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**MARKET ACCESS LIBERALIZATION FOR FOOD AND  
AGRICULTURAL PRODUCTS A GENERAL  
EQUILIBRIUM ASSESSMENT OF TARIFF-RATE  
QUOTAS**

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**Market Access Liberalization for Food and Agricultural Products**  
**A General Equilibrium Assessment of Tariff-Rate Quotas**  
by

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*Abstract:* A global trade, economywide framework is used to assess the implications of improvements in market access through quota expansion and lowering of in- and out-of-quota tariffs. Special features include recent estimates of applied tariffs and TRQs and explicit treatment of those policies in the model. Estimates of welfare impacts suggest that policy reform agreed in the URAA and continuation of such reform would lead to significant welfare gains for the world as a whole and for most regions. Further work may include alternative liberalization scenarios to identify and prioritize policy options regarding market access.

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## 1. Introduction

Few argue the critical importance of the GATT Uruguay Round of multilateral trade negotiations to the global integration of trade. The Uruguay Round reinforced a rules based system of trade; it brought agriculture into the discipline of the trade rules of GATT and established a process for reductions in support for agriculture; it entrenched tariffs, through tariffication of non-tariff barriers, as the currency of protection and; it established the World Trade Organization (WTO), with the capability to enforce the disciplines that some 115 contracting countries signed on to.

The Uruguay Round Agreement on agriculture (URAA) was concluded in December 1993 and its impacts have been documented in several studies (Goldin and Knudsen, 1990; Goldin *et al.* 1993; Brandão and Martin, 1993; USDA, 1994; OECD, 1995; Hathaway and Ingco, 1996; OECD, 1997). The URAA is being implemented over a six-year period (10 years for developing countries) that began in 1995. Steps for a new round of world trade negotiations in agriculture were initiated by the URAA. The starting point of a new round will be determined by the actual implementation of the commitments made under the URAA. It is only recently, however, that it is apparent how countries have implemented their commitments.

In this paper, recent information about commitments made under the URAA is used to evaluate improvements in market access. Simulation results are based on a global trade, economy-wide framework that has 17 regions and 10 traded commodities, and which accounts for tariff-rate quotas. The Global Trade Analysis Project framework is extended to incorporate recent estimates of trade policies and to explicitly account for TRQs.

The paper considers the trade and welfare implications of improving market access for agricultural commodities. We simulate alternative liberalization schemes: in-quota tariff reduction, over-quota tariff reduction, and raising the quota. Results suggests policy reform agreed in the URAA and continuation of such reform would lead to significant welfare gains for the world as a whole and for most regions.

## 2. Market access and tariff-rate quotas

The URAA established rules to reduce tariffs, and convert non-tariff barriers (NTBs) into ordinary import tariffs. Signatories to the URAA had two options for converting NTBs to tariffs. *Tariffication*, the only option for developed countries, required setting a bound rate of duty equal to the tariff equivalent of the NTB. The second option was the *ceiling binding* provision given to developing countries. Under this option, developing countries had discretion on the level of the tariff bindings. Many developing countries established ceiling bindings at levels higher than previous levels of applied protection (Ingco, 1996).

When tariffication of NTBs was implemented, in some cases, the calculated equivalent tariff was too high to allow for imports. Thus, a system of tariff rate-quotas (TRQs) was created to ensure that quantities imported before the agreement took effect could continue to be imported, and to guarantee that some new quantities were charged duty rates that were not prohibitive. Under these TRQs, imports are subject to low “within access commitment” rates of duty up to a predetermined limit (i.e., until the import access quantity has been reached), while imports over this limit are subject to significantly higher “over access commitment” rates of duty. The *in-quota* tariff would be the tariff rate up to the quota limit, and the *over-quota* tariff is the higher duty rate.

Tariffication has, in principle, resulted in significantly more transparent arrangements in market access. In most cases, the extent of import protection previously applied, but hidden by various non-tariff measures, is now evident. The extent of market access liberalization resulting from the TRQs is ambiguous however. On one hand, the TRQs allow some trade at a tariff below the bound level. On the other hand, in products where the applied over-quota tariffs are very high, the amount of trade is controlled by the TRQ. The discussion now is focused broadly on two issues: the high levels of over-quota tariffs (with some countries pressing for larger cuts on those tariffs), and the quotas themselves – their level and the way they are administered.

### 3. Modeling framework

We expand on earlier work (Tsigas and Ingco, 1999) to analyze the TRQ system with a global, applied general equilibrium (AGE) framework that has 17 regions and 10 traded commodities. The Global Trade Analysis Project (GTAP) (Hertel, 1997 and McDougall *et al.*, 1998) framework is extended to incorporate recent estimates of trade policies and to explicitly account for TRQs.

The AGE approach is based on assumptions that are common in the literature: perfect competition, constant returns to scale, and full employment of resources. The analysis is of a comparative static nature with medium term economic adjustments. Each regional economy consists of several economic agents. First, a household maximizes utility to determine demands for commodities and savings. Second, cost minimizing sectors employ primary factor services and intermediate inputs to produce commodities. Regional household income consists of returns to primary factors, and net taxes.

Interregional economic linkages are based on three assumptions. First, demanders treat commodity imports from different sources as imperfect substitutes. Second, a global sector demands services, from each region, to provide transportation services for shipping commodities across regions. Third, a global sector offers a portfolio of regional investments to satisfy demand for savings.

