

Cold Storage: Why Doha Failed

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Abstract

The WTO negotiations on agriculture were placed in cold storage in July 2008 although 18 of the 20 major agenda items had been agreed. The sticking point was the safeguard measures to control import surges, while the final issue, relating to domestic support for US cotton, was not addressed. Quantitative analysis of the numbers on the table indicate that improvements in market access in the European Union and Japan drive changes in exports and welfare, whereas special safeguard measures, export subsidies, domestic support and special products appear to be of lesser importance. Many developing countries, including most LDCs, would enjoy export gains but experience welfare losses because of higher import prices.

JEL subject codes F13, Q17.

Key words: agriculture, trade, WTO

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Introduction

Many observers were surprised when the ongoing Doha Round of multilateral trade negotiations collapsed in July 2008. In the contentious agricultural negotiations, 18 of the 20 major agenda items had been agreed, and the tariffs cuts on the table, which would lead to reductions in bound tariffs of around 60 per cent, seemed substantial. It appeared little could be gained by negotiating further. The stumbling block seemed to be safeguard measures to control import surges, with China and India asking for additional safeguards, and the USA insisting that such measures be limited. The final unresolved issue relates to domestic support for US cotton producers. This is a long-running concern, particularly for several West African cotton producing countries.

Had the issues of cotton and safeguard measures been resolved, there is no guarantee of success. Within the single undertaking procedure agreed upon for the Doha Round, whereupon nothing is agreed until all is agreed, any proposal put forward by the major countries must be acceptable to the wider WTO membership, which now includes 150 countries. Many developing countries within the G77, and particularly the G33 with defensive interests, may not have agreed to the tariffs cutting proposals. Analysis presented here illustrates that, in terms of number at least, the majority of developing countries and LDCs would not benefit from the proposals on the table, primarily because they would be required to pay higher prices for agricultural imports, such as wheat.

Members have made significant progress since the previous suspension of the Round in 2006. (See WTO (2008a) for the latest proposal). They agreed that tariff reductions shall be linear cuts within four bands, with the higher tariffs attracting greater reductions. The specific thresholds and tariff reductions have generally been agreed, as has the approach to the selection and broad treatment of exemptions for sensitive and special products. Developed and developing country groups would have different thresholds and linear reductions, plus there would be differentiated treatment for various groups such as LDCs, recently acceded members (RAMs) and small and vulnerable economies (SVEs). Sensitive products will not be totally exempted from tariff reductions, and countries that make use of such exemptions will be required to provide additional access in some

alternative fashion such as increasing the import or tariff rate quota where these exist. A formula for increasing the quota as compensation for a lesser tariff reduction has been discussed but it is not clear how this would work.

The proposed tariff cuts tend to overstate the impact because of the gap in developing countries between bound tariff rates, which are negotiated with the WTO, and the rates actually applied. For many countries the reductions in bound rates would not affect the applied rates, and there would be no economic impact. The major effect of the Round would be to squeeze water out of the tariff, or more technically, remove the binding overhang. However, this does not apply to developed countries, and changes in tariffs in the European Union and Japan could provide opportunities to developing country exporters. However, the scope for increased imports is limited somewhat by the exemptions for sensitive products.

Numerous potential conflicts exist between WTO members. Although the global gains from multilateral liberalisation are likely to be positive, the major effects are distributive, with changes in terms of trade benefiting some countries at the expense of others. Agricultural exporters tend to favour further liberalisation whereas importers tend not to. There is also conflict between countries with preferential access into developed country markets and those without. The current Doha Round of multilateral trade negotiations could result in average agricultural tariff reductions of 60 per cent. This would seriously erode the value of preferential access.

Many developing countries have been pushing for substantial reductions in tariffs on tropical products. Many of the products on the tropical products list (Annex G of WTO 2008a), overlap with products on the preference erosion list (Annex H of WTO 2008a), setting up a conflict in the negotiations between countries that have preferential access and those that do not. This is one of the stumbling blocs in the ongoing Doha negotiations.

South-south trade is a potential avenue for export growth where the quality requirements may not be so demanding. However, LDCs face higher barriers in other developing country markets, in spite of the existence of GSTP, a preferential system among developing countries.

In addition to the ongoing issues of multilateral and regional trade liberalisation, emerging issues impinging on agricultural trade and development include recent commodity price increases and the policy response to climate change. Export taxes to suppress domestic prices had the effect of raising international prices in 2008. Bio-fuel subsidies and mandates are one response to climate change. These appear also to have contributed to rising prices of feedstock on international markets. Rising food and feed prices in 2007 and 2008 appear to have raised concerns about food security, and with it protectionist sentiment.

With a variety of real and potential conflicts, it is not surprising a negotiated outcome is proving difficult.

The purpose of this paper is to review the current proposal on agriculture and attempt to quantify the likely impacts of the proposal if implemented. The outline of the paper is as follows. In the next section current trade flows are presented, followed by a description of impediments to trade. The fourth section outlines the latest proposal, followed by a description of the model and data. Quantitative estimates of the tariff changes and changes in trade flows, government revenue and welfare are presented in the penultimate section. Implications and conclusions are drawn in the final section.

