

A Reevaluation of Processed Food Tariffs Facing Exporters: Implications for Liberalization

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Abstract

Tariffs on processed food trade are highly uneven across countries and products. This can present a problem for aggregation at the GTAP sector level where there is a wide range of products. In the current version a simple average is used where all exporters face a common tariff. This paper reconstructs tariffs for the food processing sectors using a weighting scheme that takes into account exporter's trade composition at a detailed product level. Weighting by this method reduces the average tariff while creates differential rates by faced by individual exporters. In comparing impacts from the different weighting schemes, global welfare gains from a 50 percent reduction in tariffs are of similar magnitude however, there are differences in gains for individual countries. Differences are most apparent in net exports of individual sectors. For example impacts on U.S. vegetable oil exports are overstated using a simple average tariff while net exports of beef and sheep meat are understated using the simple average method.

I. Introduction

The Doha Development Agenda marks the ninth time since World War II that members of GATT/WTO will negotiate reductions in tariffs. Previous rounds have been very successful in reducing the level of global tariff protection on manufactured goods, which now averages below five percent. The existence of high tariffs on agricultural products, however, continues to stand out as a major distorting feature of international trade. Not only are some agricultural tariffs very high, but also tariffs in the agricultural sector tend to be highly uneven across countries and commodities. While a large proportion of agricultural trade takes place at low, or duty-free, rates a good deal of potential trade is limited by rates in excess of 100 percent (Gibson, Wainio, Whitley, and Bohman 2001)

Studies have been done in the past using GTAP or other CGE models to quantify the price, trade, and welfare effects of reducing or eliminating tariff protection around the world. One of the advantages of these models is their ability to capture the effects of policies on trade flows between individual countries.

Crucial to these analyses is the way in which tariff protection is represented in each model. The GTAP database has several processed food sectors. But unlike the primary agricultural sectors such as wheat, rice, or plant fibers, processed sectors are comprised of numerous and diverse product categories. Within any given processed food sector there can be a high degree of unevenness in tariffs. Whether for economic or political reasons, many countries appear to have strategically tailored their tariff schedules to provide protection for very specific products. This creates a problem when tariffs are averaged across a wide range of products, since a simple average may not reflect the rate of protection faced by all exporters. In particular, the method used to aggregate the numerous tariff-lines found within some of the model's commodity categories can have a substantial impact on model results in a tariff-cutting scenario is conducted.

Global trade in processed food products has outpaced growth of raw agricultural commodities in the past two decades. Income growth and dietary upgrading in middle and upper income countries have driven much of this shift toward processed products (Regmi 2001). This trend is likely to continue and may accelerate with greater trade liberalization. This is because, despite improvements in market access stemming from the Uruguay Round Agreement on Agriculture (URAA), tariff escalation, which refers to the situation where tariffs are low on raw materials then

increase or escalate as products undergo additional processing, remains common. This can result in very high effective rates of protection on processed products that can significantly impact the level of trade in these products. Evaluating the extent to which trade in these products may expand as a result of decreasing both the levels of nominal and effective tariff protection requires more accurate estimates of the level of protection currently in place.

Potential benefits from further liberalization in processed commodities feed back to the farm-level sector. For example, under a scenario where there is de-escalation in tariffs of processed products it leads to both an increase in net exports of U.S. processed food and a strengthening of the overall farm economy (Tsigas 2001). The degree of openness is also an important factor in explaining processed food exports from developing countries (Athukorala and Sen 1998). Developing country exporters would share in the benefits from expanded trade with cuts to tariffs in certain processed foods (Rae and Josling).

The purpose of this paper is to reevaluate tariffs faced by exporters of processed foods. This is done by calculating alternative estimates of the average tariffs used in the processed food categories of the current version of the GTAP database. As an alternative to using a simple average, we weighted tariffs by the exporter's actual trade at a detailed level. Tariff reduction scenarios were conducted using both sets of tariffs in the GTAP model. Our objective is to show that by utilizing the information available about an exporter's composition of exports the can be improvements in the model's ability to accurately access the impacts from tariff reductions.

II. The Tariff Aggregation Problem

The farthest one can reduce a set of data, and hopefully still retain any useful information, is to summarize it with a single measure. The tariffs found in the GTAP model are typically averages of numerous tariff-lines. In some cases, well over a hundred tariff-lines are collapsed into a single average tariff which is intended to reflect the overall restrictiveness of the country's trade policy for a given set of commodities. Different methods of calculating these averages can yield significantly different results. The most popular approach to is to calculate simple, unweighted averages of the tariffs levied within each commodity category for each country. This is what is currently done in the GTAP model. These tariff averages are then applied to imports from each trading partner. This approach, however, can introduce numerous biases into the analysis.

First, a simple average gives equal weight to all goods. For example, in calculating an average tariff for vegetable oils, the tariff on jojoba oil receives the same weight as the tariff on soybean oil, even though the latter is traded in significantly greater quantities. In fact, the distribution of tariffs within a given commodity aggregate is often made up of many low rates combined with a few very high rates. This reflects the fact that those tariffs most critical for protection of a given country's agricultural sector tend to represent a small subset of the country's total agricultural tariff schedule. As a result, the tariff schedule has a highly skewed distribution and the simple mean may not be a representative measure of the overall height of the tariff wall facing exporters since it can be biased upward by a few very high rates.