Import tariffs are usually modeled as constant, *ad valorem* wedges between world and domestic market prices. A reduction in an import tariff leads to an increase in imports and to a decline in the domestic market price. In a TRQ system, however, the wedge between world and domestic prices is a function of three policy instruments (figure 1): the in-quota tariff ( $t_1$ ), the over-quota tariff ( $t_2$ ) and the quota level. A change in only one of these policy instruments might not lead to a change in domestic market prices and imports. In figure 1, initial equilibrium imports are at the quota level and a reduction in the over-quota tariff, from  $t_2$  to  $t_2'$ , leads to an increase in imports and to a decline in the domestic market price. If the tariff reduction were smaller, however, equilibrium might not have been affected. In figure 1, the impact of a reduction in the over-quota tariff rate depends on whether the initial equilibrium point,  $E_1$ , lies higher or lower than point B on the vertical segment ABC. The AGE model used in this paper

allows for those outcomes. The model is solved using the GEMPACK software system (Harrison and Pearson, 1994).

We focus on impacts on food and agricultural industries in several developed and developing countries. Our regional specification is: Canada, USA, Mexico, Argentina, Brazil, Chile, Australia and New Zealand, Japan, Korea, Indonesia, Malaysia, the Philippines, Thailand, India, the European Union, Middle East and North Africa, and a rest of the world (ROW). There are four primary agricultural sectors (rice, other grains, non-grains, and livestock production) and two processed foods sectors (meat and dairy products, and other processed food products). The rest of the economy is represented with four sectors (natural resource based industries, textiles and apparel, other manufacturing, and services).

Of the 97 developing country members of WTO, only 25 countries had tariffed their NTBs and established minimum or current access commitments by 1995-96. Among those 25 countries, 8 were in Latin America (Brazil, Colombia, Costa Rica, El Salvador, Guatemala, Mexico, Nicaragua and Venezuela), 5 were in Asia (Indonesia, Republic of Korea, Malaysia, Philippines, and Thailand), and 6 were in Central and Eastern Europe (Czech Republic, Hungary, Poland, Romania, Slovak Republic, and Slovenia). A few African countries (Morocco, South Africa, and Tunisia) had also established TRQs to implement their market access commitments. The other 72 developing countries took advantage of the ceiling binding option and therefore did not have to establish minimum access commitments. However, some developing countries had established TRQs for selected products even though tariffication was not applied; for these products, ceiling bindings were also established.

Information from the implementation by 33 countries has been used to construct a database with 1995-96 applied tariffs and TRQs (Ingco and Tsigas, 1998). Table 1 summarizes the TRQs and price wedges between domestic market prices and world prices for our regional and commodity specification. Sections A, and B show powers of in- and over-quota tariff rates for agricultural and food commodities for the cases that quotas are in place and for the regions that there was information to compute quotas. Section C shows the ratio of imports/quota for global imports. Ratios of less than 1.00 might suggest

imports are restricted by the in-quota tariff. There are, however, several reasons that quotas do not fill, and in-quota tariffs are one among the many (Skully). A ratio of 1.00 might suggest that imports are restricted by the over-quota tariff. For the cases that imports are equal to the quota, the domestic/world price wedge (section D) was set equal to the average of the in-quota and over-quota tariffs. Where imports are less than the quota, the domestic/world price wedge was set equal to the in-quota tariff, and where imports are greater than the quota, the domestic/world price wedge is set equal to the over-quota rate. For the cases that there are no TRQs in place, there is a simple import tariff and their values are given in section D, table 1. We have assumed that, in initial equilibrium, *bilateral* trade policies are described by the policies in table 1. In a simulation, however, market conditions determine the status of bilateral TRQs. We have also assumed that tariff revenues from the TRQ accrue to the household of the importing country.

Section D in table 1 shows that the level of agricultural protection resulting from tariffication is very high relative to applied rates in other sectors. Furthermore, section C, table 1, shows that in about 50 percent of the cases, agricultural imports are less than or equal to the corresponding quota.

A revised equilibrium has been constructed by replacing the GTAP trade policy data with the applied tariffs and TRQs in table 1. In the GTAP data, the same domestic/world price gap has been applied on both the import and export prices of a commodity (Chapter 13 in McDougall *et al.*, 1998). This implies that modification of the GTAP data (or simulation of trade liberalization) would require modifying both the import and export distortions, so that the same domestic/world price wedge is maintained at both the import and export sides of the market (Hertel, 1998).

#### **4. Simulated impacts of continued agricultural trade reform**

We consider simulated impacts of two scenarios of agricultural trade reform. In both simulations, the starting point is the period 1995/96. First, we consider the implications of total removal of border

policies for food and agricultural commodities by all trading partners. Second, we assess the trade and welfare implications of improving market access for agricultural commodities under the URAA.