2. Current agricultural trade patterns

The Doha Development Agenda is not limited to developing countries obtaining access to agricultural markets in developed countries. While developing countries as a group are net exporters, more than half the countries are net importers. Although LDCs are considered to be predominantly agrarian societies, 36 of the 50 are net importers of agricultural products. These countries stand to lose from the rising prices likely to follow further liberalisation, particularly if they don't reduce their own applied tariffs.

Nonetheless, developing countries as a group tend to export agricultural products to developed countries. \$126 billion out of total agricultural exports of \$244 billion was sent to developed countries in 2007, whereas \$117 billion involved South - South trade (table 1). Developed countries also tend to trade among themselves, \$408 billion out of \$556 billion. LDCs trade very little with themselves, exporting \$12 billion to developing countries and \$6 billion to developed countries.

Table 1 Agricultural exports, 2007

	Importer			
	Developed \$b	Developing \$b	LDC \$b	World \$b
Exporter				
Developed	408.5	145.5	2.2	556.3
Developing	125.7	117.0	1.8	244.5
LDC	6.3	12.1	1.0	19.4
World	540.5	274.6	5.1	820.2

Source: Comtrade, 2007, Agricultural products defined by WTO Agreement on Agriculture. Excludes some industrial crops such as rubber.

Agricultural trade is dominated by a handful of countries, United States, Brazil, the European Union, Australia, Canada and China. Total exports of agricultural goods amount to around \$820 billion. The developed country exporters tend to be major importers as well, with the notable exception of Australia and New Zealand. Developing countries as a group are net agricultural exporters, as are about half of the individual countries, with Brazil, Argentina, Thailand, Ecuador and Ivory Coast the leading five. This list excludes China, which as well as being a leading exporter is also a major importer. LDCs as a group are net importers, as are 14 of the 50 countries in the group. The leading countries are Myanmar, Uganda, Malawi, Ethiopia and Tanzania. The largest net importers are Bangladesh, Nigeria, Yemen, Angola and Senegal.

When considering the impact of changes in trade policies or changes in prices, the specific commodities are important. Developed countries tend to export temperate products such as oilseeds, beef, wheat, hides & skins, and maize (table 2).²

² Any classification is somewhat arbitrary because of the way commodity sectors are defined.

Table 2 Primary agricultural exports by commodity

	Developed \$m	Developing \$m	LDCs \$m
Livestock	2179	1350	224
Bovine meat	7706	4616	3
Sheep meat	1735	115	24
Pig meat	3519	1982	0
Poultry	4976	4800	8
Milk, conc.	4070	1814	16
Butter	828	175	0
Cheese	2072	600	0
Hides & skins	5678	944	130
Wheat	7157	6240	32
Rice	1830	4200	211
Barley	961	836	0
Maize	5637	3169	52
Sorghum	538	44	3
Sugar, raw	831	4628	78
Sugar, refined	821	4687	16
Coffee, green	162	6787	599
Coffee, proc.	1083	1225	5
Cocoa beans	427	3640	229
Cocoa, proc.	1985	2152	8
Tobacco leaves	1021	4723	430
Oilseeds, temp.	8122	6614	139
Oilseeds, trop.	13	661	36
Vegetable oils	1422	8332	73
Pulses	1730	1784	728
Tomatoes	1036	4612	26
Roots & tubers	158	598	1
Apples	1706	3584	2
Citrus fruits	2461	7432	5
Bananas	276	6618	23
Other tropical fruits	2161	8346	93
Tea	1785	2844	266
Rubber	55	3806	125
Cotton	3699	2788	772
Total	79841	116745	4356

Source: Derived from Comtrade.

For developing countries the major exports are sugar, tropical fruits, vegetable oils, citrus fruits, green coffee and bananas. LDCs tend to export tropical products cotton, pulses, tobacco and coffee. Most of the protection is on temperate products in developed

countries, but for several products tropical and temperate products are good substitutes. This includes oilseeds, rice and sugar.

On the import side the major developed country imports are oilseeds, coffee, beef, other tropical fruits, citrus fruits and bananas (table 3). The major developing country imports are wheat, temperate oilseeds, vegetable oils, beef and poultry. Maize and rice are also important, particularly in view of rising cereal prices in 2007 and 2008, which are not reflected in these valuations. Wheat, refined sugar and rice are the major imports for LDCs.