Second, because patterns of trade differ among countries, the average tariff that country A's export mix faces in country B will differ from the average that country C faces in country B. As mentioned, GTAP currently assigns the same simple average tariff to the imports from each trading partner. This implicitly assumes that all exporters face the same level of protection regardless of what they actually export.

Table 1 shows the percent of total agricultural export value accounted for by the top four HS6-digit products for various exporters within selected GTAP commodity categories. The number of HS6-digit lines found in each of these categories ranges from 21 in the dairy products category to almost 200 in the other foods category. The degree of dependency on a few products is extremely high for most countries, with the top four export earners accounting for over 50 percent of total value in 87 percent of the cases. This export concentration level suggests that, for most exporting countries, the tariffs that impact their level of total exports are also only a subset of the total rates found in the importers tariff schedule. Even the United States and the European Union (EU), which have the most diversified export sectors in the world, do not export every product. And, even though they compete in many markets, their composition of exports in processed products is very different. As a result, in these sectors the subset of a mutual trading partner's tariff schedule that have the greatest impact on their exports can be quite different. The challenge is to devise a meaningful method of measuring and comparing relative levels of tariff protection between trading partners that distinguishes between "important" and "unimportant" tariffs.

There are a number of alternative ways to average and aggregate tariffs, none of which is without bias. Weighted averages are often calculated in an attempt to emphasize certain tariffs over others. Weighting a country's tariffs based on import values, perhaps the most commonly used weighting scheme, may bias the average downward, because items with the highest tariffs will receive virtually no weight since little or no trade will

take place under such tariffs. Weighting based on shares of domestic value of production would assure that highly protected commodities produced in large amounts get appropriately large weights, but this method can result in an upward bias, because many factors other than tariffs affect agricultural production levels. In addition, production data at the tariff-line level are rarely available. The share of the domestic value of consumption is another alternative, but also biased to the extent that high tariffs reduce consumption. Similar to production, consumption data are generally not available at the tariff-line level.

To give expression to the relative importance of two trading partners' tariffs, Sandrey utilizes a tariff and trade based measure called the Relative Tariff Ratio Index (RTR).¹ In this study, we generated tariff averages for individual trade flows between trading partners using the RTR methodology. The RTR approach provides an effective and practical way to combine large numbers of trade flows and tariffs into a single and concise figure. When comparing tariffs between trading partners, it puts the greatest emphasis on those tariffs in the importing country that are of the greatest importance to the exporting partner. It also provides a valuable starting point for considering the effect that a trading partner's tariff regime has on a country's exports.

In order to calculate average tariffs using the RTR methodology, one needs comparable data between one partner's total exports and the other partner's tariffs. Unfortunately, this data also does not exist at the tariff line level. Tariff schedules across countries use identical HS nomenclatures for categorizing duties up to the 6-digit level. Beyond the 6-digit level, however, commodity definitions vary from country to country, making specific comparisons across countries impossible. In those cases where countries bound their tariffs at a more disaggregate level than 6-digit, it was necessary to average tariffs to the HS6 digit level. This was done via a simple average. We then calculated weights based on the value of each exporting country's total exports at the HS6-digit level for the year 2000.

These weights were used to calculate a unique average tariff for each set of trading partners. This was done by weighting each of the importing country's tariffs by the proportion of the exporting country's total exports accounted for by each tariff-line within a given commodity category. For example, within the vegetable oils category, country A might export only soybean oil while country B might export both soybean and rapeseed oil,

¹ Sandrey attributes the original concept for the RTR to John Luxton, former Associate Minister for Foreign Affairs and Trade in New Zealand.

each accounting for 50 percent of total export value. If an importing country had a tariff of 20 percent on soybean oil and zero on all other oils, then country A's vegetable oil exports would face an average tariff of 20 percent in the importing country while country B's exports would face an average tariff of 10 percent. In this example, if there were ten vegetable oil tariff-lines in all, countries A and B would both face an average tariff of 2 percent using the methodology currently used in the GTAP model.

III. Tariffs Between Trading Partners

The methodology described above was used to calculate weighted tariffs for six of the commodity aggregates found in the GTAP model: 1) beef and sheep meat, 2) other meats, 3) vegetable oils, 4) dairy products, 5) other food products, and 6) beverages and tobacco products. As is evident in table 2, the tariff dispersion found within each category is quite high. In only three of the 228 country/commodity combinations found in table 1 (beef and sheep meat in Australia and Chile and vegetable oils in Peru) were all of the tariffs found within the category identical. In these cases, the weighted tariff averages would be the same as the simple averages currently being used in GTAP. In all of the other cases, the tariff average facing exporters in each importing country will vary depending on the mix of products being exported.

Table 3 contains the weighted tariffs calculated for selected exporters in the Japanese market. The range of mean tariffs within each category is surprisingly large. In the beef and sheep meat category, the weighted average tariff varies from one percent in the case of Vietnam to 58 percent for Denmark. The bulk (94 percent) of Vietnam's exports in this category are accounted for by frozen lamb carcasses and half carcasses, for which the average tariff in Japan is zero. Denmark, on the other hand, exports mostly fresh and chilled beef cuts on which Japan levies an average tariff of 50 percent, while other Danish exports face tariffs in excess of 100 percent in Japan. The United States also faces a high average tariff (42 percent) for beef and sheep meat in Japan due to rates of 50 percent on fresh, chilled, and frozen boneless beef cuts, which account for 57 percent of total U.S. exports within this category.