#### *4.1 An evaluation of the costs of agricultural protection*

We simulate the total removal of all import taxes and export subsidies for the six food and agricultural commodities in our model. This simulation provides estimates of the welfare costs associated with 1995/96 agricultural and food trade policies. The first section in table 2 presents selected results from this simulation. Global welfare benefits from trade liberalization amount to about \$US 124 billion. Almost all regions gain from a better allocation of resources, with Japan and the European Union realizing the majority of those benefits, \$US 65 and 50 billion, respectively (second column in table 2). Strong terms-of-trade effects (third column in table 2), however, dilute Japanese allocative benefits; the total welfare impact remains positive, however, \$US 46 billion (first column in table 2). An improvement in terms-of-trade augments allocative efficiency gains for the European Union.

In relative terms, welfare improves the most in the aggregate region representing Australia and New Zealand, 3.4 percent. Malaysia and Argentina gain 3.2 and 2.3 percent, respectively. These countries are members of the Cairns group -- strong advocates of liberalized agricultural trade, especially in the area of export subsidies.

All agricultural and food sectors expand in the USA, Brazil, Chile, and the aggregate regions of Australia & New Zealand, Middle East & North Africa, and the ROW (where there is a small decline in other grains however) (percent change in output in table 2). In the European Union, all agricultural and food sectors contract. In Japan, agriculture contracts, but the impact on food sectors is mixed.

Land rents suggest the impact of trade liberalization on farming – they decline in eight regions. Land rents drop significantly (between 20 and 60 percent) in Japan, Korea, Thailand, and the European Union; land rents drop by smaller percentages in Canada, Indonesia, the Philippines, and India.

The last part of section A in table 2 shows impacts on trade balances (i.e., change in exports less imports) by commodity, with the last column showing the change in trade balance for all merchandise trade. Argentina is the only region for which all food and agricultural trade balances increase, with meat and milk, and other food increasing the most (\$US 5 and 2 billion, respectively). The European Union and Japan experience substantial declines in their food and agricultural trade balances, with the biggest impacts in other food and meats and milk aggregates.

#### *4.2 An evaluation of improving market access for agricultural commodities*

In this simulation, we consider the impact of trade policy reform agreed in the URAA and that has taken place during the 1995/96 to 2000 period. The following border policy changes are implemented for agricultural commodities. First, quota levels are increased by about 66 percent to simulate the increase in quotas from 3 percent of domestic production to 5 percent of domestic consumption. Second, the over-quota tariffs that are imposed by developed regions are cut by 36 percent; the over-quota tariffs that are imposed by developing regions are cut by 24 percent. Third, export subsidies are cut by the same percentages that over-quota tariffs are cut in an attempt to equalize the domestic prices of imported and exported commodities (as in initial equilibrium).

The second section in table 2 presents selected results from this simulation. Global welfare benefits amount to \$US 61 billion. Almost all regions gain from a better allocation of resources, with Japan and the European Union each realizing welfare gains of about \$US 30 billion. Terms-of-trade effects dilute Japanese allocative efficiency benefits from this simulation, but the total welfare impact remains positive. An improvement in terms-of-trade augments allocative efficiency gains for the European Union. In relative terms, welfare improves the most in Japan, 0.7 percent. Malaysia gains 0.5 percent; Argentina, the European Union, and the aggregate region representing Australia and New Zealand gain 0.4 percent.

All agricultural and food sectors expand in the USA, Brazil, Chile, Indonesia, and the aggregate regions of Australia & New Zealand, Middle East & North Africa, and the ROW. In the European Union, all agricultural and food sectors contract.

Land rents decline in six regions. Land rents drop significantly (between 20 and 30 percent) in Canada, Japan, and the European Union; land rents drop by smaller percentages in Korea, Thailand, and the Philippines.

The United States and the aggregate region of Australia and New Zealand are the only regions for which all food and agricultural trade balances increase. The EU, Japan and Korea experience substantial declines in food and agricultural trade balances.

## **5. Simulated impacts of a new round of agricultural trade reform**

In this section, we consider simulated impacts of a new round of agricultural trade reform. The starting point is the outcome of the second simulation in the previous section. In particular, we simulate the following border policy changes for agricultural commodities, from their respective 2000 estimated levels. First, quota levels are increased by 15 percent. Second, in- and over-quota tariffs are cut by 15 percent for all importers; export subsidies are cut by the same percentages that over-quota tariffs are cut. This simulation should not be confused with any proposal for reforming agricultural trade policies.

Table 3 presents selected results from this simulation. Global welfare benefits amount to \$US 13 billion. Almost all regions gain from a better allocation of resources, with Japan and the European Union realizing the majority of those benefits, about \$US 6 billion each. Terms-of-trade effects, however, dilute Japanese benefits from this simulation, but the total welfare impact remains positive. An improvement in terms-of-trade augments allocative efficiency gains for the EU. In relative terms, welfare improves the most in Malaysia, 0.3 percent. Argentina and the aggregate region representing Australia and New Zealand gain 0.8 percent, each.

All agricultural and food sectors expand in the USA, Argentina, Brazil, Chile, and the aggregate regions of Australia & New Zealand, and Middle East & North Africa. In the European Union, all agricultural and food sectors contract.

Land rents decline in nine regions. Land rents drop the most (between 3.8 and 9.1 percent) in Japan, the European Union, and Thailand; land rents drop by smaller percentages in Canada, Mexico, Korea, Indonesia, the Philippines, and India.

The United States, Argentina, and the aggregate region of Australia and New Zealand are the only regions for which all food and agricultural trade balances increase. The European Union and Japan experience substantial declines in food and agricultural trade balances.