Table 3 Primary agricultural imports by commodity

	Developed \$m	Developing \$m	LDCs \$m
Livestock	2438	1173	143
Bovine meat	6258	5957	111
Sheep meat	898	974	2
Pig meat	2924	2531	46
Poultry	3676	5614	494
Milk, conc.	847	4331	721
Butter	314	670	19
Cheese	1462	1182	28
Hides & skins	1918	4832	2
Wheat	2739	9031	1659
Rice	983	4006	1252
Barley	511	1260	27
Maize	3494	5104	259
Sorghum	161	414	10
Sugar, raw	1189	4148	201
Sugar, refined	1208	2953	1362
Coffee, green	6400	1125	22
Coffee, proc.	1191	1092	32
Cocoa beans	2867	1417	13
Cocoa, proc.	2554	1564	26
Tobacco leaves	3115	2917	142
Oilseeds, temp.	7885	6901	89
Oilseeds, trop.	435	216	58
Vegetable oils	2779	6307	740
Pulses	1080	2791	371
Tomatoes	2585	2735	354
Roots & tubers	458	292	7
Apples	3518	1716	58

Citrus fruits	5681	4144	73
Bananas	5191	1707	18
Other tropical fruits	6231	4183	187
Tea	2097	2593	206
Rubber	2339	1640	7
Cotton	2277	4833	149
Total	89704	102350	8888

Source: Derived from Comtrade.

3. Current tariff protection

As a generalisation, in developed countries tariff protection is applied predominantly against temperate products grown in other developed countries with similar agronomic and climatic conditions. Typical developing country products such as coffee and tropical fruits are not particularly substitutable with temperate products. Exceptions include sugar (cane and beet sugar are substitutes), vegetable oils, tobacco and cotton. Many tropical products, such as coffee, attract little protection in developed countries. With preferential access provided to developing countries and LDCs, developed countries impose lesser tariffs, on average, on their agricultural imports from LDCs and developing countries, as indicated in table 4. LDCs gain some advantage, but by no means enjoy duty free access. This reflects the composition of trade, with developing countries tending to export commodities that attract high tariffs. On their exports, developed countries tend to face lower tariffs in developing countries and LDCs than they impose on imports from those groups of countries. Developing countries have substantial tariffs on tropical commodities, but on average impose similar levels of tariffs on imports from all groups, in spite of preferential arrangement between developing countries such as the GSTP. LDCs impose lower tariffs on imports from other LDC countries. The LDC global average agricultural tariff, at 9 per cent, is lower than the average for the richer countries. As exporters, LDC face tariffs averaging 11 per cent.

Table 4 Existing agricultural average tariffs

Exporter	Importer			
	Developed %	Developing %	LDCs %	World %
Developed	15.4	17.0	11.5	16.1
Developing	8.3	17.6	8.3	12.5
LDCs	5.3	17.4	5.9	11.4
World	11.7	17.3	9.2	14.2

Source: CAMAD, WTO/ITC/UNCTAD. Trade weighted applied tariffs, including preferences.

While developing country applied tariffs are around 17 per cent, the average bound rate is 60 per cent. It is bound rates that are negotiated within the WTO. Coupled with exemptions for special and sensitive products, there will be little reduction in applied rates in developing countries, and none in LDCs. Therefore, it is useful to focus on tariff revenue in developed countries. What is important to know is whether it is on exports from developed or developing countries where the reform is likely to occur. Given the importance of exemptions for sensitive and special products, it is useful to examine trade flows and tariffs by sector. One indication is given by the imputed tariff revenue, the value of imports multiplied by the average applied tariff. This is shown in table 5, and illustrates the importance of trade flows when looking at the impacts of reducing high tariffs. Total imputed tariffs revenues on primary agricultural imports are \$30 billion, around 15 per cent of global trade for these products. This is evenly divided between developed and developing countries, with LDCs making little contribution to the total. The data also suggests that tariff barriers to developing country imports are of a similar magnitude to developed country barriers. It would be wrong to conclude that agricultural liberalisation is a task for developed countries only. By contrast, while LDCs have some high tariffs, their trade flows are sufficiently small to have only a minimal impact on global exports. They are small enough to be safely ignored by exporters.

At a commodity level, the data in table 5 suggest that rather than rice, sugar and bananas, of greater significance are livestock products (pig meat, poultry, beef), wheat and vegetable oils.

Table 5 Imputed tariff revenue by commodity

	Developed \$m	Developing \$m	LDCs \$m	Total \$m
Livestock	234	62	19	315
Bovine meat	999	984	14	1997
Sheep meat	66	54	0	121
Pig meat	2031	586	5	2622
Poultry	1336	1233	74	2643
Milk, conc.	231	578	93	902
Butter	200	115	3	318
Cheese	420	215	3	638
Hides & skins	1	141	0	142
Wheat	1076	1592	131	2800
Rice	488	534	198	1220
Barley	204	210	2	416
Maize	646	1312	24	1982
Sorghum	137	45	1	184
Sugar, raw	587	372	15	974
Sugar, refined	111	332	271	715
Coffee, green	172	115	5	292
Coffee, proc.	175	123	6	305
Cocoa beans	6	60	1	68
Cocoa, proc.	357	168	4	529
Tobacco leaves	831	1060	28	1919
Oilseeds, temp.	232	784	5	1021
Oilseeds, trop.	15	18	4	38
Vegetable oils	243	1778	92	2113
Pulses	150	566	36	751
Tomatoes	434	385	60	880
Roots & tubers	76	82	1	159
Apples	566	256	11	832
Citrus fruits	1069	324	16	1408
Bananas	342	285	3	630
Other tropical fruits	526	581	34	1140
Tea	157	397	25	579
Cotton	0	211	9	220
Total	14117	15559	1194	30871

Source: Calculated from data from WTO/ITC/UNCTAD and ATPSM.