Even more pronounced is the spread found in the other meats category. South Africa faces an average rate of only two percent while Italian exports face an average of 76 percent. The low average on South African exports is explained by the duty-free access for edible offal imports in

Japan. This product accounts for 85 percent of total South African exports in this category. Cured ham, on which Japan levies a tariff of over 170 percent, accounts for the largest share of Italy's exports in this category.

The largest spread across the weighted tariff averages, of over 100 percentage points, is found in the dairy products category. Exports from Switzerland face an average tariff of 45 percent versus 149 percent on exports from Finland. Switzerland's exports within this category are dominated by cheeses, which face tariffs of around 30 percent in Japan. Finland also exports a lot of cheese, but about one-quarter of the total value of Finnish exports in this category are accounted for by butter, on which Japan levies a tariff of 325 percent. At 105 percent, the average tariff faced by U.S. dairy exports in Japan is 30 percent lower than that faced by Finland. Like Finland, U.S. dairy exports are largely made up of products facing high tariffs in Japan, such as whey (273 percent) and low-fat milk powder (100 percent). But the United States also exports large quantities of cheese, ice cream, and lactose, which face Japanese tariffs of 30 percent or below.

The bottom of table 3 contains the tariffs found in GTAP version 5. While they are included for comparison purposes, they are not strictly comparable to our rates due to the very different methodological approaches used. As mentioned, our averages are the product of calculating simple averages up to the HS6-digit level, then weighting by each exporter's trade. The GTAP version 5 rates are simple averages of most, but not all, of the tariff-lines found in each category. Notably missing from these calculations were the in-quota rates associated with Japan's tariff-rate quotas (TRQs). The in-quota rates were excluded because it was felt that the over-quota rates best represented the marginal, binding constraint on additional trade. In calculating the trade-weighted tariff averages, however, we included the in-quota rates. Since most of the trade in products subject to TRQs takes place at the lower in-quota rates, our rates tend to be lower than the GTAP version 5 averages. Nowhere is this difference more pronounced than in the dairy products category, where the GTAP version 5 rate applied to Japan's imports from all countries is 287 percent. Because dairy products are subject to a number of TRQs in Japan our tariff averages tend to be much lower.

Tables 4-6 contain similar information for Korea, India, and Egypt. Again we see that their trading partners face a wide range of average tariffs in each of the commodity aggregate markets. In Korea, for example, the United States faces an average tariff on vegetable oil exports of only 8 percent, since the bulk of its exports are made up of soybean products which receive favorable tariff treatment. Taiwan, however, faces an average of 273 percent owing to the high proportion of sesame oil exports, which face a tariff in excess of 600 percent in Korea. In both India and

Egypt, the average tariffs levied on the beverages and tobacco category are extremely high. For the United States, however, the average tariff levied on these products, 67 percent in India and 338 percent in Egypt, are among the lowest in the group. This is because two-thirds of the value of U.S. exports in this category consist of cigarettes and tobacco products, which face some of the lowest rates. Most of the EU countries, on the other hand, face average tariffs of over 100 percent in India and about 1000 percent in Egypt. This is due to the high proportion of wines and distilled spirits in their composition of exports, products that are heavily taxed at the border in these two countries.

These examples clearly illustrate that the combination of diversity in each exporter's composition of exports and each importer's tariff schedule can produce very different export-weighted tariff averages. In order to more accurately calculate the effect of reducing global tariffs on prices, trade, and general welfare, efforts should be made to reflect these different tariff averages by trade flow. If a country's exports already face low tariffs on average then one would expect their trade to be less affected by tariff reductions than that of countries whose exports face high average tariffs. In the next section, we compare various results from cutting tariffs in the GTAP model using both the version 5 tariffs and the export-weighted tariffs.

IV. Regional aggregation and scenario description

The standard GTAP model is employed in conducting the simulations in this paper. Since our objective is to reveal what differences might arise from using alternative tariffs, it is in our interest to generate results from a wide range of individual countries. The country/region aggregation consists of 29 individual countries and 11 geographical region aggregates. Differences in the composition of exports by individual EU-members make it attractive to keep retain members as individual countries. In food and agriculture there are 8 processed food sectors and 1 primary agricultural sector. The nonfood sectors were aggregated to other primary products, total manufactures, and services.

The two data sets are used which differ only in the tariff rates in processed food sectors. The first database contains tariffs that are based on a simple average. These rates do not vary by trading partner. The other database is one where tariffs have been altered using the exporter's detailed product trade as weights. Tariffs are cut by 50 percent only in processed food sectors with protection rates in all other sectors kept constant. Thus, the impacts are attributed only to cuts in processed food, which could be interpreted as a tariff de-escalation scenario.