Table 4 decomposes the impacts of this simulation: part A shows the implications of reducing import tariffs and export subsidies by 15 percent; part B shows the implications of expanding quota levels by 15 percent. In terms of welfare implications, table 4 suggests that all regions would gain from an expansion in quota levels. A reduction in import tariffs and export subsidies leads to welfare improvement for most regions. The Philippines, India, the European Union, and the aggregate regions of Middle East & North Africa and the ROW experience a decline in welfare.

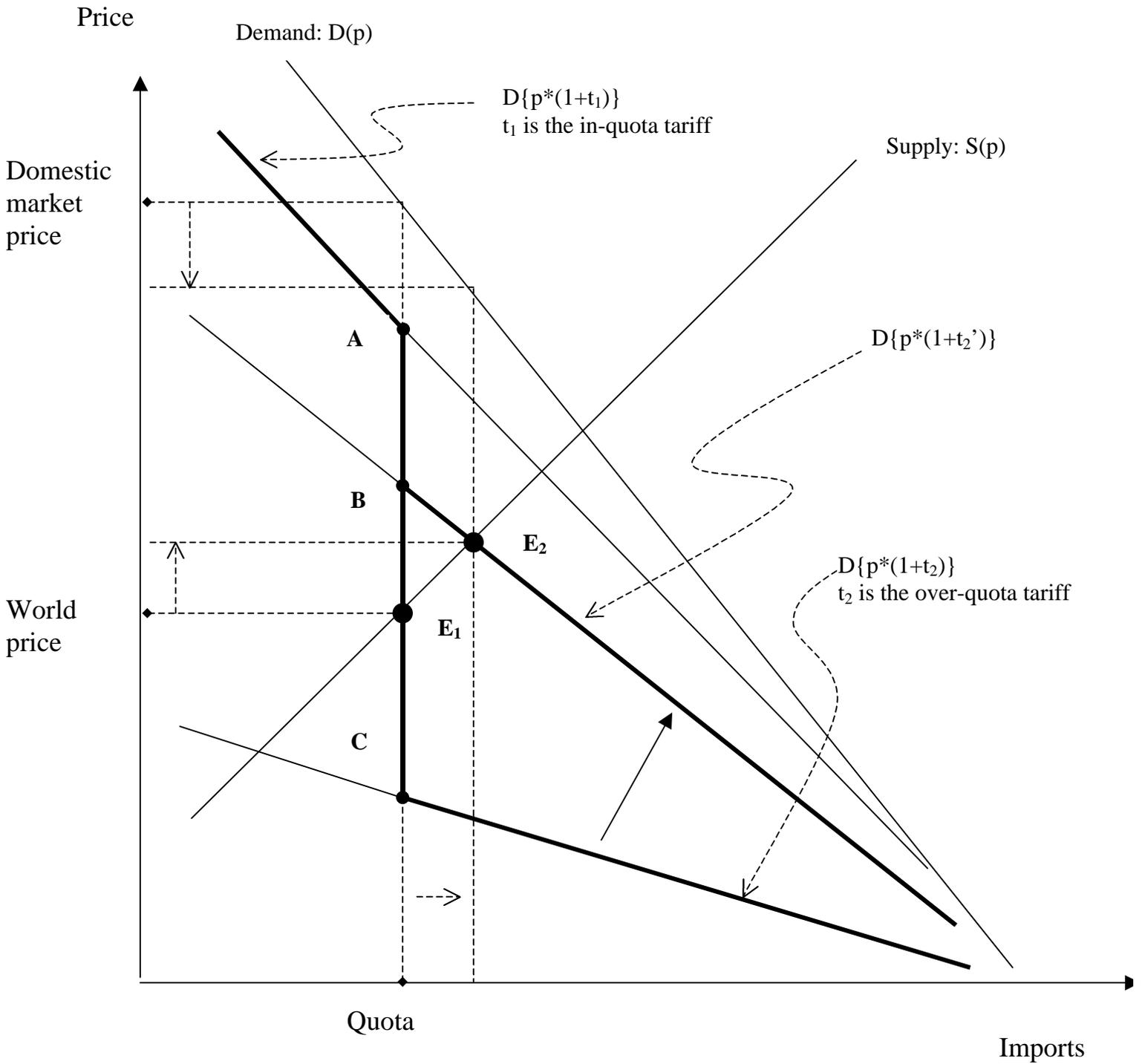
The welfare results in table 4 suggest that for most regions, the welfare impacts of reducing import tariffs and export subsidies by 15 percent are larger than the welfare impacts of expanding quota levels by 15 percent (e.g., EU15 and Japan). Under tariff reduction, lower tariffs apply to all imports, whereas under quota expansion, lower in-quota tariffs apply to only a portion of trade. An exception is Korea where gains from quota expansion are substantially larger than gains from tariff reduction. Japan is the region that benefits the most under either tariff reduction or quota expansion.

## **6. Summary**

We have used a global trade, applied general equilibrium framework to assess the implications of improvements in market access through quota expansion and lowering of in- and out-of-quota tariffs. Special features of this work include recent estimates of applied tariffs and TRQs and an explicit treatment of those policies in the model.

Our welfare impacts suggest that policy reform agreed in the URAA and continuation of such reform would lead to significant welfare gains for the world as a whole and for most regions.

