Economic Analysis of the Liberalization of Red Meat Markets in the Pacific Region from 1988 to 2007

Economic Market Analysis Unit

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L IST OF ACRONYMS

AAFC	Agriculture and Agri-Food Canada
BSE	Bovine Spongiform Encephalopathy
CUSTA	Canada-United States Trade Agreement
DW	Dressed Weight
FAO	Food and Agriculture Organization (United Nations)
NAFTA	North American Free Trade Agreement
OECD	Organisation for Economic Co-operation and Development
SIP	Standard Import Price
WTO	World Trade Organization
C$	Canadian dollars
URAA	Uruguay Round Agreement on Agriculture (WTO)
US$	American dollars

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Summary

The liberalization of red meat (beef and pork) markets since 1988 is a good example of government action that has led to significant gains for the Canadian and American agri-food industries. Japan, South Korea and Mexico are the main countries that have liberalized their red meat markets since 1988. The industry has also benefited from the free trade agreement between Canada and the United States. It has also gained from the liberalization of the beef market in Indonesia and the pork markets in Australia and the Philippines.

As a result of the 1988 agreement between Japan and the United States, the beef tariff rate quota level was increased and then replaced in 1991 by a 70% tariff, which was gradually reduced to 50% in 1993. This reduction continued with the Uruguay Round Agreement on Agriculture (URAA). To a certain extent, the resulting drop in prices of beef in Japan forced the government to lower the standard import price (SIP) of pork to avoid a significant change in the relative prices of these two meats. The increase of pork imports to Japan has been strong, reaching 1.1 million tonnes in dressed weight (dw) in 2007. Beef imports experienced a similar rise, but then collapsed, first in 2002 following cases of bovine spongiform encephalopathy (BSE) in Japan, and then again in 2004 after BSE appeared in the United States. Nevertheless, they again reached nearly 700,000 tonnes (dw) in 2007.

The tariff rate quotas in South Korea had limited red meat imports to negligible quantities prior to 1990. Spurred on by bilateral agreements in late 1989, particularly with the United States and Australia, the Korean red meat market gradually opened up. Liberalization continued with the URAA. Korea maintained a tariff rate quota for frozen pork and for beef until 1997 and 2000, respectively. Since then, the Korean market has been protected only by tariffs. Pork imports increased heavily during the 2000s, reaching 425,000 tonnes (dw) in 2007. Beef imports experienced a similar growth, but collapsed in 2004 after BSE appeared in the United States.

Before joining the World Trade Organization (WTO) in late 1987, Mexico imported practically no red meat. Imports increased slowly during the first half of the 1990s. The signing of NAFTA and the instantaneous, rather than gradual, removal of tariffs fostered an explosion in imports beginning in 1997. Despite the fluctuations caused by BSE in Canada and the United States, beef and pork imports held steady at about 300,000 tonnes (dw) each in 2007. The free trade agreement between Canada and the United States led to the elimination of the final tariffs affecting the red meat industry. They had generally been very low, and were eliminated more quickly than provided for in the initial agreement.

This analysis includes five individual scenarios for Australia, South Korea, Japan, Mexico, the Philippines and Indonesia, and a scenario for the elimination of tariffs between Canada and the United States, in addition to an overall global scenario.

In the first scenario, the tariffs between Canada and the United States are set at 1988 levels. For Mexico, imports are kept at pre-1988 levels, which are practically nil. For Australia, the scenario consists of keeping pork imports at pre-1990 levels, which represents an annual average reduction of 57,000 tonnes (dw) over the entire period. For Korea, imports are kept at pre-1990 levels (practically nil). This represents an average decrease of 128,000 and 207,000 tonnes (dw) for pork and beef, respectively. For Japan, beef imports have been kept at 1987 levels; the SIP is set at the average value from 1982 to 1985, and the pork tariff is set at 5%. This represents an average decrease of 167,000 and 203,000 tonnes (dw) for pork and beef, respectively. Finally, for the Philippines and Indonesia during the period from 1995 to 2007, pork and beef imports have been respectively set at the average level prior to the URAA.

The red meat component of the Pacific market from the OECD/FAO's AGLINK/Cosimo model is used to produce this analysis. This component has a few weaknesses, which is why the results of this analysis must be considered to be the minimum impact. On one hand, the analysis showed that the impact of each of these market liberalizations was not very significant, and that the liberalization of the Japanese market was the one that had the greatest impact. On the other hand, it also showed that the combination of all of these agreements did have a considerable impact.