V. Results

A comparison of economy-wide welfare gains from tariff reductions using the simple average tariff and the weighted-average tariffs is given in table 7. Global gains for simple weighted tariffs are \$21.9 billion while gains are slightly less (\$19.9 billion) using trade weighted tariffs. These differences in global welfare gains may not justify major concern of a potential aggregation biases in tariffs. However, at the individual country level the differences are noteworthy. For most countries trade weighted tariffs generate less welfare gains in a liberalization scenario. When an importers highest tariffs are weighted by relatively low export volumes the economy-wide distortionary effects are weaker. Cases with noticeably higher welfare gains are the 'rest of middle east' and other southeast Asian region. In these regions, weighting tariffs had less change on the aggregate rate of protection. However, relative to other countries these rates became higher from the exporter's perspective.

Another way to view welfare gains is the contribution of allocative efficiency gains made by individual food processing sectors. The contribution to economy-wide efficiency gains by processed food sectors is shown in table 8. Other food products contribute most of the global gains (\$5.8 billion), with beverage and tobacco as the second largest contributor (\$4.8). These sectors are among the largest among food processing sectors in most countries. However, these sectors do not make the largest contribution towards allocative efficiency gains in all countries. This is dependent on both the relative size of the sector within the economy and the rate of protection. In Japan, the processed rice sector contributes to the largest efficiency gains, accounting for a third of the total gains. It is also the most heavily protected sector. Due to a very high rates of protection of beverages and tobacco in the 'rest of middle east', this sector contributes more than any other sector, accounting for nearly a third of the total gains. Differences in the tariff-weighting scheme employed here did not change the relative contributions made by of individual sectors.

The more noticeable biases likely to arise from alternative tariff aggregation are revealed in trade patterns. Clearly this is where tariffs have the most direct impact. Net export volume changes arising cuts in the simple tariff averages are compared with changes generated from reducing trade-weighted tariffs. Table 9 displays the difference between the two sets of results. This is done by subtracting net export changes generated from the simple average approach from results from using weighted tariff. There are a number of examples worth noting.

For the United States net exports in beef and sheep meat will be higher by \$83 million if tariffs are trade-weighted than if tariffs are calculated using a simple average. This has to do with the fact the tariffs on high quality fresh beef, which the U.S. is a sizable exporter, are higher than other meats in beef and sheep sector. It demonstrates a downward bias in the simple tariff rate that U.S. beef exporters face. The opposite can be said for other meat and vegetable oils for the United States. The reason for this is that the United States exports a larger share of poultry than pig meat. Since poultry has a lower tariff than pig meat, the U.S. actual faces a lower tariff in other meat products than the rate calculated by a simple average. The opposite is true for Canada and Denmark, which are major exporters of pig meat. Japan is net importer of other meat, meaning it has negative net exports. The proper interpretation of the results is that it will import \$136 million less (or less negative net exports) in other meats when using a weighted tariff in place of simple average tariffs. This suggests Japan's import changes have an upward bias when using a simple average tariff.

The United States exports a large share of soybean oil in the vegetable oils sector. As discussed earlier soybean oil has one of the lowest tariff rates among vegetable oils. Brazil and Argentina are also heavy exporters of soybean oil. These countries would face a lower aggregate tariff because of the high content of soybean oil in their exports. As a result, their exports of vegetable oil are over-stated using the simple average tariffs. The opposite is true for the other south east Asian region. Net exports would be greater in vegetable oils using a weighted tariff. The results indicate that China, a net importer of vegetable oil, imports less (\$136 million) if tariffs are based on weighted tariffs instead of simple average. For dairy products in several EU countries net exports would expand more when tariffs are weighted. But Switzerland's net exports would not expand as much. Overall differences are minor for processed rice and sugar because of small variations in tariffs within these sectors.

The largest differences in net export volumes are found in the other food product and in the beverage and tobacco sectors. Japan is major importer of other processed foods (\$16 billion). The difference in its net export position from the two sets of results is (\$1.2 billion), meaning it would import this much less when tariffs are weighted than if tariffs are calculated by a simple averages. Net exports of U.S. beverage and tobacco sectors expand more (\$537 million) when tariffs are cut from weighted averages than from simple averages. In that case there is a downward bias created by the simple average approach for the United States. On the hand the results suggest that for several EU countries that net exports in beverages and tobacco would be overstated using a simple tariff average.

VI. Conclusions

An 'ideal' tariff aggregation scheme does not exist given all the complexities in the specification of tariffs and assumptions that must be made concerning world production and trade. The effort made here is a step closer toward constructing a better estimate of an aggregate tariff. This paper reevaluates tariffs in the processed food sector by taking into account the composition of trade by exporting countries. By doing so tariffs are constructed from the perspective of what tariffs exporters actually face in individual markets. Although global welfare gains are not affected much by this alternative aggregation scheme, there are notable changes when it comes to individual countries. In a number of cases biases are revealed. A simple average tends to overstate gains from trade liberalization of processed foods. Part of this is the fact that heavily traded processed products are less protected whereas heavily protected commodities are traded relatively less. For major exporting countries such as the United States and EU countries, differences arise due to the specific product composition in the meats, vegetable oils, other food products, and beverages and tobacco sector. Biases from tariff aggregation are apparent in net trade volume changes of individual countries. Users of the GTAP database should be aware of such biases.

References

Athukorala, P. and Sen, K. 1998. "Processed food exports from developing countries: patterns and determinants", *Food Policy* 23: pp 41-54.