Further work may include alternative liberalization scenarios to identify and prioritize policy options regarding market access (e.g., effects of targeted TRQ liberalization, and separating out export subsidy cuts).



**Figure 1. Tariff-rate quota: reduction in over-quota tariff from  $t_2$  to  $t_2'$**

**Table 1. Powers of in- and over-quota tariffs, imports/quota ratios, and domestic/world price ratios**

<b>A. Powers of in-quota of tariffs (1+% tariff rate)</b>							<b>B. Powers of over-quota tariffs (1+% tariff rate)</b>						
	Rice	Other Grains	Non Grains	Live stock	Meat Milk	Other food		Rice	Other Grains	Non Grains	Live stock	Meat Milk	Other food
Canada		1.15			1.25	1.10	Canada		1.25			2.573	1.148
USA			1.03		1.10	1.015	USA			1.038		1.295	1.03
Mexico		1.50	1.209		1.50		Mexico		1.50	1.50		1.55	
Argentina							Argentina						
Brazil			1.05				Brazil			1.076			
Chile							Chile						
Aust., NZ					1.02	1.02	Aust., NZ					1.041	1.042
Japan	1.25	1.40	1.35		1.33	1.25	Japan	1.97	3.48	3.48		3.50	5.90
Korea	1.05	1.073	1.19	1.00	1.436	1.323	Korea	1.89	4.60	1.40	1.99	3.20	1.99
Indonesia	1.90				1.40		Indonesia	1.90				1.616	
Malaysia		1.05	1.05	1.175	1.60		Malaysia		1.087	1.087	1.28	2.108	
Philippines	1.50	1.35	1.288	1.32	1.35		Philippines	1.65	1.45	1.50	1.453	1.44	
Thailand	1.30	1.20	1.339		1.20	1.248	Thailand	1.40	2.436	1.494		2.19	1.413
India							India						
EU 15		1.176	1.187	1.32	1.602	1.187	EU 15		2.06	1.788	1.786	2.563	2.55
MENAfr							MENAfr						
ROW							ROW						

<b>C. Imports/quota ratios</b>							<b>D. Domestic/world price ratios</b>										
	Rice	Other Grains	Non Grains	Live stock	Meat Milk	Other food		Rice	Other Grains	Non Grains	Live stock	Meat Milk	Other food	Other NaRes	Text Appar	Other Manuf	Serv.
Canada	1.00				1.00	4.50	Canada	1.00	1.20	1.032	1.168	1.912	1.148	1.023	1.185	1.059	1.00
USA			1.00		0.64	0.31	USA	1.05	1.05	1.034	1.295	1.10	1.015	1.001	1.124	1.032	1.00
Mexico	1.00	0.58			1.00		Mexico	1.103	1.50	1.209	1.066	1.524	1.18	1.075	1.287	1.115	1.00
Argentina							Argentina	1.001	1.10	1.084	1.029	1.108	1.13	1.02	1.187	1.118	1.00
Brazil			35.56				Brazil	1.10	1.08	1.076	1.011	1.138	1.073	1.132	1.088	1.161	1.00
Chile							Chile	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.00
Aust., NZ					1.00	1.36	Aust., NZ	1.00	1.00	1.029	1.00	1.03	1.042	1.003	1.21	1.098	1.00
Japan	1.00	0.73	0.55		0.56	1.00	Japan	1.61	1.40	1.35	5.76	1.33	3.575	1.00	1.11	1.057	1.00
Korea	1.11	1.25	1.42	1.49	1.00	1.29	Korea	1.89	4.60	1.40	1.99	2.318	1.99	1.045	1.065	1.078	1.00
Indonesia	1.00				1.00		Indonesia	1.90	1.275	1.275	1.21	1.508	1.60	1.203	1.519	1.55	1.00
Malaysia		0.19	2.13	0.64	1.50		Malaysia	1.00	1.05	1.087	1.175	2.108	1.068	1.05	1.17	1.093	1.00
Philippines	0.06	0.13	1.04	8.40	0.05		Philippines	1.50	1.35	1.50	1.453	1.35	1.17	1.04	1.192	1.177	1.00
Thailand	1.00	5.72	6.07		1.47	1.96	Thailand	1.35	2.436	1.494	1.94	2.19	1.413	1.154	1.494	1.268	1.00
India							India	1.00	1.331	1.331	1.00	1.317	1.61	1.313	1.733	1.562	1.00
EU 15		0.46	1.00	1.00	1.00	1.00	EU 15	2.412	1.176	1.487	1.553	2.082	1.868	1.013	1.125	1.056	1.00
MENAfr							MENAfr	1.20	1.15	1.15	1.073	1.101	1.133	1.10	1.193	1.243	1.00
ROW							ROW	1.06	1.259	1.259	1.058	1.25	1.146	1.067	1.236	1.105	1.00