In the overall scenario, the prices of cattle and hogs would have been about 6% less on average over the 1988 to 2007 period had it not been for these multilateral and bilateral agreements. On average, these reduced prices would have reduced beef and pork production on Canadian farms by an average of 8% and 10% per year, respectively. The combination of lower prices and lower production would have caused annual average decreases in farm cash receipts drawn from the cattle and hog market equal to C$776 million and C$486 million, respectively, for a grand total of C$25.7 billion over this 20-year period for the entire agriculture industry. Additionally, the value added of the red meat processing industry would have dropped by an average of C$432 million per year, for a total loss of C$8.6 billion. Finally, the value of exports of the red meat supply chain would have dropped by an average of C$1.044 billion per year, for a grand total of C$21 billion over this 20-year period.

Economic Analysis of Liberalization of Red Meat Markets in the Pacific Region
from 1988 to 2007

Introduction

1.0 INTRODUCTION

The liberalization of agricultural markets has been slower and less complete than that of the majority of other economic sectors. However, a certain degree of openness has been created through bilateral, regional, and multilateral agreements over the past 20 years. The degree of the openness and the extent of the impact varies among agricultural sectors, depending on the policies in place and the length of the liberalization process. For beef and pork markets in the Pacific Rim countries, liberalization began in 1988 and became more generalized and concrete in 1995 with the URAA signed under the aegis of the WTO.

The purpose of this study is to analyze the impact of this liberalization over the 20-year period from 1988 to 2007. In order to identify the impact of the measures adopted by each country in the region, the analysis includes five individual scenarios for Australia, South Korea, Japan, Mexico and other countries (the Philippines and Indonesia), as well as a scenario for the elimination of tariffs between Canada and the United States. Each scenario includes a model simulation without the market liberalization measures that all of the countries have adopted since 1988. The first two sections include a general description of the beef and pork markets, and provide an overview of the model used to produce the analysis. The remaining sections address each of the liberalizations in the following order: the Canada-United States Trade Agreement (CUSTA), Mexico, Australia, South Korea, Japan, and other countries. The details of the agreement, a description of the market structure over the entire period, the creation of the scenario and the results are given for each situation respectively. The overall impact of all of these individual liberalizations is discussed in the final section.

Beef and Pork Markets

2.0 BEEF AND PORK MARKETS

Due to animal diseases, there are no truly global pork and beef markets. Instead, there are a few regional markets, which generally include countries with the same sanitary status, as with Pacific Rim countries, which are normally free of foot-and-mouth disease. The existence of such markets is primarily supported by the fact that these countries carry out the vast majority of their beef and pork trade among themselves. The high price levels in the majority of these countries relative to other world regions are further evidence that such Pacific markets exist. Prices are indeed much higher in these markets because of the health of the livestock, the quality of the meat and the purchasing power of the region.

These countries notably include Canada, the United States, Mexico, Australia, New Zealand, Japan, and South Korea. The majority of the pork trade of the Philippines and Chile, as well as the beef trade of Indonesia, are also conducted with these Pacific Rim OECD countries. In addition, a portion of the pork exports from the European Union is imported into this market.

For Canada and the United States, it is clear that the vast majority of pork and beef exports are also intended for these countries. During the 2000-2006 period, 91% and 98% of all Canadian pork and beef exports, respectively, (in all forms, including live animals) were shipped to one of these countries. For the United States, the percentages are 82% and 78% for pork and beef, respectively.

The integration of these countries into the Pacific markets has not been perfect. It varies both between countries and over time, depending on the level of openness, the use of safeguard measures, the discovery of animal diseases and the occurence of macroeconomic crises. Nevertheless, it remains true that over time, a genuine Pacific market for beef and pork has developed.

Model

3.0   MODEL

A component of the 2007 version of the OECD/FAO's AGLINK/Cosimo model has been used to produce this analysis. AGLINK is a dynamic partial equilibrium model of the main global agricultural markets, with specific representation of the major agricultural policies currently in place. Global beef and pork markets are defined relative to each country's sanitary status. More generally, the model includes about 14,000 equations and has been constructed by the OECD and the FAO in direct collaboration with the OECD member countries since 1989. The model is used both to produce OECD agricultural outlooks and as a forward looking analysis tool. This is also why the OECD has decided not to include past market structures and agricultural policies.