Gibson, P., J. Wainio, D. Whitley, and M. Bohman 2001, "Profiles of Tariffs in Global Agricultural Markets" U.S. Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No.796, Jan. 2001.

Rae A. and T. Josling. 2000 "Multilateral Approaches to Market Access Negotiations in Agriculture: Processed food trade and developing countries" Paper presented at 3rd Annual Conference on Global Economic Analysis, June 28-30, 2000.

Regmi, A.(ed.) Changing Structure of Global Food Consumption and Trade, U.S. Department of Agriculture, Agriculture and Trade Report. WRS-01-1,2001.

Sandrey, R. "The Relative Tariff Ratio Index". New Zealand Trade Consortium Working Paper No. 7. The New Zealand Trade Consortium with the New Zealand Institute of Economic Research, 2000.

Tsigas M.E. "How would Food Markets be Affected by Liberalizing Trade in Processed Foods?"
Office of Economics Working Paper, No. 2001-08-A. United States International Trade Commission, 2001

Wainio, J., G. Hasha, and D. Skully 1998, "Market Access Issues" in *Agriculture in the WTO*, U.S. Economic Research Service, U.S. Department of Agriculture. WRS-98-4, Dec. 1998.

Table 1: Proportion of Total 2000 Export Earnings from Top Four HS6-digit Product Categories, Selected Exporters

	Beef and sheepmeat	Other meat	Vegetable oils	Dairy products	Other food products	Beverages and tobacco products
No. of HS6-digit tariffs per category	30	38	46	21	195	29
Argentina	93%	92%	92%	88%	38%	81%
Australia	78%	63%	67%	67%	32%	90%
Austria	86%	56%	52%	75%	30%	90%
Belgium-Lux	70%	51%	46%	48%	26%	57%
Brazil	96%	78%	97%	75%	70%	58%
Canada	79%	77%	85%	66%	24%	74%
Chile	71%	76%	77%	89%	49%	95%
Denmark	77%	79%	64%	71%	25%	76%
Finland	78%	69%	79%	82%	41%	86%
Fr Germany	78%	48%	54%	57%	23%	75%
Greece	68%	68%	93%	98%	53%	77%
Ireland	87%	54%	88%	75%	68%	86%
Italy	76%	63%	84%	81%	30%	85%
Mexico	84%	91%	63%	85%	38%	94%
Netherlands	82%	56%	52%	72%	24%	84%
New Zealand	82%	93%	86%	68%	42%	86%
Philippines	96%	82%	99%	94%	53%	77%
Poland	74%	45%	92%	80%	27%	89%
Portugal	70%	62%	70%	71%	29%	92%
South Africa	86%	97%	76%	82%	30%	94%
Spain	74%	57%	84%	51%	20%	73%
Sweden	65%	47%	81%	81%	26%	88%
Switzerland	84%	83%	70%	92%	38%	80%
Taiwan	96%	59%	64%	95%	45%	91%
Thailand	85%	94%	68%	82%	53%	84%
United Kingdom	81%	49%	47%	56%	27%	84%
United States	72%	66%	66%	62%	28%	81%
Vietnam	100%	97%	88%	100%	72%	87%

Table 2: Range in Size of HS6-digit Tariffs Found Within Commodity Aggregates, Selected Importers

	Beef and sheepmeat	Other meat	Vegetable oils	Dairy products	Other food products	Beverages and tobacco products
No. of HS6-digit tariffs per category	30	38	46	21	195	29
Argentina	9-15	1.6 - 27	5.4 - 15	0.3 - 27	0.1 - 19	17 - 23
Australia	0-0	0 - 5	0 - 5	0 - 51.2	0 - 65.1	0 - 5
Brazil	9-15	1.6 - 19	5 - 15	0.3 - 27	0.1 - 19	17 - 23
Chile	9-9	0.8 - 9	3.7 - 9	0.1 - 9	0 - 9	7.8 - 9
China	8-25	1.3 - 24.9	4.5 - 28.6	0.2 - 19	0.1 - 28.7	0 - 55.2
Colombia	15-20	1.7 - 20	8.2 - 20	0.3 - 20	0.1 - 20	15 - 20
Egypt	5-40	5 - 80	5 - 28.8	5.6 - 30	0.1 - 40	18.9 - 1650
El Salvador	0-15	0 - 15	0 - 15	0 - 40	0 - 15	0.1 - 32
European Union	0-91.5	0 - 73.2	0 - 49.8	2.2 - 157.6	0 - 65	0 - 62.5
Guatemala	0-15	0 - 15	0 - 15	0 - 15	0 - 15	0.1 - 20
Honduras	1-18.2	0.9 - 18	0.9 - 18	0.3 - 20	0 - 18	1 - 55
India	10-40	3 - 40	18.6 - 40	0 - 40	0 - 190	30.1 - 260
Indonesia	5-7.5	0 - 5	0 - 10	0.1 - 5	0 - 41.6	5 - 170
Israel	4-128	2 - 170	0.4 - 76	0.4 - 250	0 - 117.7	1 - 148
Japan	0-124.5	0 - 184.1	0 - 27.9	8.5 - 325	0 - 84.5	2.7 - 49.3
Korea, Rep. of	3-43.5	2.5 - 78.4	3 - 686	1.6 - 211.1	0.1 - 147.9	8 - 254.2
Morocco	2.5-361.5	2.9 - 166.3	10 - 196.6	1.8 - 100	0.1 - 47.3	10 - 42.5
Nicaragua	0-10	0 - 10	2.1 - 10	0 - 20	0 - 10	0 - 14
Pakistan	36.9-65	35 - 65	25 - 261.2	30 - 65	0.2 - 70	0.1 - 65.2
Peru	12-30	2.5 - 30	12 - 12	0.4 - 25	0.1 - 25	12 - 17
Philippines	3-32.1	2.2 - 45	3 - 20	0.1 - 10	0.1 - 34.6	3 - 15
South Africa	0-40	0 - 40	0 - 69.8	0 - 627.9	0 - 36.3	0 - 45
Switzerland	3.5-369.3	1.7 - 315.3	6.3 - 146.7	7.3 - 635.3	0 - 146.1	1.7 - 112.3
Taiwan	0-51.2	0 - 106.1	0 - 131.9	0.3 - 41	0 - 34.6	0 - 27
Thailand	10-60	2.8 - 60	0 - 31.4	0.6 - 60	0.1 - 72.2	4.9 - 92.8
Tunisia	26.4-43	3.6 - 43	17 - 43	0.3 - 43	0.2 - 43	31.1 - 43
Turkey	2-242	1.6 - 200	0.9 - 37	2.2 - 130	0 - 78.2	0.4 - 85.7
United States	0-9.6	0 - 6.4	0 - 10.4	0.3 - 45.7	0 - 22.5	0.2 - 70.9
Venezuela	15-20	1.7 - 20	8.2 - 20	0.3 - 20	0.1 - 20	15 - 20