Table 2. Selected impacts of agricultural and food trade policies, 1995/96

<b>Part A: Removal of import tariffs and export taxes for agricultural and food commodities</b>																
<b>Welfare Impact, \$US mil.</b>			<b>Percent Change in Output</b>							<b>Change in Trade Balance by Commodity, \$US mil.</b>						
	<u>Total</u>	<u>Alloc.</u>	<u>ToT</u>	<u>Rice</u>	<u>Other Grns</u>	<u>Non Grns</u>	<u>Livestock</u>	<u>Meat Milk</u>	<u>Other Food</u>	<u>Rice</u>	<u>Other Grns</u>	<u>Non Grns</u>	<u>Livestock</u>	<u>Meat Milk</u>	<u>Other Food</u>	<u>All traded</u>
Canada	3,788	2,087	1,699	36.7	-1.7	26.6	-17.6	-30.4	15.6	0	532	1,327	1,007	-2,386	2,490	723
USA	10,907	179	10,726	14.9	10.8	14.0	6.9	9.0	12.8	137	6,139	5,837	-40	12,087	19,076	-4,618
Mexico	674	197	475	5.9	-8.9	2.0	6.4	-1.6	5.7	-9	-707	448	983	-200	762	93
Argentina	5,400	676	4,714	6.3	-3.5	0.2	17.1	20.6	7.0	0	143	228	22	5,234	2,535	-929
Brazil	9,507	2,805	6,706	9.8	10.7	8.2	5.8	6.2	14.7	-2	-371	2,699	146	2,144	8,813	-3,375
Chile	976	83	894	8.4	8.8	9.0	13.5	16.5	24.8	0	-71	343	5	641	1,282	198
Aust., NZ	12,105	1,803	10,315	22.8	8.5	5.5	35.8	72.2	38.8	-1	-17	472	215	14,758	4,220	-4,667
Japan	45,694	65,456	-19,761	-19.0	-38.4	-1.7	-34.1	6.6	-20.3	-5	383	-710	-6,631	-2,616	-34,062	2,374
Korea	1,938	2,781	-866	0.9	-75.6	2.3	-8.0	-4.1	1.1	0	-1,373	-679	-938	-1,026	-524	-4,718
Indonesia	-153	-28	-121	-2.6	-1.8	0.2	1.7	-2.4	-2.5	-10	-159	244	26	-40	-771	-216
Malaysia	2,955	904	2,061	16.4	45.9	6.0	-26.1	-62.4	47.4	0	-201	-349	195	-983	5,542	1,067
Philippines	-507	29	-541	8.0	-4.3	-6.7	4.0	-1.8	8.2	0	-220	-397	20	-313	837	-452
Thailand	2,664	784	1,903	21.7	-44.4	-5.4	-25.0	-26.1	23.9	11	-119	247	-221	-854	2,933	-193
India	-1,354	-484	-874	-0.1	-0.3	-1.3	2.4	7.3	-11.6	64	-4	-816	767	109	-1,912	111
EU15	51,216	50,131	1,016	-65.0	-9.7	-13.2	-16.8	-18.7	-21.2	-190	1,981	-8,688	-1,670	-31,136	-41,898	11,385
MENAFr	-9,446	-758	-8,771	2.0	3.7	5.9	6.2	11.4	16.0	-21	-1,300	1,108	405	984	2,447	627
ROW	-12,140	-1,390	-10,844	6.9	-0.7	0.4	8.8	8.0	27.1	24	-4,663	-1,038	6,950	3,321	31,800	2,590
<b>Part B: Quota expansion and reduction in import tariffs and export taxes for agricultural and food commodities</b>																
<b>Welfare Impact, \$US mil.</b>			<b>Percent Change in Output</b>							<b>Change in Trade Balance by Commodity, \$US mil.</b>						
	<u>Total</u>	<u>Alloc.</u>	<u>ToT</u>	<u>Rice</u>	<u>Other Grns</u>	<u>Non Grns</u>	<u>Livestock</u>	<u>Meat Milk</u>	<u>Other Food</u>	<u>Rice</u>	<u>Other Grns</u>	<u>Non Grns</u>	<u>Livestock</u>	<u>Meat Milk</u>	<u>Other Food</u>	<u>All traded</u>
Canada	1,521	1,445	75	3.6	-3.9	4.3	-9.8	-13.5	2.7	0	-20	295	200	-963	448	245
USA	189	-210	397	0.9	1.1	3.3	1.5	1.8	3.1	1	430	1,044	142	2,062	3,824	-2,046
Mexico	26	-61	88	2.5	-1.2	0.7	1.3	0.6	1.8	-1	-92	119	93	67	248	7
Argentina	937	79	857	2.3	-2.1	1.1	3.6	4.2	2.5	0	-51	168	21	852	699	-213
Brazil	1,230	214	1,017	2.2	3.1	2.0	1.3	1.2	3.3	0	-49	526	38	357	1,650	-742
Chile	97	-38	135	1.8	1.7	3.3	2.4	2.8	5.1	0	-13	105	5	96	218	37
Aust., NZ	1,534	216	1,321	5.4	2.1	0.8	7.9	11.6	8.1	0	1	21	358	2,051	660	-735
Japan	31,494	32,918	-1,467	-7.1	2.4	1.6	-16.8	5.2	-7.6	-2	293	1,545	-2,094	980	-5,688	2,504
Korea	1,571	1,503	38	2.7	-40.5	0.5	-1.3	-1.8	2.9	0	-545	-326	-165	-358	173	-2,417
Indonesia	123	-56	177	1.0	1.2	0.2	0.4	0.1	1.0	-3	-10	122	22	5	330	193
Malaysia	471	186	286	3.3	11.1	1.9	-4.0	-15.2	9.5	0	-40	-33	113	-153	917	237
Philippines	-94	-18	-77	2.6	4.7	-2.2	3.0	1.6	2.7	0	-18	-119	10	-15	247	-178
Thailand	382	115	269	7.5	-7.4	-1.8	-2.0	-5.9	8.5	-6	-21	-52	18	-134	693	-80
India	174	48	124	0.0	-0.1	0.4	0.9	2.6	0.8	0	-5	75	213	33	301	215
EU15	30,209	28,547	1,610	-1.5	-1.9	-9.6	-5.5	-6.3	-7.7	21	1,070	-8,010	-274	-6,867	-11,481	875
MENAFr	-2,608	-422	-2,218	1.4	2.4	2.6	2.4	4.4	6.1	0	-134	621	201	477	1,183	-310
ROW	-5,779	-3,203	-2,631	2.0	1.1	2.2	2.8	3.6	7.9	-8	-657	4,325	1,816	1,878	8,037	2,407

