input intensities, import intensities are also permitted to vary across uses. Since much trade is in intermediate inputs, the distinction between sales to final consumers and sales to other firms can be quite important. Lowering the cost of imported goods to consumers is quite different from lowering the cost of intermediate inputs to domestic firms that may be competing with imports in the final product market.

As well, products are differentiated by place of production. The linkage between the different prices of a product is typically quite strong, but will depend on the degree

of substitutability in consumption. In addition to matching up more effectively with reality, this approach has the advantage of permitting bilateral trade to be tracked, as opposed to simply reporting total exports net of imports.

Since it is cumbersome to conduct and present projections with the full 50-sector, 45-region GTAP data base, the present results have been aggregated up to a level which highlights sectors and countries of interest for this particular study. Unfortunately, the regional aggregation in GTAP allows only the very largest IOR economies to be shown separately. The model is solved with GEMPACK software, described in Harrison and Pearson (1996).

2. Projecting the post-Uruguay Round world economy to 2005

Version 4 of the GTAP model's data base is for 1995, the beginning of the Uruguay Round's implementation. Using estimates of the tariffs in place at the start and conclusion of Uruguay Round implementation (Table 1) and projections of growth in factor endowments, productivity and population to 2005 (based mainly on World Bank numbers -- see Table 2), it is possible for the GTAP model to project the world's economies forward. Table 3 summarizes the results of such a base-case projection scenario for 2005 on output in developing and other economies, from which a number of points can be made.

[insert Tables 1, 2 and 3 near here]

First, non-trivial structural changes necessarily accompany different rates of expansion in (a) relative factor endowments and productivities and (b) incomes as economies grow. In general, the growth of agricultural and other primary product output is slower than that for manufactures and services in virtually all countries.

Second, outputs of all sectors tend to grow slower in slower-growing economies. This is a direct result of the home bias that is so prevalent in every

nation's economy: foreign products, even of fairly homogeneous items such as cereals, are an imperfect substitute for the domestically produced item because of such things as nationalistic preferences and transport costs. Hence relatively rapidly growing China is projected to increase its output of agricultural goods over the decade to 2005 at a faster rate than South Asia (whose economies are projected to grow slower than China's).

Third, the proportional changes over the decade are very similar in the two scenarios (compare Tables 3(a) and 3(b)). This is a crucial point that is often not appreciated. The point is that as major as the Uruguay Round is, the impact of its decade-long implementation on the structure of the world's economies is small relative to the impact of normal market forces that accompany economic growth over such a longish period.

Fourth, within South Asia and Sub-Saharan Africa, perhaps the most significant structural change difference between the two scenarios has to do with textiles and clothing. The densely populated countries in South Asia are projected to have significantly bigger textile and clothing (and slightly bigger service) sectors because of the Uruguay Round reforms, but smaller shares of output from other manufactures. (This scenario assumes, however, that there is *full* implementation of the Uruguay Round's Agreement on Textiles and Clothing, without any offsetting safeguards measures being implemented at the end of the reform period in late 2004; and that reform of China's quota-restricted trade in these products is not complete until 2008 rather than 2005.) In more agrarian and less densely populated Sub-Saharan Africa, by contrast, the manufacturing sector would grow somewhat slower following Uruguay Round implementation as that region instead exploits new market opportunities for its more-competitive agricultural products.

Fifth, notice that the service sector's expansion is shown to be not very different under the two scenarios in proportional terms (although in dollar terms that huge sector would be significantly bigger under freer trade). This is because we assume, like most of our predecessor modellers, that the General Agreement on Trade in Services (GATS) will deliver no significant reforms by 2004.

[insert Table 4 near here]

Changes in consumption also accompany economic growth and policy reforms, and it is the difference between them and the production changes that determine the changes in sectoral trade balances. The latter can be summarized in terms of the self sufficiency ratio (the ratio of production over consumption), as shown in Table 4, where it should be kept in mind that the sum of the sectoral trade balance changes is set exogenously by the modellers at zero (that is, no running up or running down the aggregate balance of trade over time). What Table 4 reveals is a remarkable degree of stability as between the two projection scenarios for developing countries. The implementation of the Uruguay Round is not projected to cause major changes in agricultural self-sufficiency, for example. In fact the only significant differences between the scenarios are in manufactures: South Asia will specialize more in textiles and clothing and less in other manufactures because of the Uruguay Round, while Sub-Saharan Africa will specialize more in primary products and less in industrial goods.