4. The latest proposal

To analyse the likely impact of a Doha Round outcome the draft modalities text (WTO 2008a) is taken as a benchmark. The standard scenario is described in table 6.

Table 6 Standard agricultural liberalisation scenario

Countries	Tariffs	Export subsidies	Domestic support
	%	%	%
Developed countries	If >75, -70 If >50 and ≤75, -63 If >20 and ≤50, -57 If ≤ 20, -50. One third tariff cut plus TRQ expansion for 5% sensitive products.	-100	EU -80, US and Japan -70 others -55
Developing countries	If >130, -47 If >80 and ≤130, -42 If >30 and ≤80, -38 If ≤ 30, -33 One third tariff cut plus TRQ expansion for 6.7% sensitive products plus exemption for special products (wheat, rice and maize).	-100	-55
LDCs	0	0	0

The exemptions are selected by tariff levels at the 6-digit level, with the assumption being that the most sensitive industries attract the highest tariffs.³ In developing countries the percentage difference between applied and bound rates was taken as the criteria with products having the lowest difference being selected as sensitive products. This reflects the likely approach that developing countries apply the flexibilities in such a way to make as little changes in their applied rates as possible. The sensitive products in developing countries were not selected among maize, rice and wheat because these products were in all scenarios determined as special products (SP) which were totally exempted from any tariff cuts or quota expansions.⁴

³ The draft text (WTO 2008a) proposes a four per cent limit for sensitive products. However, five per cent has been chosen here because Japan and Canada have expressed doubts about their ability to meet the four per cent limit. In selecting sensitive products, an alternative approach is to use tariff revenue as a criterion, which combines the tariff and the trade flows, following Anderson et al. (2006). However, a possible anomaly with this approach is that sensitive products with prohibitive tariffs, such as Japanese rice, have low tariff revenue and are not selected.

⁴ Special products can be designated by developing countries only but their selection is most likely subject to criteria related to food security, livelihood security and rural development. The draft text proposes 12 per cent of tariff lines may be designated as exempt, with 5 per cent requiring no cut (paragraph 129) but several countries have expressed reservations about these numbers.

The expansion of TRQs is an important issue that received little discussion at the July 2008 Ministerial. The draft text (WTO 2008a) suggests that where products are declared sensitive, the tariffs cuts may be one third, one half or two thirds of the specified formula cuts for the specific band. To compensate the required expansion of the TRQ for developed countries would be between two and four per cent, depending on the size of the tariff reduction and the initial ratio of the quota to domestic consumption. The maximum expansion, four per cent, applies where the cut is one third of the formula and the TRQ is less than ten per cent of consumption. The required expansion of TRQs is shown in table 7. For developing countries the expansion of TRQs would be two thirds of the developed country rate. Not resolved was whether TRQs could be formed where they did not exist pre-Doha (WTO 2008b). In the simulation it has been assumed they could not.

Table 7 Developed country TRQ expansion

TRQ/consumption	Exemptions as proportion of formula cuts		
	One third %	Half %	Two thirds %
<10%	4	3.5	3
10-30%	3.5	3	2.5
>30%	3	2.5	2

Source: Calculated from WTO (2008a).

The draft text specifies that the expansion of the quota shall occur on an mfn basis (WTO 2008a paragraph 79), although it is not clear how this might be interpreted. This implies that the quota rent, the difference between the inquota and outquota tariffs multiplied by the value of imports, does not accrue to exporters because competition between them drives out the rent. For rent to be captured by exporters the quotas need to be allocated bilaterally. Many important quotas, such as EU sugar and beef, are allocated on in this manner, with rent going to exporters. The expansion of quotas will in fact be new quotas, with the old ones left in place and retaining their method of administration. It is assumed here that changes in quota rent are allocated to exporters according

to their initial shares. Rents will not increase in proportion to the expansion of quota because of the reduction in outquota tariffs.⁵

The expansion of quotas is not equivalent to the expansion of imports. The quotas may not be filled, in which case they are not binding and the rent disappears. This implies that consumers are more likely to be paying the lower price rather than a price determined by the outquota tariff.

It is useful to look at the existing TRQs and the likely impact of an expansion. Table 8 shows the change in imports for selected sensitive products. For EU bovine meat for example, the bound tariff of 77 per cent attracts an exemption and the final tariff is 36 rather than 24 per cent. The cuts and exemptions are applied at the HS6 level and aggregated. Not all tariff lines in the bovine meat sector are designated as sensitive so the final tariff appears lower than if the two thirds exemption was applied to every product. The notified TRQ, aggregated over several tariff lines, is 164 kt. This is less than ten per cent of consumption so the four per cent expansion applies. The four per cent is reduced to 1.4 per cent to take account of the tariff lines in the bovine meat category that are not exempt. The TRQ is expanded by 58 kt, which is 1.4 per cent of consumption. This appears to be an overestimate because consumption, 4184 kt, includes product that doesn't relate to the exempted TRQs, such as sausages. However, Annex C of the draft text includes an option that consumption for the whole product category is taken as the base (WTO 2008a).