Table 3: Tariff averages faced in Japan by selected exporters

Exporter	Beef and sheepmeat	Other meat	Vegetable oils	Dairy products	Other food products	Beverages and tobacco products
Argentina	40	21	6	106	15	24
Australia	37	28	18	108	20	18
Austria	48	57	13	101	25	12
Belgium	40	50	12	140	26	16
Brazil	46	28	3	62	24	12
Canada	46	56	12	96	17	15
Chile	28	23	6	84	5	16
Czech Rep.	30	20	14	120	25	19
Denmark	58	59	9	98	14	13
Finland	46	37	21	149	20	26
Germany	46	45	8	108	26	15
France	45	31	13	93	27	10
Greece	28	17	1	52	16	13
Ireland	41	42	25	140	40	15
Italy	42	76	2	48	23	14
Mexico	33	42	8	115	15	11
Netherlands	51	53	9	116	22	13
New Zealand	21	4	8	120	16	15
Philippines	54	62	6	126	12	13
Poland	28	35	14	85	15	17
Portugal	54	42	6	148	11	14
South Africa	38	2	10	121	12	15
Spain	44	60	2	135	14	12
Sweden	34	30	14	122	18	23
Switzerland	38	28	11	45	27	15
Taiwan	8	59	6	127	6	13
Thailand	45	29	6	99	11	11
Turkey	6	9	11	91	19	14
United Kingdom	13	30	9	145	22	13
United States	42	28	6	105	22	15
Vietnam	1	64	9	112	2	14
Base tariff	36	58	7	287	38	16

Base tariff is the initial tariff applied to all exporters in the current version 5 GTAPdatabase

Table 4: Tariff averages faced in Korea by selected exporters

<u>Exporter</u>	Beef and sheepmeat	Other meat	Vegetable oils	Dairy products	Other food products	Beverages and tobacco products
Argentina	39	57	6	160	17	100
Australia	37	28	13	106	26	56
Austria	40	29	16	46	34	16
Belgium	36	26	12	64	28	51
Brazil	40	22	4	48	48	29
Canada	37	30	21	84	21	62
Chile	24	21	7	84	14	35
Czech Rep.	24	19	14	102	33	83
Denmark	36	31	16	51	25	45
Finland	33	31	15	66	49	89
Germany	38	25	13	72	38	44
France	38	17	19	71	36	37
Greece	32	18	8	38	33	33
Ireland	40	35	9	80	54	33
Italy	35	27	9	36	30	29
Mexico	29	33	79	177	22	28
Netherlands	39	21	11	79	40	36
New Zealand	34	27	8	95	19	29
Philippines	29	39	5	195	23	32
Poland	29	24	9	131	28	34
Portugal	31	28	8	64	20	30
South Africa	33	27	17	147	28	29
Spain	37	28	9	51	25	31
Sweden	23	27	14	69	33	45
Switzerland	33	23	19	57	34	33
Taiwan	6	23	273	165	15	12
Thailand	26	17	26	72	35	16
Turkey	29	5	12	43	34	36
United Kingdom	28	18	23	87	30	37
United States	35	17	8	88	35	37
Vietnam	28	34	81	114	10	32
Base tariff	36	58	7	287	38	16

Base tariff is the initial tariff applied to all exporters in the current version 5 GTAPdatabase