3. Effects of removing remaining distortions to goods trade in 2005

Having established the post-Uruguay Round base-case projection scenario for 2005, we examine how different the world would look then if the remaining import tariffs on all goods, and all agricultural producer and export subsidies, were to be removed. This thought experiment is done in two stages: first, with all except South

Asian and Sub-Saharan African distortions removed, and then with those developing countries' policies abolished as well.

If all regions (other than South Asia and Sub-Sahara) were to remove their trade distortions remaining after the end of 2004 (when all Uruguay Round commitments are to have been implemented), the world economy would structurally adjust to allow each region to exploit even more its comparative advantages. For example, Table 5(a) shows Australia and New Zealand would expand their temperate crop and livestock output as the agricultural protectionist countries of East Asia contracted theirs. It is the comparison between Tables 5(a) and 5(b) for South Asia and Sub-Saharan Africa that are of particular interest in this paper, however.

[insert Table 5 near here]

The first point to note is that South Asia and Sub-Saharan Africa would have to undertake some structural changes within and between key sectors even if they chose not to join in such a trade reform (Table 5(a)). In particular, agriculture would expand at the expense of manufacturing in those developing countries.

Second, South Asia would expand its agricultural output more if it also undertakes reforms itself than if it stands aside from reform. Its textile/clothing output, by contrast, would shrink a little if it stands aside from reform but would expand if it joins in. The latter expansion would not be at the expense of other manufactured output, though. On the contrary, a comparison between Tables 5(a) and 5(b) reveals that industrial and service sector output generally also is greater in that region when it participates in reform. That is, the removal of South Asia's own distortionary policies expands all sectors of its economies, even if the manufacturing sector is the one to grow fastest.

Third, the output differences between the two reform scenarios for Sub-Saharan Africa suggest this region too would enjoy faster growth in manufactures

than in agriculture if it freed up its own trade. For South Africa, that industrial boost would be in less labour-intensive products at the expense of textiles and clothing while for the rest of Sub-Saharan Africa the opposite is true.

And fourth, those adjustments would lead the Middle East and North Africa to shift further away from food and feed production, in which it has a strong comparative disadvantage. Some of their resources (particularly those in Egypt) would instead go into plant fibre (cotton) and textiles and clothing production.

The trade balance for the different product groups is affected by the above production effects plus changes in consumption following relative price and income changes. The net effects are seen by comparing Tables 6(a) and 6(b). The key point to draw from them is that net food imports are less for South Asia and Sub-Saharan Africa following the removal of remaining trade barriers in 2005, and more so when those developing countries participate in the reform. The consequences for self-sufficiency ratios are reported in Tables 7(a) and 7(b).

[insert Tables 6, 7 and 8 near here]

Table 8 summarizes the estimated effects on economic welfare without and with South Asia and Sub-Saharan Africa participating in the removal of remaining distortions post-Uruguay Round. The global welfare gain is well over US\$200 billion per year, and of course more if all countries participate. South Asia's gains are hugely greater if it participates than if it does not: \$14 billion per year compared with just \$1.6 billion if it does not -- despite the fact that South Asia's own liberalization would turn the international terms of trade against itself. The reason is that the region's resources are used so much more efficiently when its own distortionary policy interventions are removed.

Sub-Saharan Africa's gain when it reforms is only 40 per cent of South Asia's gain. This reflects two facts: first, that the South Asian economies in aggregate are

nearly twice as large as the whole of Sub-Saharan Africa; and second, that South Asia's trade restrictions (at least according to the model's database as reported in Table 1) are more severe than Sub-Saharan Africa's. When South Africa is disaggregated from Other Sub-Saharan Africa, however, then as shown in Table 8 it appear Other Sub-Saharan Africa in aggregate does not gain any more from participating in than from standing aside from further trade liberalization. The reason is clear from Table 8: the very considerable gains from more efficient resource use are offset by an adverse change in its terms of trade when all of those countries expand their agricultural and mineral exports simultaneously.

Does that mean the economy of each Sub-Saharan African country would be better off if its government did not participating in the next WTO round? Certainly not. On the contrary, their economy's welfare would be even worse if their government did not participate, for several reasons. One is that it would forego the economic efficiency gains from reforming its own policies while still suffering the terms of trade loss from others' reforms (since any one of those countries is too small for its own policy choice to alter the terms of trade significantly).¹ Second, it would forego the opportunity to seek through the negotiations greater market access for its particular exports to other countries. And third, there is the promise in this next round that any participating poor economies that lose from taking part in the multilateral liberalization could secure much more compensation than in previous rounds, in the form of technical and economic assistance (WTO 2001b).