⁵ Quota rents are calculated as the quota times the world price times the difference between the inquota and outquota tariffs. An expansion of the quota may be offset by the fall in the outquota tariff, leading to a reduction in rent.

Table 8 TRQ expansion for selected sensitive products

	Bound tariff	Final tariff without exemp- tion	Final tariff with exemption	Initial TRQ	Consump- -tion	Final TRQ
	%	%	%	kt	kt	kt
European Union						
Bovine meat	77	24	36	164	4184	222
Sheep meat	61	20	23	137	1383	142
Rice	51	19	23	84	1340	94
Sugar, refined	76	24	30	1390	20824	1532
United States						
Sugar, refined	77	25	53	1117	8342	1347
Oilseeds, trop.	17	7	10	53	221	57
Japan						
Milk, conc.	173	52	71	56	321	59
Rice	503	151	333	495	8044	744
Canada						
Poultry	145	43	87	45	1158	75
Milk, conc.	127	38	76	0	110	3
Cheese	123	37	43	20	370	22

Source: Calculated from data from WTO/ITC/UNCTAD and ATPSM.

5. The model and data

To assess the impact of WTO agricultural trade policy reform we use ATPSM, a static, partial equilibrium, global agricultural trade model jointly developed by UNCTAD and FAO. The model distinguishes between bound and applied tariffs and includes tariff rate quotas (where the tariff rate depends on whether imports exceed a specified quota), two important features of the post Uruguay Round tariff structure. The model results are driven by changes in policy variables (tariffs, export subsidies, domestic support and tariff rate quotas) which determine changes in domestic prices, consumption and production. This in turn leads to a change in imports and exports, which feed into world prices. The model solves by finding a set of world prices that equate global imports and exports. Intersectoral effects are captured through cross-elasticities, but there are no constraints on the use of resources such as capital, labour or water. Nor is there account

of changes in stocks. Imports are assumed to be homogeneous, with consumers and importers indifferent to the source of their products.⁶ The results indicate the effects of the policy changes assuming a constant base, 2002-2004. There is no account of exogenous growth over the implementation period. The model is well-documented (Peters and Vanzetti 2004) and is downloadable from the UNCTAD website.⁷ One limitation is the model commodity coverage, which emphasizes primary commodities but does not include all the products covered by the Agreement on Agriculture. For example, wool and rubber are not included.

Price and production data are an average of 2002 to 2004 and are compiled from FAO statistics.⁸ Elasticities are from FAO's World Food Model. These are based on a trawling of the literature and are not econometrically estimated specifically for the model. Some of the elasticities were modified by the authors to reflect homogeneity, symmetry and other conditions. The WTO/ITC/UNCTAD World Tariff Profile database is the source of information on applied and bound tariffs. For the quad countries plus Norway and Switzerland *ad valorem* equivalents have been calculated based on the guidelines agreed to at the Mini-Ministerial in Paris in May 2005. Global quotas, notified to the WTO, are obtained from the AMAD database where available and aggregated to the ATPSM commodity level, as shown in table 2. Export subsidy data are notified to the WTO and modified by UNCTAD (Peters 2006). Bilateral trade flow data relate to 2004 and are from the United Nations Comtrade database.

The present version of the model covers 150 individual countries plus two regions, the European Union, which includes 25 countries, and the Rest of World, which includes those countries, mostly small island economies, not covered explicitly. Developing countries, self-designated with the WTO, include the Republic of Korea, and Taiwan, Province of China. A third group is the 50 least developed countries. There are 34 commodities in the ATPSM data set, including meat, diary products, cereals, sugar,

⁶ An Armington approach is used on the demand side to differentiate domestic and foreign products, but there is no differentiation between imports from different sources.

⁷ The standard version of ATPSM is downloadable from www.unctad.org/tab.

⁸ World prices for many commodities rose sharply in 2007 and 2008. By not taking more recent data into account, the modelling underestimates the positive and negative impacts.

edible oils, vegetables, fruits, beverages, tobacco and cotton. This includes many tropical commodities of interest to developing countries, although many of these have relatively little trade by comparison with some of the temperate products.

Some markets include production quotas. These include EU raw sugar and dairy products, Canadian dairy and poultry and Japanese rice and dairy. In the absence of better information, in most cases the rent is assumed to be 20 per cent, with the exception of EU sugar (30 per cent).⁹ These quotas are quite significant, with implicit rent (quantity times price times assumed percentage rent) on these products alone amounting to \$13 billion. The significance of production quota rents is that changes in domestic prices driven by tariff changes may have no effect on production until all the rent has been eroded.