The model is therefore not very suitable for analyses that must be conducted in a historical context, particularly when the analysis period spans 20 years. This is why it was necessary to use only the red meat component of the Pacific market, which includes the countries mentioned in the previous section, as well as Thailand and a few Central American countries. As a result, the analysis tool became even more partial. In order to somewhat reduce the partial nature of the model, reduced-form equations have been added in order to determine the influence of changes in the level of red meat production in the Pacific Region on the global and national prices of both cattle feed (coarse grains, wheat, and oil meal) and poultry, which acts as a substitute in the pork and beef demand functions. The coefficients of these equations were calculated using simulations run with the complete model over the forecast period.[1]

Trade in AGLINK is not broken down by country of origin and destination, meaning that bilateral trade flows are unavailable. Trade is represented by variables for meat, for animals on a meat-equivalent basis and for their sum; however, it is not represented for each cut of meat. A special effort was made to isolate both beef imports and beef exports for Mexico because it largely imports meat and almost exclusively exports feeder cattle and calves. The relative profitability of feedlots in the United States and Mexico is the main variable behind Mexican exports, while the imports are calculated residually. The sum of exports of all these countries is obviously not always exactly equal to the sum of imports. In fact, even though these countries conduct the majority of their red meat trade among themselves, there is still a small portion that is conducted

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1. *We have determined that it is preferable to have a link between the production of red meat in the Pacific Region and the prices of feed, even though this link is not based on a simulation conducted over the historical period.*

with countries that belong to other markets appearing in AGLINK. These quantities are kept exogenous for the purposes of this study. Production on farms and in slaughterhouses both appear in the model; however, as with trade, neither meat is broken down by cut.

The impact of these scenarios on the countries depends not only on the market structure (which is explained in detail in the following section) but also on the elasticity of supply and demand, the size of each market with respect to the whole is also an important factor. As shown in Table 1, it may be expected that the United States has experienced the greatest impact in absolute terms because of its position in the Pacific market and relatively high supply elasticities. The cross-elasticities in the demand function between beef and pork are greater in North America than elsewhere. The amount of sheep meat consumption explains this phenomenon in Oceania, while fish and poultry play the same role in Asia.

As with all models, AGLINK has certain weaknesses. Firstly among them is the fact that the Canadian and American beef import laws that were in place at the beginning of the analysis period have not been taken into account. For Canada and Mexico, this does not constitute a significant weakness because the resulting restrictions were not binding for half of the years in question and, in any event, did not affect the cattle trade between North American countries. Thus, they did not constitute a strong trade restriction. Furthermore, with this type of model, it is very difficult to explicitly determine the effects of the following factors: the harmonization of meat classification systems, the integration of processors, a better cooperative spirit that normally arises from a free-trade agreement and a reduction in trade disruptions resulting from the creation of an independent tribunal to settle trade disputes. Finally, as the model does not break the meat down into cuts, it is impossible to isolate the benefits arising from different relative prices in all countries participating in the market liberalization agreements. For all of these reasons, and because certain countries were not considered in this analysis (such as Taiwan), these scenarios should be considered as presenting the minimal impact.

Table 1: Elasticities of Long-term Supply in the Pacific Rim Countries

	BEEF		PORK	
	Elasticity	Share (%)[a]	Elasticity	Share (%)
Canada	1.4	8.1	3.3	12.3
United States	1.54[b]	59.3	1.9	51.0
Mexico	0.5	7.7	1.5	6.0
Japan	0.2	2.6	1.3	7.2
Korea	1.8	1.1	1.1	6.0
Australia	1.31	11.6	1.0	2.2
New Zealand	0.57	3.3	1.1	0.3
Thailand	0.58	1.0	1.0	3.7
Chile			1.0	2.2
Philippines			1.0	7.5
Indonesia	1.7	2.1		

a   Average percentage with respect to total production or consumption in the countries included within the Pacific market over the 2000-2007 period. The figures do not add up to 100 because Central American countries do not appear in the table.

b   Even though this is native production, the ability of the United States to import large quantities of cattle and calves from Canada and Mexico as feeders increases the elasticity of beef.