It is thus in the national economic interest of such countries to be pressured from abroad to commit to such reform, painful though that may be politically for its government. The political pain tends to be less, and the prospect for a net economic

¹ For empirical support for this proposition, see for example Anderson and Strutt (1999) with respect to Indonesia. The point is made strongly also in the volume on the Uruguay Round edited by Martin and Winters (1996).

gain greater, the more sectors the country involves in the reform. The economic gain is prospectively greater the more sectors it involves because a wider net reduces the possibility that reform is confined to a subset of sectors that are not the most distorted. In the latter case, resources might move from the reformed sector to even more inefficient uses, thereby reducing rather than improving the efficiency of national resource use.²

Notice that other parts of the world gain a little more when all regions participate, in their case because of improved terms of trade when South Asia and Sub-Saharan Africa take part.

4. Qualifications and policy implications

Of course net national economic welfare is not the only criterion that drives governments to act as they do. Indeed until recently, it may not have been even a major one. However, it is steadily becoming more dominant, for at least three reasons. One is the rapid globalization of the world that technological and economic policy changes have stimulated over the past decade or so, a major effect of which is that economies will be penalized ever-more rapidly and severely through capital flight for bad economic governance.

Another reason is the broader mandate of the WTO, which makes it easier now than before the Uruguay Round for developing countries to engage profitably in cross-sectoral exchange of market access commitments, including in services trade.

A third reason is that it is becoming better understood that there are three other important source of gains from trade reform that are not captured in the above results,

² A variant of that point shows up in column 1 of Table 8. It is that Sub-Saharan African countries lose welfare when other countries remove their trade distortions. The reason is that the terms of trade changes encourage more resources in that region to move into already protected sectors and away from ones in which the region has its strongest comparative advantage and least distortions.

namely, gains from reform to trade in services, gains from increasing competition and economies of scale, and dynamic gains.

While measuring distortions to services trade and mark-ups by imperfectly competitive firms is fraught with difficulty, initial attempts are beginning to bear fruit. A new study by Francois (2001) includes one set of estimates of the tariff equivalent of those distortions in a version of the GTAP model that also incorporates imperfect competition. Specifically, that study assumes monopolistic competition exists in the non-primary sectors involving economies of scale that are internal to each firm. These modifications amplify the estimated gains from trade considerably. For example, that study finds that if applied tariff rates for both goods and services were to be cut in half, the global gains would be US\$385 billion, of which 51 per cent would be due to services reform. The 49 per cent due to halving tariffs on goods trade (\$192 billion) in the Francois study compares with the estimate reported in Table 8 (where no imperfect competition is assumed) of \$257 billion from totally removing all tariffs on merchandise trade. The distribution of those gains to the developing countries focused on in our study is very similar to that reported in Table 8: about 3 per cent is attributed to India and 2 per cent to Sub-Saharan Africa.

The key point to draw from this comparison is that the gains from trade reported in the previous section should be interpreted as lower-bound estimates for at least two reasons: because they apply only to goods trade, leaving aside the important distortions prevalent in services markets; and because they are based on the assumption that there are no economies of scale and that perfect competition prevails in all sectors.

Both aspects of this point are especially important for Sub-Saharan Africa. With respect to policies at home they are important partly because that region has among the highest barriers to services trade (Francois 2001, Table C.2), and partly

because the region's national economies are small and hence those services trade barriers translate into a high degree of monopolistic activity and diseconomies of small scale.

With respect to policies abroad, this point is perhaps even more important for Sub-Saharan Africa, especially as it applies to ocean shipping. Two-thirds of Sub-Saharan African exports are primary products. Most of them are being shipped in bulky unprocessed or semi-processed form. The region's export earnings are thus affected significantly by the cost of ocean shipping services. That service sector is characterised by a high degree of oligopolistic activity on the part of ship owners, virtually all of whom are developed country firms. While ever that service sector remains restrictive, the benefits of freer trade will be captured in part by the cartel of shipowners who can charge a higher mark-up above their marginal costs as import tariffs on goods are lowered.

To illustrate this last point, a recent empirical study was undertaken by Francois and Wooten (2000). They estimate that, depending on the degree of collusion, shippers could absorb for themselves, in the form of higher mark-ups, up to half the gains that exporters would otherwise enjoy from goods trade liberalization if only shipping was a competitive service activity. The clear conclusion to draw from the Francois/Wooten study is that liberalizing trade in maritime services under GATS is likely to boost substantially the gains from merchandise trade reform and especially reform of bulky commodities such as agricultural products.