6. The results

Changes in tariffs

The initial and final bound and applied tariffs are shown in table 9. To illustrate the impact of the sensitive products, the middle column of the table shows average final tariffs in the absence of exemptions. For example, EU tariffs, initially at 22 per cent, would be reduced to an average of 8 per cent under the formula cuts but this average increases to 12 per cent with exemptions for the five per cent highest tariffs. For the EU, a cut in the average tariff of 62 per cent is reduced to 44 per cent. Note that this is not the same as an (unweighted) average cut. The parties agreed to a minimum average cut of 54 per cent.

There is a substantial cut in developing country bound rates, from 60 to 39 per cent, although the change in applied rates is minimal, from 17 to 15 per cent. The addition of sensitive products does little to change the average tariff because many of the higher tariffs are exempted under the special product provisions that relate to staples, such as wheat, rice and maize.

⁹ The EU dairy quota rent estimate of 20 per cent is supported by Requillart, V., INRA <http://www.defra.gov.uk/foodrin/milk/supplychainforum/capinfluences.pdf>, and the OECD's PEM model.

Table 9. Initial and final tariffs with exemptions for sensitive products

	Initial %	No sensitive products %	Sensitive products %
European Union	21.6	8.2	12.1
United States	6.2	2.7	4.0
Japan	31.3	10.6	18.4
Canada	15.4	5.4	10.0
Switzerland	64.7	20.9	34.6
Norway	148.6	45.0	63.5
WTO Developed	48.5	15.6	24.0
WTO Developing (bound)	59.7	39.1	40.2
WTO Developing (applied)	17.2	15.0	15.4

Source: Simple averages derived from WTO/ITC/UNCTAD World Tariff Profiles 2006, with WTO CoA method used to calculate ad valorem equivalents. Data in table 9 based on entire tariff universe of agricultural products; analysis below based on ATPSM coverage of primary agricultural products.

Changes in prices

Given the changes in tariffs as specified by the formula cuts and the likely exemptions, domestic prices will fall in those countries where tariffs are reduced. This leads to a fall in production, a rise in consumption and an increase in imports. To satisfy the requirement that global imports equal global exports, it is necessary that prices received by exporters will rise. The market clearing price changes are shown in table 10. The (export weighted) average world price change is 5.2 per cent. The largest changes are for wheat, maize, sugar and livestock products. These are the products with large changes in tariffs associated with large trade flows. The changes of major importance occur in the European Union and Japan.

The large change in the price of wheat is driven by a change in the tariff in the European Union from 56 to 21 per cent and the 80 per cent reduction in domestic support. Wheat is not selected as a sensitive product because it is not among the 5 per cent highest tariffs.

The changes in global quantities are trivial exceeding one per cent in only two cases. Quantities depend on the responses of producers to price changes in different countries. Trade liberalisation is not a solution to the supply shortages and prices rises observed in 2007 and 2008. In many cases production falls because of the removal of support to producers.

Table 10. Estimated changes in world prices and quantities relative to base

Commodity	World prices %	Global quantities %
Livestock	0.7	-0.02
Bovine meat	3.8	-0.08
Sheep meat	5.1	0.18
Pig meat	2.7	0.16
Poultry	2.9	0.15
Milk, conc.	4.8	0.18
Butter	6.4	0.06
Cheese	7.5	0.45
Hides & skins	1.9	-0.44
Wheat	13.5	-0.82
Rice	0.8	-0.02
Barley	2.2	0.26
Maize	7.2	-1.16
Sorghum	1.2	0.37
Sugar, raw	2.1	0.02
Sugar, refined	5.5	-0.34
Coffee, green	0.2	0.01
Coffee, proc.	1.6	0.09
Cocoa beans	0.0	-0.01
Cocoa, proc.	2.2	0.51
Tobacco leaves	2.2	-0.19
Oilseeds, temp.	3.8	-1.49
Oilseeds, trop.	0.2	0.01
Vegetable oils	1.5	0.15
Pulses	0.9	-0.02
Tomatoes	1.6	0.03
Roots & tubers	1.6	0.05
Apples	3.3	0.23
Citrus fruits	2.5	0.36
Bananas	0.8	-0.18
Other tropical fruits	1.2	0.09
Tea	1.5	0.12
Cotton	1.4	-0.22
Average*	5.2	

Source: ATPSM simulations. * Average weighted by base exports.

Changes in trade flows

Changes in trade flows are shown in table 11 for country groups. The most obvious point from the table is the increase in imports into developed countries and the comparable increase in exports from developing countries. On the other hand, developing country imports increase only marginally as do developed country exports. These are net trade flows for the group and obviously hide large differences for individual countries. The explanation for the absence of any increase in developing country imports is the minimal change in applied tariffs, shown in table 9. For LDCs, there is no reduction in tariffs, and imports are reduced in response to the higher world prices. LDC exports do increase, however, as higher prices reduce consumption, increase production and lead to a greater exportable surplus.

Table 11. Estimated absolute and relative change in imports and exports

	Change in imports		Change in exports	
	\$m	%	\$m	%
Developed	20479	23	1525	2
Developing	270	0	17960	15
LDCs	-475	-5	1381	32
Total	20275	10	20866	10

Source: ATPSM simulations.