Table 5: Tariff averages faced in India by selected exporters

<u>Exporter</u>	Beef and sheepmeat	Other meat	Vegetable oils	Dairy products	Other food products	Beverages and tobacco products
Argentina	10	33	36	8	22	76
Australia	10	21	31	16	31	95
Austria	10	15	32	28	40	51
Belgium	11	16	32	21	36	66
Brazil	10	12	38	28	48	92
Canada	10	13	32	22	30	131
Chile	10	13	35	26	17	98
Czech Rep.	14	14	33	15	44	60
Denmark	11	14	31	22	33	90
Finland	10	17	30	17	35	149
Germany	11	18	33	24	41	77
France	10	11	31	24	41	128
Greece	11	21	31	30	38	119
Ireland	10	23	31	14	101	174
Italy	11	20	30	29	39	120
Mexico	10	12	30	8	29	142
Netherlands	10	11	33	19	37	72
New Zealand	10	20	33	15	33	113
Philippines	11	37	40	12	31	77
Poland	12	19	34	13	33	123
Portugal	13	27	31	22	26	99
South Africa	12	13	29	22	22	104
Spain	10	13	30	26	30	112
Sweden	12	22	30	18	41	216
Switzerland	13	19	31	27	60	92
Taiwan	29	24	31	3	17	57
Thailand	12	19	30	32	27	70
Turkey	10	10	29	30	36	56
United Kingdom	11	13	32	18	38	184
United States	10	11	35	21	46	67
Vietnam	10	12	34	25	9	160
Base tariff	36	58	7	287	38	16

Base tariff is the initial tariff applied to all exporters in the current version 5 GTAPdatabase

Table 6: Tariff averages faced in Egypt by selected exporters

<u>Exporter</u>	Beef and sheepmeat	Other meat	Vegetable oils	Dairy products	Other food products	Beverages and tobacco products
Argentina	5	33	7	16	16	638
Australia	6	36	14	16	20	929
Austria	7	41	12	20	33	165
Belgium	9	45	12	19	30	315
Brazil	6	59	6	24	32	469
Canada	8	42	11	18	22	804
Chile	16	49	11	24	10	1009
Czech Rep.	16	54	12	16	30	279
Denmark	14	41	15	18	18	520
Finland	12	41	15	16	28	672
Germany	8	43	11	20	28	445
France	8	57	11	19	26	1092
Greece	9	49	12	22	32	759
Ireland	5	40	16	14	19	898
Italy	11	41	12	21	31	1060
Mexico	15	40	10	18	23	801
Netherlands	8	51	11	18	26	359
New Zealand	5	45	15	14	14	910
Philippines	20	35	12	17	19	369
Poland	14	54	12	12	29	505
Portugal	18	37	11	20	19	949
South Africa	8	57	13	18	20	1003
Spain	9	43	12	22	23	1053
Sweden	17	38	17	17	26	961
Switzerland	11	36	11	19	30	469
Taiwan	25	49	11	15	10	241
Thailand	16	52	13	26	19	287
Turkey	5	66	14	23	31	203
United Kingdom	8	54	13	18	27	1112
United States	8	56	8	18	23	338
Vietnam	5	39	12	24	8	786
Base tariff	36	58	7	287	38	16

Base tariff is the initial tariff applied to all exporters in the current version 5 GTAPdatabase

Table 7: Welfare gains from a 50 percent reduction tariffs in processed food

	Simple average tariffs	Weighted tariffs --millions \$U.S.--	Difference
USA	1,301	1,347	46
Canada	654	653	-1
Mexico	111	116	5
Australia	301	275	-26
New Zealand	470	400	-70
Austria	137	130	-7
Belgium	106	101	-5
Denmark	58	87	29
Finland	56	58	2
France	605	382	-223
Germany	737	604	-133
United Kingdom	1,298	1,123	-175
Greece	117	99	-18
Ireland	-114	-97	17
Italy	681	559	-122
Luxembourg	5	4	-1
Netherlands	230	199	-31
Portugal	130	130	0
Spain	284	238	-46
Sweden	139	122	-17
Switzerland	1,243	1,359	116
Other W.European	1,354	767	-587
Morocco	119	37	-82
Rest of Middle East	2,178	2,675	497
Brazil	613	366	-247
Argentina	374	269	-105
Rest of South America	320	405	85
China	573	159	-414
Japan	3,142	2,675	-467
Korea	245	106	-139
Taiwan	40	-73	-113
S.East Asia	678	987	309
India	141	110	-31
Rest of S.Asia	145	159	14
Central America	249	268	19
Central Europe	1,083	1,119	36
Former Soviet Union	195	97	-98
Rest of N.Africa	1,115	1,082	-33
South Africa	309	286	-23
Rest of World	549	483	-66
World	21,892	19,866	-2,026

Table 8: Allocative efficiency gains by individual food processing sector from 50 percent reduction in weighted tariffs