None of the studies reported above draw on a truly dynamic economic model. They measure well the effects of producers reallocating their resources and consumers adjusting their purchases when relative product prices change with trade reform, but they do not measure the impact of such reform on investment behaviour. Yet we know from experience that when markets are freed up, investors divert their funds

towards expanding the now-more-profitable activities and away from the now-less-profitable ones, and are willing to invest more in aggregate. That applies between countries as well as within them, especially following the reductions in barriers to foreign investment and hence international technology transfers over the past two decades. Economic growth is boosted by that diversion and expansion of investment funds, over and above the boost in output from reallocating existing resource endowments.

This additional effect is omitted from most empirical modelling efforts for two reasons: partly because it takes much longer for analysts to build and to run dynamic models than comparative static ones, and partly because the extent to which investors respond to changing incentives is less well understood and hence cannot be included with as much certainty as the other behavioural characteristics that are common to both comparative static and dynamic models. Keeping that in mind, it is nonetheless instructive to note the results of a recent study that examined the range of outcomes generated as the responsiveness of productivity to openness is varied.

The World Bank (2001, Ch. 6) conducted a study very similar to the one reported in Section 3 above, and obtained very similar results when its version of the GTAP model was in comparative static mode (a global welfare gain from complete liberalization of merchandise trade of \$312 billion per year by 2015, compared with the present study's estimate of \$257 billion as early as 2005 when the world economy would be somewhat smaller). When their same model was switched into dynamic mode, however, that global gain increased two- to three-fold over reasonable ranges of productivity responsiveness parameters. This adds further weight to the claim that the earlier welfare results should be considered as very much lower-bound estimates of the gains from trade liberalization.

In short, the developing countries of South Asia and Sub-Saharan Africa have much to gain from taking part in the next round of WTO negotiations to liberalize trade, and more so the more they are willing to embrace reform at home so as to enable their firms to take greatest advantage of the opportunities provided by the opening up of markets abroad.

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Table 1: Import tariffs at the beginning (1995) and end (2005) of the Uruguay Round implementation period (%)

	Agriculture and food		Other primary products		Other manufactures	
	Pre-UR	Post-UR	Pre-UR	Post-UR	Pre-UR	Post-UR
All Advanced industrial countries	16	13	0	0	2	2
All developing countries	16	14	6	4	16	14
Northeast Asia	28	26	3	3	4	4
Southeast Asia	24	21	3	2	20	19
South Asia	40	32	10	7	59	31
Sub-Saharan Africa	13	10	2	2	13	9

Source: Francois and Strutt (1999).

Table 2: Growth in GDP, population, and endowments of productive factors, by region, 1995 to 2005 (% p.a.)

	Real GDP	Population	Physical capital	Unskilled labour	Skilled Labour
ANZ	3.4	0.8	3.0	1.1	0.9
NEAsia	2.6	0.2	4.8	-0.1	0.0
SEAsia	5.4	1.5	8.4	1.6	6.9
China	7.7	0.7	9.5	1.4	3.9
India	5.0	1.5	5.4	1.9	5.5
OtherSAsia	5.3	2.0	5.4	2.7	5.7
NthAmerica	2.6	1.0	3.5	1.0	1.1
Mexico	4.4	1.5	3.5	0.7	5.9
SouthernCone	3.5	1.2	3.0	1.5	5.5
OtherLatinAm	4.4	1.5	3.0	0.7	5.9
WEurope	2.6	0.0	2.4	-0.2	0.0
EEFSU	4.9	0.4	0.7	0.5	0.9
MidEastNAfr	4.2	2.1	3.2	2.9	5.6
SthAfrica	3.7	2.0	3.2	2.5	2.9
OthSubSahara	4.3	2.7	3.2	3.2	3.8
Rest of World	4.1	1.4	3.2	2.0	3.0

Source: Based on Anderson et al. (1997) but updated using more-recent World Bank projections.

Table 3: Cumulative percentage change in sectoral output at 1995 prices resulting from global economic growth, 1995 to 2005

(a) Assuming no Uruguay Round implementation or China WTO accession

	ANZ	NEAsia	SEAsia	China	India	OthSAsia	MidEast/		Other
							NAfrica	SAfrica	
Rice	11	39	57	69	39	40	38	49	56
Wheat	54	74	44	76	41	47	57	57	60
CerealGrain	52	74	77	71	36	41	60	49	64
VegFruitNuts	33	44	70	89	69	64	62	35	62
OilSeeds	50	75	79	82	75	80	72	70	87
OthCrops	44	68	80	74	75	77	78	60	112
PlantFibre	66	92	102	88	75	82	80	92	141
Livestocks	45	55	81	110	63	68	66	53	91
OthFoodProd	34	22	44	88	56	60	45	38	47
MeatDairyPrd	26	23	41	91	42	47	40	39	41
ForestryFish	37	16	9	68	44	37	27	31	10
EnergMineral	57	56	88	95	73	76	63	63	57
VegOilsFats	27	31	44	90	54	61	41	35	51
TextileWap	50	20	51	86	61	79	36	39	41
OtherManuf	43	33	90	120	65	68	50	41	43
Services	39	31	70	116	65	68	47	42	39

Source: Authors' model results.