Some \$18 billion of the increase in developed country imports comes from the European Union (\$14 billion) and Japan (\$4 billion) (table 12). For the European Union the major increases in imports are wheat, sugar, citrus, tomatoes and apples.¹⁰ For Japan the major changes in imports are in pig and poultry meat, beef and dairy products. There is a marginal increase in rice imports.

¹⁰ This classification is arbitrary, depending on the aggregation of sectors.

Table 12. Estimated absolute change in EU and Japanese imports

	European Union	Japan
	\$m	\$m
Livestock	4	265
Bovine meat	884	274
Sheep meat	620	2
Pig meat	0	1380
Poultry	30	880
Milk, conc.	9	99
Butter	12	0
Cheese	91	83
Hides & skins	12	1
Wheat	4174	225
Rice	54	10
Barley	3	17
Maize	796	114
Sorghum	0	24
Sugar, raw	387	70
Sugar, refined	1280	-1
Coffee, green	25	-7
Coffee, proc.	7	24
Cocoa beans	-3	0
Cocoa, proc.	35	23
Tobacco leaves	333	0
Oilseeds, temp.	578	47
Oilseeds, trop.	-1	2
Vegetable oils	66	11
Pulses	39	24
Tomatoes	1194	100
Roots & tubers	56	3
Apples	1011	83
Citrus fruits	1258	118
Bananas	571	30
Other tropical fruits	388	78
Tea	20	23
Cotton	-45	3
Total	13888	4006

Source: ATPSM simulations.

The major suppliers of the additional imports into the European Union, Japan and other developed countries are Brazil, China, India, Argentina and Australia. Exports by sector are shown in table 13. Much of the additional wheat, not shown in the table, is supplied by Russia and the Ukraine. China produces around 90 million tonne of wheat most of which it consumes. An increase in world prices can tip the balance towards excess

production, leading to a significant increase in exports. India produces around 70 million tonne and exports 4 million. The increase in exports represents about one per cent of production.

Brazil is the major supplier of sugar and citrus (mainly oranges), with tomatoes and apples coming from China. Brazil also provides a quantity of the additional pig and poultry meat imported into Japan, although most of it comes from the European Union (\$515 million) and the United States (\$300 million). Finally, the major suppliers of dairy products are Australia and New Zealand.

Table 13. Estimated absolute change in exports by sector for selected countries

	Brazil	China	India	Argentina	Australia
	\$m	\$m	\$m	\$m	\$m
Livestock	129	471	19	18	33
Bovine meat	447	281	103	172	167
Sheep meat	5	1	48	8	92
Pig meat	121	184	15	0	17
Poultry	361	21	35	47	41
Milk, conc.	3	2	7	17	46
Butter	0	0	0	5	18
Cheese	0	14	0	72	101
Hides & skins	8	0	0	6	12
Wheat	1	473	833	292	381
Rice	0	-29	87	1	-8
Barley	0	0	2	1	-19
Maize	181	388	99	118	4
Sorghum	0	0	5	2	0
Sugar, raw	210	0	179	11	41
Sugar, refined	309	36	374	32	31
Coffee, green	6	0	0	0	0
Coffee, proc.	5	0	2	0	0
Cocoa beans	0	0	0	0	0
Cocoa, proc.	9	1	0	1	2
Tobacco leaves	45	93	21	8	0
Oilseeds, temp.	362	13	156	278	18
Oilseeds, trop.	0	0	-1	0	0
Vegetable oils	23	0	1	29	1
Pulses	0	4	1	1	7
Tomatoes	79	569	165	0	0
Roots & tubers	4	0	8	1	0

Apples	20	488	22	27	3
Citrus fruits	551	2	78	66	12
Bananas	35	0	90	0	1
Other tropical fruits	75	-290	280	11	4
Tea	10	19	1	11	0
Cotton	3	2	0	0	15
Total	3002	2742	2630	1235	1019

Source: ATPSM simulations.

Government revenues

Developing countries are commonly concerned about tariff revenues, particularly where these are a significant source of government revenues. One of the advantages of tariffs as a source of revenue is that they are relatively easy to administer. Like any tax, a fall in the rate may lead to an increase in revenues if the volume increase more than offsets it. The changes in tariff revenues are shown in table 14. These exclude expenditure on export subsidies and domestic support. Tariff revenue fall only marginally in developed countries as a group even though the average tariff cut is around 60 per cent.¹¹ This is because there is a 23 per cent increase in imports (table 11). In developing countries as a group tariff revenues rise slightly although there is little change in average applied tariffs and only a small increase in imports. Most of the increase is attributable to Korean imports of maize. Nonetheless, more than half the developing countries modelled reveal a loss in tariff revenue.

Table 14. Estimated tariff revenues

	Initial \$m	Final \$m	Change %
Developed	14117	13504	-4.3
Developing	15559	16325	4.9
Least Developed	1194	1132	-5.2
Total	30871	30962	0.3

Source: ATPSM simulations.