Table 3. Selected impacts of agricultural and food trade policy reform, 2000

	15% Quota expansion and 15% reduction in import tariffs and export taxes for agricultural and food commodities																		
	Welfare Impact, \$US mil.			Percent Change in Output							Change in Trade Balance by Commodity, \$US mil.								
	<u>Total</u>	<u>Alloc.</u>	<u>ToT</u>	<u>Rice</u>	<u>Other</u>	<u>Non</u>	<u>Live-</u>	<u>Meat</u>	<u>Other</u>	<u>Rice</u>	<u>Other</u>	<u>Non</u>	<u>Live-</u>	<u>Meat</u>	<u>Other</u>	<u>All</u>			
				<u>Grns</u>	<u>Grns</u>	<u>stock</u>	<u>Milk</u>	<u>Food</u>		<u>Grns</u>	<u>Grns</u>	<u>stock</u>	<u>Milk</u>	<u>Food</u>	<u>traded</u>				
Canada	322	183	139	3.0	0.1	2.1	-1.6	-2.9	1.2	0	64	98	81	-147	167	67			
USA	634	-63	698	1.6	1.4	1.2	0.5	0.7	0.9	15	839	510	5	856	1,284	-341			
Mexico	82	44	37	0.3	-1.1	0.1	0.5	-0.2	0.4	-1	-62	31	80	-23	47	-2			
Argentina	425	43	382	0.7	0.0	0.1	1.1	1.3	0.8	0	32	19	5	325	264	-70			
Brazil	632	163	470	0.8	0.8	0.7	0.4	0.4	1.2	0	-34	231	10	120	676	-231			
Chile	64	2	62	0.5	0.6	0.7	1.1	1.3	1.6	0	-5	32	1	48	78	14			
Aust., NZ	829	124	706	1.8	1.2	1.1	2.8	4.9	2.6	0	14	105	76	1,013	263	-314			
Japan	6,411	7,660	-1,248	-2.0	-6.6	-0.4	-5.1	0.3	-2.1	0	34	-207	-660	-413	-2,087	344			
Korea	331	371	-41	1.0	-31.4	0.3	-0.5	0.1	1.1	0	-331	-57	-57	-61	165	-595			
Indonesia	72	38	35	-0.2	-0.4	-0.1	0.1	0.0	-0.1	-1	-22	-7	-2	2	-22	-46			
Malaysia	287	117	171	1.4	3.3	0.7	-3.1	-8.8	3.9	0	-17	-20	23	-87	468	91			
Philippines	-65	5	-71	0.5	-1.2	-0.6	0.2	-0.5	0.6	0	-22	-29	2	-34	42	-25			
Thailand	268	89	181	1.6	-5.0	-0.4	-3.1	-3.4	1.8	2	-9	41	-18	-87	232	-30			
India	13	51	-37	0.0	0.0	-0.2	0.3	0.8	-1.2	5	-1	-121	82	11	-134	-4			
EU15	5,629	4,818	807	-9.0	-1.1	-0.5	-1.3	-1.5	-1.9	-19	63	-85	-101	-1,653	-2,758	1,058			
MENAfr	-1,109	-183	-934	0.0	0.1	0.3	0.5	0.9	1.1	-3	-147	16	16	49	58	159			
ROW	-1,589	-234	-1,361	0.5	-0.3	-0.3	0.8	0.5	1.8	3	-427	-559	625	75	1,690	-76			