Table 3: Cumulative percentage change in sectoral output at 1995 prices resulting from global economic growth, 1995 to 2005

(b) Assuming full Uruguay Round implementation and accession to WTO by China

	ANZ	NEAsia	SEAsia	China	India	OthSAsia	MidEast/		Other
							NAfrica	SAfrica	
Rice	16	38	60	70	37	43	33	53	58
Wheat	57	72	46	78	40	52	56	64	60
CerealGrain	70	72	74	72	36	43	59	54	66
VegFruitNuts	35	44	69	90	65	67	62	38	63
OilSeeds	100	75	71	86	80	97	71	83	87
OthCrops	42	66	87	73	78	94	78	61	118
PlantFibre	55	98	101	94	81	100	80	85	146
Livestocks	54	52	75	106	63	73	65	69	94
OthFoodProd	48	22	43	88	48	64	43	75	49
MeatDairyPrd	40	21	32	93	55	51	40	58	43
ForestryFish	39	16	8	69	44	36	28	32	13
EnergMineral	57	56	91	109	71	82	65	61	62
VegOilsFats	291	35	29	90	52	35	35	91	44
TextileWap	32	15	100	84	111	174	20	30	30
OtherManuf	40	37	88	155	59	112	51	39	43
Services	40	31	70	120	66	79	47	42	40

Source: Authors' model results.

Table 4: Self sufficiency ratio by sector at the end of Uruguay Round implementation, 2005

(a) Assuming no Uruguay Round implementation or China WTO accession

	ANZ	SEAsia	India	OthSAsia	MidEast/		Other
					NAfrica	SAfrica	
Rice	1.05	1.07	1.07	1.01	0.51	0.81	0.95
Wheat	1.91	0.02	1.02	0.82	0.81	0.51	0.80
CerealGrain	1.02	0.74	1.00	0.99	0.81	0.93	1.01
VegFruitNuts	1.12	0.99	1.04	0.92	1.07	1.13	1.07
OilSeeds	1.03	0.83	1.01	0.98	0.73	0.94	1.08
OthCrops	1.22	1.64	1.04	0.95	0.72	1.43	1.66
PlantFibre	1.92	0.70	0.98	0.90	0.95	1.35	2.07
Livestocks	1.08	0.95	1.00	1.00	0.91	1.00	1.24
OthFoodProd	1.31	1.00	1.08	1.01	0.92	1.06	0.97
MeatDairyPrd	1.50	0.91	1.00	0.94	0.88	0.96	0.87
ForestryFish	1.30	0.94	0.96	0.99	0.96	1.53	1.05
EnergMineral	1.66	0.98	0.82	0.66	2.00	2.12	1.61
VegOilsFats	0.91	1.55	0.90	0.48	0.62	0.64	0.95
TextileWap	0.78	1.14	1.19	1.37	0.89	0.96	0.81
OtherManuf	0.78	0.85	0.85	0.58	0.78	0.86	0.68
Services	1.00	1.03	1.00	0.99	1.00	1.00	0.98

Source: Authors' model results.

Table 4: Self sufficiency ratio by sector at the end of Uruguay Round implementation, 2005