Welfare

Static annual welfare gains are shown in table 15. Welfare includes government revenues and gains or losses (surpluses) to producers and consumers. It also includes quota rents received by exporters. These rents are eroded when importing countries reduce their MFN tariffs. Welfare is a

¹¹ The average tariff cut, 60 per cent, is not the same as the cut in the average, 50 per cent.

superior measure to export growth in assessing various proposals because it takes into account the costs of producing additional exports. Not taken into account here are intersectoral effects, dynamic gains associated with investment, competition and technology, employment effects and the cost of moving resources between sectors.

The first observation is that the bulk of the welfare gains go to developed countries, in spite of the round being focused on development. This is not only because it is the developed countries that provide the bulk of the protection but also because it is these countries that are making the bulk of the cuts. Developing countries have high agricultural tariffs, but relatively low trade flows. They may become worse off for three reasons: (i) rising world price of imports; (ii) elimination of export subsidies; and (iii) erosion of quota rents received on preferential exports. Among the developing countries, the major beneficiaries in terms of welfare are South Korea (maize), Morocco (livestock and sheep meat), India (wheat) and Argentina (wheat). The major losers are temperate product (wheat and sugar) importers China, Mexico, Russia, Algeria and Egypt. About 90 developing countries are worse off in welfare terms, in spite of the fact that gross agricultural exports increase in all these countries.

Table 15. Estimated annual welfare impacts

	Change in welfare \$m
European Union	6592
United States	416
Japan	3424
Developed	13056
Developing	-173
Least Developed	-497
Total	12386

Source: ATPSM simulations.

5. Implications

The value of modelling is to separate the important from the trivial, the wheat from the chaff. Initially in the Doha negotiations emphasis was placed on the removal of export subsidies and domestic support, yet the analysis indicates that it is market access that is by far the most important. More recently much discussion has focused on special

products and the special safeguard mechanism, yet these factors are far less important than sensitive products for developed countries. Little attention has been paid to quota administration, yet the distribution of rents associated with tariff rate quotas is an important factor.

An important consideration made obvious by the modelling is that the major effects of trade liberalisation are distributional. While there are global allocative efficiency gains, calculated here at \$12.4 billion per year, these are swamped by gains and losses to consumers, producers and governments. For example, in the European Union total welfare gains are \$6.6 billion, but meanwhile producers lose \$27.1 billion while consumers benefit by \$15.8 billion and taxpayers \$17.9 billion. Managing such change is a difficult problem for governments.

The results highlight the importance of the European Union and, to a lesser extent, Japan in the negotiations. These countries combine large trade flows with high protection. China and the United States have large trade flows but relatively low tariffs. India has high bound tariffs but much lower applied tariffs. Countries such as Norway and Switzerland, with high support but low trade flows, are small enough to be ignored.

Ironically, given the apparent conflict between China and the United States on the issue of safeguards at the July WTO meeting, these two countries are not obvious beneficiaries or potential losers in agriculture. China has little or no gap between its bound and applied tariffs, and has little room to move in response to an import surge if it were unable to lift tariffs above pre-Doha rates. However, it stands to gain more than any other developing country in terms of expansion of exports. India also has to consider the livelihoods of a large number of small farmers, but in contrast to China it has room to move in responding to import surges because of the large gap between bound and applied rates.

An important result here is that although all countries appear to gain from increasing exports, these benefits are offset by the higher price of imports for many countries. Coupled with the cost of producing additional exports, around 90 developing countries

appear likely to experience a welfare loss. This implies they need to be compensated elsewhere, in NAMA or services perhaps, to bring the negotiations to a satisfactory outcome.

With respect to individual commodities, of importance is the exemptions chosen by the large developed countries. A simple rule of thumb (i.e. tariffs) is used here, but this ignores other political considerations, such as regional employment. Further, it is likely that countries will choose to spread their exemptions across a wider range of products, weakening the ambition even further.

Unresolved in the negotiations are the special safeguard mechanism and cotton. There is also uncertainty about how the additional tariff rate quotas are to be administered. The means by which the quotas are allocated and the distribution of rents appears to be a hidden yet significant issue to be resolved.

Current developed country policies appear to have only modest effect on developing countries as a group. By holding down prices marginally, many small food importing countries benefit. On the other hand, the lower prices have a negative impact on producer returns in most developing countries, and these outweigh the positive effects of lower consumer prices in food exporting countries. The main beneficiaries among the developing countries are the larger producers of temperate products, Brazil, Argentina, India and China.

The effects of trade liberalisation on high food prices would most likely be minimal. The potential impacts on global supplies are small, of the order of plus or minus two per cent. On the other hand, trade liberalisation has an important role to play in smoothing out price fluctuations caused by domestic supply shocks, caused by drought, floods or frost. It is not surprising that the recent spike in commodity prices was most evident in the rice market, which is very thin, with less than five per cent of production traded internationally. Thinning the market even further through the use of export controls was an understandable response, yet it only exacerbated the problem.

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