	Beef and sheepmeat	Other meat	Vegetable Oils	Dairy Products	Processed Rice	Sugar	Other food products	Beverages and tobacco	Total
--millions \$U.S. --									
USA	4	2	3	88	0	162	156	9	424
Canada	10	114	2	347	0	0	44	310	827
Mexico	38	108	8	34	0	0	13	15	216
Australia	3	0	0	-4	0	0	5	21	25
New Zealand	0	0	0	0	0	0	4	2	6
Austria	10	5	0	13	5	7	25	28	93
Belgium	52	7	1	56	6	6	55	63	246
Denmark	7	-8	2	-36	3	2	54	4	28
Finland	5	1	0	0	2	13	30	2	53
France	135	30	3	40	44	13	188	15	468
Germany	195	83	8	195	25	14	269	15	804
United Kingdom	267	46	5	193	25	142	212	89	979
Greece	40	1	0	3	1	3	14	4	66
Ireland	-20	0	0	-13	1	4	3	7	-18
Italy	156	20	15	50	9	37	92	61	440
Luxembourg	2	0	0	2	0	0	2	3	9
Netherlands	68	25	4	65	11	24	79	43	319
Portugal	17	1	1	3	8	4	38	12	84
Spain	57	11	8	30	8	28	94	34	270
Sweden	24	4	2	8	5	4	44	6	97
Switzerland	32	176	16	72	0	11	293	881	1,481
Oth. W.Europe	21	72	10	73	2	4	566	94	842
Morocco	3	0	28	15	1	21	4	5	77
Rest of Mid East	426	260	71	786	8	26	715	995	3,287
Brazil	9	4	-18	22	9	29	93	132	280
Argentina	1	2	1	1	0	1	9	6	21
Rest of S. Amer.	35	3	13	5	3	7	32	48	146
China	2	5	115	1	87	7	37	20	274
Japan	253	200	3	725	1,136	59	786	17	3,179
Korea	27	10	27	66	0	0	160	65	355
Taiwan	2	1	1	1	0	1	15	-23	-2
S.East Asia	8	22	14	11	54	9	152	55	325
India	0	0	47	1	0	5	14	57	124
Rest of S.Asia	0	0	72	9	9	29	16	24	159
Central America	5	4	5	11	15	23	30	40	133
Central Europe	4	135	31	76	4	63	274	374	961
Former S. Union	13	32	5	-56	2	18	147	-39	122
Rest of N.Africa	1	1	16	14	2	33	70	965	1,102
South Africa	40	17	24	33	0	17	48	172	351
Rest of World	4	14	21	11	3	30	89	197	369
World	1,953	1,412	564	2,953	1,486	856	4,973	4,828	19,025

Table 9: Difference in net trade from simple average tariffs and weighted average tariffs

	Beef and sheepmeat	Other meat	Vegetable Oils	Dairy Products	Processed Rice	Sugar	Other food products	Beverages and tobacco	Total
--millions \$U.S.--									
USA	83	-304	-255	-29	16	0	-219	537	-171
Canada	-9	59	-14	-8	-1	1	-111	4	-79
Mexico	-7	-2	0	1	0	8	-23	-13	-36
Australia	-21	-16	5	-26	6	3	-99	0	-148
New Zealand	-168	-35	1	54	0	1	-61	2	-206
Austria	5	2	0	7	0	0	7	-7	14
Belgium	8	17	33	19	0	-1	35	-83	28
Denmark	1	138	-15	63	0	-5	-118	-12	52
Finland	0	1	-1	4	0	0	-8	-3	-7
France	29	17	12	74	0	-6	143	-567	-298
Germany	36	11	-83	106	-1	-10	102	-79	82
United Kingdom	39	-4	9	21	0	-11	34	-391	-303
Greece	-2	0	11	0	0	0	6	-18	-3
Ireland	23	2	-2	3	0	0	30	-11	45
Italy	-1	9	7	0	6	-2	112	-42	89
Luxembourg	1	1	2	1	0	0	2	-3	4
Netherlands	42	18	-72	142	-1	-5	45	-76	93
Portugal	-2	0	1	3	1	2	3	-16	-8
Spain	13	8	22	10	0	-6	27	-47	27
Sweden	-1	1	-5	1	-1	-2	-63	-3	-73
Switzerland	1	15	-2	-362	0	1	57	-19	-309
Oth. W.Europe	68	27	-12	39	12	72	728	109	1,043
Morocco	0	0	30	3	0	2	-268	0	-233
Rest of Mid. East	-65	-57	34	-230	-18	-42	202	-121	-297
Brazil	-3	-66	-483	1	1	0	10	9	-531
Argentina	-61	36	-175	2	1	2	-122	23	-294
Rest of S. Amer.	12	5	-2	-1	-3	-3	267	-39	236
China	1	-144	305	7	6	-1	-729	408	-147
Japan	-43	136	15	9	0	-3	1,213	91	1,418
Korea	-27	-22	28	1	0	1	-259	24	-254
Taiwan	6	63	6	16	0	0	-298	292	85
S.East Asia	-3	64	468	1	-23	-12	635	33	1,163
India	0	1	58	-1	-2	4	-392	7	-325
Rest of S.Asia	-1	1	2	-1	-6	-1	34	-1	27
Central America	-1	-1	-2	1	-1	-7	54	-5	38
Central Europe	8	7	0	38	-1	11	15	-13	65
Former S. Union	9	10	5	8	2	9	-576	10	-523
Rest of N.Africa	6	0	46	17	4	0	26	13	112
South Africa	13	0	-4	1	0	1	-92	-29	-110
Rest of World	9	5	29	7	3	2	-350	35	-260

Results are calculated by subtracting net export changes generated from cuts in the simple average tariff rates from net export changes simulated from cuts in weighted average tariffs.