(b) Assuming full Uruguay Round implementation and accession to WTO by China

	ANZ	SEAsia	India	OthSA	MidEast/		Other
					NAfrica	SAfrica	
Rice	1.04	1.09	1.06	1.01	0.51	0.78	0.95
Wheat	1.65	0.02	1.01	0.83	0.81	0.49	0.80
CerealGrain	0.97	0.75	1.00	0.99	0.81	0.86	1.02
VegFruitNuts	1.09	0.98	1.01	0.91	1.07	1.09	1.08
OilSeeds	1.01	0.83	1.01	0.98	0.73	0.90	1.09
OthCrops	1.11	1.75	1.02	0.95	0.72	1.26	1.70
PlantFibre	1.89	0.66	0.97	0.90	0.97	1.21	2.15
Livestocks	1.06	0.95	1.00	1.00	0.91	1.00	1.25
OthFoodProd	1.40	1.00	1.02	1.00	0.91	1.25	0.99
MeatDairyPrd	1.60	0.87	1.09	0.94	0.88	1.06	0.88
ForestryFish	1.27	0.93	0.96	0.95	0.96	1.49	1.08
EnergMineral	1.68	1.02	0.82	0.60	2.01	2.07	1.66
VegOilsFats	2.26	1.42	0.89	0.42	0.60	0.80	0.90
TextileWap	0.70	1.31	1.43	1.69	0.82	0.91	0.76
OtherManuf	0.76	0.84	0.80	0.59	0.79	0.84	0.67
Services	1.00	1.04	0.99	0.99	1.00	0.99	0.99

Source: Authors' model results.

Table 5: Percentage difference in sectoral output when all merchandise trade distortions remaining post-UruguayRound are removed, 2005

(a) In all regions except South Asia and Sub-Saharan Africa

	ANZ	NEAsia	SEAsia	China	India	OthSAsia	MidEast/		Other
							Nafrica	SAfrica	
Rice	19	-9	-12	2	12	9	3	6	5
Wheat	103	-66	-15	14	6	6	42	11	17
CerealGrain	11	-51	-11	14	1	2	30	2	110
VegFruitNuts	-7	1	2	1	1	1	5	-1	0
OilSeeds	-4	-14	16	44	-1	1	-2	0	0
OthCrops	84	-6	0	-2	-2	0	-1	2	45
PlantFibre	-19	29	12	23	-2	0	-3	80	-13
Livestocks	28	-13	-5	4	0	1	61	12	27
OthFoodProd	-17	16	2	1	-1	29	7	0	25
MeatDairyPrd	67	-5	-24	54	1	3	65	3	36
ForestryFish	-2	0	2	1	0	1	4	1	1
EnergMineral	-1	1	0	4	1	2	1	2	-4
VegOilsFats	-20	105	47	-13	-2	-5	-1	-4	-2
TextileWap	-21	37	-1	60	-10	-16	-6	16	-16
OtherManuf	0	2	34	-2	4	11	2	7	-3
Services	1	1	-2	1	0	0	0	2	0

Source: Authors' model results.

Table 5: Percentage difference in sectoral output when all merchandise trade distortions remaining post-UruguayRound are removed, 2005

(b) In all regions including South Asia and Sub-Saharan Africa

	ANZ	NEAsia	SEAsia	China	India	OthSAsia	MidEast/		Other
							NAfrica	SAfrica	
Rice	5	-9	-12	2	19	18	-9	-12	2
Wheat	101	-66	-15	14	15	7	-66	-15	14
CerealGrain	10	-51	-11	14	1	2	-51	-11	14
VegFruitNuts	-7	1	2	1	0	-3	1	2	1
OilSeeds	-5	-14	22	45	0	7	-14	22	45
OthCrops	82	-6	-1	-2	-2	-4	-6	-1	-2
PlantFibre	-19	30	12	21	-2	-1	30	12	21
Livestocks	29	-13	-5	3	0	6	-13	-5	3
OthFoodProd	-17	16	3	1	1	38	16	3	1
MeatDairyPrd	70	-5	-23	54	2	8	-5	-23	54
ForestryFish	-2	0	2	1	0	3	0	2	1
EnergMineral	-1	1	0	4	6	3	1	0	4
VegOilsFats	-20	106	67	-13	-15	-17	106	67	-13
TextileWap	-22	36	-2	56	5	29	36	-2	56
OtherManuf	0	2	35	-2	19	60	2	35	-2
Services	1	1	-2	1	2	4	1	-2	1

Source: Authors' model results.

Table 6: Changes in sectoral trade balances when all merchandise trade distortions remaining post-UruguayRound are removed, 2005