Table 4. Selected impacts of agricultural and food trade policy reform, 2000

<b>Part A: 15% reduction in import tariffs and export taxes for agricultural and food commodities</b>																	
Welfare Impact, \$US mil.			Percent Change in Output							Change in Trade Balance by Commodity, \$US mil.							
<i>Total</i>	<i>Alloc.</i>	<i>ToT</i>	<i>Rice</i>	<i>Other Grns</i>	<i>Non Grns</i>	<i>Live-stock</i>	<i>Meat Milk</i>	<i>Other Food</i>	<i>Rice</i>	<i>Other Grns</i>	<i>Non Grns</i>	<i>Live-stock</i>	<i>Meat Milk</i>	<i>Other Food</i>	<i>All traded</i>		
Canada	315	177	139	2.6	0.0	2.0	-1.4	-2.7	0.9	0	55	97	77	-119	125	61	
USA	453	-31	483	1.6	1.0	1.3	0.3	0.5	0.9	15	605	570	-57	659	1,163	-398	
Mexico	82	48	33	0.2	-1.1	0.1	0.5	-0.2	0.3	-1	-61	28	79	-22	28	-9	
Argentina	436	45	390	0.4	-0.2	-0.1	1.6	2.0	0.4	0	22	14	3	444	167	-69	
Brazil	534	124	411	0.6	0.7	0.6	0.5	0.6	0.9	0	-29	235	12	178	485	-216	
Chile	49	0	49	0.3	0.3	0.7	0.9	1.1	1.0	0	-4	34	1	38	50	13	
Aust., NZ	888	134	756	1.4	0.9	0.9	3.3	6.1	2.1	0	7	92	48	1,232	186	-346	
Japan	5,488	6,362	-874	-1.6	-6.6	-0.4	-4.9	0.3	-1.7	0	17	-261	-609	-449	-1,252	316	
Korea	18	157	-140	-0.3	-1.3	0.1	-0.7	-0.4	-0.3	0	-26	-34	-37	-66	-37	-67	
Indonesia	33	33	1	-0.4	-0.5	-0.1	0.2	-0.3	-0.4	-1	-19	0	-1	-4	-95	-62	
Malaysia	269	105	165	1.4	3.0	0.7	-2.9	-8.2	3.7	0	-17	-19	24	-82	443	91	
Philippines	-80	4	-84	0.4	-1.4	-0.6	0.3	-0.4	0.4	0	-21	-28	3	-33	23	-17	
Thailand	195	70	127	0.3	-5.5	-0.3	-2.6	-2.7	0.3	2	-8	59	-17	-63	70	-38	
India	-5	47	-52	0.0	0.0	-0.2	0.3	0.3	-1.4	5	-1	-121	86	2	-178	-13	
EU15	5,471	4,262	1,205	-8.8	-1.0	-0.4	-1.4	-1.6	-1.4	-20	23	-197	-125	-1,866	-1,256	715	
MEN Afr	-1,127	-187	-949	0.0	0.0	0.3	0.5	0.9	1.0	-3	-147	15	18	49	1	152	
ROW	-1,920	-262	-1,665	0.4	-0.5	-0.3	0.8	0.5	1.3	3	-416	-491	658	91	659	-112	
<b>Part B: 15% expansion in quota levels for agricultural and food commodities</b>																	
Welfare Impact, \$US mil.			Percent Change in Output							Change in Trade Balance by Commodity, \$US mil.							
<i>Total</i>	<i>Alloc.</i>	<i>ToT</i>	<i>Rice</i>	<i>Other Grns</i>	<i>Non Grns</i>	<i>Live-stock</i>	<i>Meat Milk</i>	<i>Other Food</i>	<i>Rice</i>	<i>Other Grns</i>	<i>Non Grns</i>	<i>Live-stock</i>	<i>Meat Milk</i>	<i>Other Food</i>	<i>All traded</i>		
Canada	7	7	1	0.3	0.2	0.0	-0.1	-0.2	0.2	0	9	1	4	-28	39	7	
USA	130	-32	162	0.0	0.4	-0.1	0.1	0.0	0.1	0	239	-47	64	70	122	83	
Mexico	0	-4	4	0.1	0.0	0.0	0.0	0.0	0.1	0	-1	3	1	-1	18	6	
Argentina	30	2	28	0.3	0.1	0.1	-0.1	-0.1	0.3	0	3	-5	-1	-12	83	-8	
Brazil	119	44	76	0.2	0.1	0.1	0.0	0.0	0.3	0	-4	-11	-1	-5	185	-25	
Chile	11	1	10	0.2	0.2	0.0	0.1	0.1	0.5	0	-1	-1	0	3	28	1	
Aust., NZ	17	3	15	0.3	0.3	0.1	-0.1	-0.3	0.5	0	4	2	9	-52	69	1	
Japan	787	1,091	-304	-0.3	0.0	0.0	-0.2	0.1	-0.4	0	13	46	-49	31	-670	11	
Korea	272	188	83	1.4	-30.1	0.1	0.3	0.5	1.4	0	-301	-23	-14	-2	200	-521	
Indonesia	31	1	30	0.2	0.0	0.0	0.0	0.3	0.2	0	-3	-6	-1	5	70	15	
Malaysia	16	12	4	0.1	0.3	0.0	-0.2	-0.6	0.2	0	-1	-1	-1	-6	25	0	
Philippines	11	1	10	0.1	0.1	0.0	0.0	0.0	0.1	0	-1	-1	0	0	16	-5	
Thailand	67	22	46	1.2	0.6	-0.1	-0.7	-1.1	1.3	0	-1	-14	0	-30	149	5	
India	13	1	12	0.0	0.0	0.0	0.0	0.5	0.2	0	0	0	-3	9	44	10	
EU15	227	710	-483	-0.3	-0.1	0.0	0.0	0.0	-0.6	1	43	134	32	22	-1,615	372	
MEN Afr	19	4	15	0.0	0.1	0.0	0.0	0.0	0.1	0	-1	0	-1	-1	56	9	
ROW	312	19	293	0.1	0.1	0.0	0.0	0.0	0.5	0	-12	-69	-31	-6	1,011	39	

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