(a) Reform in all regions except South Asia and Sub-Saharan Africa

	ANZ	NEAsia	SEAsia	China	India	OthSAsia	MidEast/		Other
							NAfrica	SAfrica	
Rice	73	-370	-2,603	440	1,894	401	-120	-57	24
Wheat	4,651	-14,684	-920	2,178	678	44	2,031	-54	41
CerealGrain	145	-44,265	-3,152	1,714	51	1	106	1,006	1,825
VegFruitNuts	-73	-108	-231	142	63	-15	-48	-133	4
OilSeeds	-41	-440	-221	3,621	119	40	-52	-83	43
OthCrops	4,332	-2,239	-1,980	662	-11	-117	-188	2,568	-2,163
PlantFibre	-113	-1,723	-456	-2,442	31	-36	3,683	-101	717
Livestocks	-94	-267	71	46	6	4	1,331	20	372
OthFoodProd	-7,077	27,269	22	-13,137	-393	3,206	-2,979	4,675	354
MeatDairyPrd	16,851	-29,270	-3,843	11,153	147	126	-16	2,887	560
ForestryFish	-96	76	-1,714	-264	-3	-26	-17	-12	-42
EnergMineral	-560	-1,602	-10,692	7,938	12	-328	-1,284	-755	-117
VegOilsFats	-621	1,871	4,341	-2,151	-93	-78	-593	-162	-23
TextileWap	-2,192	67,816	-5,864	23,648	-7,107	-6,412	191	-1,048	-177
OtherManuf	-11,874	-644	44,514	-25,711	4,627	3,615	-14,855	-5,833	-485
Services	-3,311	-1,420	-17,273	-7,836	-22	-426	12,811	-2,920	-933

Source: Authors' model results.

Table 6: Changes in sectoral trade balances when all merchandise trade distortions remaining post-UruguayRound are removed, 2005

	(b) Reform in all regions including South Asia and Sub-Saharan Africa									
	ANZ	NEAsia	SEAsia	China	India	OthSAsia	MidEast/ NAfrica	SAfrica	SubSahara	Other
Rice	31	-395	-2,940	249	2,558	692	-148	-85	-58	
Wheat	4,557	-14,685	-1,022	2,191	1,747	157	1,820	-155	-254	
CerealGrain	141	-44,286	-3,334	1,697	68	0	73	1,672	1,921	
VegFruitNuts	-71	-115	-105	169	-119	-572	-295	-85	897	
OilSeeds	-40	-452	-306	3,665	223	-170	-65	-66	64	
OthCrops	4,224	-2,211	-2,497	604	-681	-1,987	-346	3,749	1,591	
PlantFibre	-105	-1,666	-423	-2,247	-242	-737	3,930	-68	284	
Livestocks	-144	-264	69	36	-3	8	1,060	72	1,151	
OthFoodProd	-7,218	26,767	-13	-13,068	297	3,506	-2,281	4,593	237	
MeatDairyPrd	17,557	-29,316	-3,740	11,246	449	33	-63	-553	-240	
ForestryFish	-104	105	-1,783	-266	-237	-149	-59	21	274	
EnergMineral	-540	-1,790	-10,932	7,783	-569	-3,376	-3,605	6,446	4,517	
VegOilsFats	-643	1,904	6,547	-2,137	-1,195	-588	-626	-142	-46	
TextileWap	-2,265	64,548	-6,521	19,212	663	3,468	-1,780	-1,153	-1,522	
OtherManuf	-12,112	2,941	44,695	-21,635	-4,990	1,846	-8,852	-11,856	-8,042	
Services	-3,269	-1,085	-17,696	-7,499	2,029	-2,130	11,238	-2,390	-773	

Source: Authors' model results.

Table 7: Sectoral self-sufficiency ratios when all merchandise trade distortions remaining post-UruguayRound are removed, 2005

	(a) Reform in all regions except South Asia and Sub-Saharan Africa									
	ANZ	NEAsia	SEAsia	China	India	OthSAsia	MidEast/ NAfrica	SAfrica	SubSahara	Other
Rice	1.25	0.99	0.98	1.00	1.13	1.06	0.55	0.78	0.95	0.95
Wheat	3.98	0.06	0.01	0.96	1.07	0.84	0.93	0.52	0.82	0.82
CerealGrain	1.11	0.04	0.53	1.12	1.01	0.99	0.83	1.67	1.93	1.93
VegFruitNuts	1.07	0.96	0.99	1.01	1.02	0.91	1.07	1.04	1.07	1.07
OilSeeds	0.98	0.14	0.83	1.67	1.01	0.99	0.75	0.82	1.09	1.09
OthCrops	2.41	0.52	1.65	0.82	1.02	0.94	0.76	1.68	1.55	1.55
PlantFibre	1.85	0.08	0.68	0.77	0.97	0.89	1.85	1.02	2.41	2.41
Livestocks	1.03	0.96	0.96	1.01	1.00	1.00	1.01	1.00	1.43	1.43
OthFoodProd	1.14	0.99	1.03	0.93	1.01	1.27	0.90	1.40	1.00	1.00
MeatDairyPrd	2.17	0.69	0.68	1.47	1.10	0.96	0.90	1.35	0.97	0.97
ForestryFish	1.25	0.89	0.90	0.98	0.96	0.94	0.97	1.44	1.07	1.07
EnergMineral	1.66	0.32	0.88	0.99	0.82	0.58	1.99	1.94	1.66	1.66
VegOilsFats	1.97	1.10	1.88	0.64	0.87	0.39	0.58	0.72	0.90	0.90
TextileWap	0.57	1.18	1.25	1.31	1.33	1.53	0.88	0.80	0.75	0.75
OtherManuf	0.74	1.07	0.97	0.99	0.82	0.64	0.80	0.80	0.67	0.67
Services	1.00	0.99	1.02	1.00	0.99	0.99	1.01	0.98	0.99	0.99

Source: Authors' model results.

Table 7: Sectoral self-sufficiency ratios when all merchandise trade distortions remaining post-UruguayRound are removed, 2005

	(b) Reform in all regions including South Asia and Sub-Saharan Africa									
	ANZ	NEAsia	SEAsia	China	India	OthSAsia	MidEast/		Other	
							NAfrica	SAfrica		SubSahara
Rice	1.13	0.99	0.98	1.00	1.17	1.09	0.53	0.77	0.95	
Wheat	3.94	0.06	0.01	0.96	1.17	0.85	0.92	0.46	0.78	
CerealGrain	1.11	0.04	0.52	1.12	1.02	0.99	0.83	2.45	2.01	
VegFruitNuts	1.07	0.96	0.99	1.01	1.02	0.85	1.07	1.07	1.17	
OilSeeds	0.98	0.14	0.83	1.68	1.02	0.97	0.74	0.84	1.10	
OthCrops	2.37	0.52	1.62	0.82	1.01	0.82	0.75	2.02	1.86	
PlantFibre	1.86	0.08	0.68	0.77	0.96	0.81	1.91	1.09	2.26	
Livestocks	1.03	0.96	0.96	1.01	1.00	1.00	0.99	1.03	1.96	
OthFoodProd	1.13	0.99	1.03	0.93	1.03	1.33	0.91	1.43	1.02	
MeatDairyPrd	2.19	0.69	0.68	1.47	1.12	0.95	0.90	0.98	0.87	
ForestryFish	1.25	0.89	0.90	0.98	0.95	0.93	0.96	1.51	1.13	
EnergMineral	1.66	0.32	0.87	0.98	0.83	0.45	1.96	2.93	1.85	
VegOilsFats	1.96	1.10	2.07	0.64	0.79	0.34	0.58	0.74	0.91	
TextileWap	0.57	1.17	1.23	1.29	1.48	1.82	0.85	0.83	0.69	
OtherManuf	0.74	1.07	0.97	0.99	0.85	0.75	0.81	0.77	0.63	
Services	1.00	0.99	1.02	1.00	1.00	0.97	1.01	0.98	0.99	

Source: Authors' model results.

Table 8: Economic welfare effects of all merchandise trade distortions remaining post-Uruguay Round being removed (a) without and (b) with South Asia and Sub-Saharan Africa participating, 2005

(US\$ million per year in 1995 dollars)

(a) Without South Asia/SS Africa (b) With South Asia/SS Africa

	Resource			Resource		
	use	Terms of	TOTAL	use	Terms of	TOTAL
	efficiency	trade		efficiency	trade	
ANZ	953	5,582	6,381	994	5,786	6,630
NEAsia	83,617	-13,397	68,597	83,973	-11,981	70,548
SEAsia	19,144	-6,152	12,416	19,453	-4,893	13,980
China	28,793	3,701	30,849	28,483	4,203	31,161
India	704	368	990	12,554	-4,641	7,539
OtherSAsia	429	303	642	10,309	-3,053	6,217
NthAmerica	7,270	11,139	18,218	7,877	14,162	21,817
Mexico	2,192	-1,687	966	2,258	-1,816	936
SouthernCone	15,703	-3,465	11,482	15,516	-3,490	11,255
OtherLatinAm	1,948	3,506	5,323	1,988	3,688	5,543
WEurope	56,231	-2,653	53,670	56,703	-559	56,404
EEFSU	2,878	6,074	8,810	2,965	6,337	9,175
MidEastNAfr	8,880	-5,697	2,637	9,559	-3,952	5,019
SthAfrica	-257	2,475	2,236	3,574	1,584	5,063
OthSubSahara	-118	723	589	1,195	-696	525
Rest of World	6,874	-1,307	4,709	6,914	-1,294	4,732
TOTAL	235,240	-487	228,516	264,318	-615	256,544

Source: Authors' model results.