Table 2: Elasticities of Long-term Demand in the Pacific Rim Countries[a]

	BEEF			PORK		
	Elasticity	Share (%)	Cross-Elasticity	Elasticity	Share (%)	Cross-Elasticity
Canada	-0.26	5.3	0.18	-0.16	4.7	0.16
United States	-0.25	66.2	0.06	-0.18	49.5	0.13
Mexico	-0.50	8.0	0.15	-0.20	7.4	0.15
Japan	-0.47	6.7	0.10	-0.30	13.2	0.05
Korea	-0.65	2.6	0.25	-0.37	7.3	0.20
Australia	-0.67	3.6	0.00	-0.56	2.5	0.14
New Zealand	-0.46	0.6	0.00	-0.66	0.4	0.08
Thailand	-0.90	1.2	0.06	-0.76	3.6	0.04
Chile				-0.60	1.7	0.03
Philippines				-0.81	7.6	0.04
Indonesia	-0.90	2.6	0.05			

a   The elasticities of demand are in relation to producers' prices (except in Japan where wholesale prices are used).

Scenarios 1 and 2

4.0 SCENARIOS 1 AND 2: THE CANADA-UNITED STATES TRADE AGREEMENT (CUSTA)/ACCESSION OF MEXICO TO THE WTO AND THE NORTH AMERICAN FREE TRADE AGREEMENT (NAFTA)

4.0.1 History

In addition to harmonizing and establishing rules and institutions and thereby mitigating the potential dangers of trade conflicts, the inception of CUSTA in 1989 fundamentally changed the trade environment between the two countries. The agricultural portion of the agreement sought to eliminate tariffs on certain agricultural commodities over a period of 10 years (1989 to 1998). The liberalization of the Mexican markets began with its entry into GATT (the forerunner of the WTO) in late 1987. Prior to this, Mexico used import licenses that had limited red meat imports to very low levels.

GRAPH 1: Mexican red meat imports

Beginning in 1988, these licenses were converted into tariffs, which stimulated imports until the peso crisis of the mid-90s, as shown in Graph 1. NAFTA, which came into force in 1994, completed the liberalization of the Mexican red meat markets by eliminating most existing tariffs with Canada and the United States.
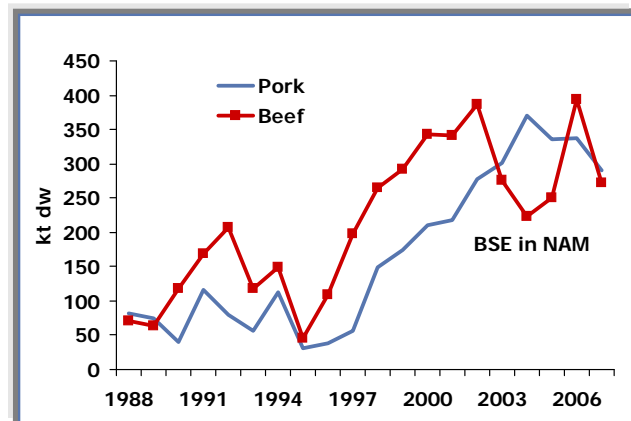
4.0.2 Cattle and Beef

Regarding measures specific to the cattle market, the United States and Canada had 2.2 cents/kilo tariffs in place on all imported cattle (except for breeding and dairy cattle). These tariffs were gradually eliminated beginning in 1989. This process, which was originally meant to take 10 years, was accelerated, and ultimately, in 1993, the tariffs between these two countries were completely eliminated. In 1992, Mexico increased its tariffs for non-breeding cattle from zero to 15%, but when NAFTA came into force in 1994, this tariff was eliminated.

As for beef, the United States and Canada maintained a 4.4 cents/kilo tariff on imports. This tariff was gradually eliminated beginning in 1989. As with cattle, the initial intent was to eliminate

this tariff over a 10-year period, but the process was ultimately accelerated, and the tariffs between Canada and the United States were completely eliminated in 1993. For NAFTA, all tariffs between the three countries were eliminated in 1994. Canada and the United States also had variable tariff rate quotas in place as part of their respective laws regarding beef imports. With the inception of CUSTA and NAFTA, they agreed to exempt both one another and Mexico from restrictions on imported quantities. In 1992, Mexico increased its tariffs on fresh and frozen beef from zero to 20% and 25%, respectively.

4.0.3 Live Hogs and Pork

Neither Canada nor the United States had any tariffs on imports of live hogs prior to the inception of CUSTA and NAFTA. Prior to 1994, Mexico imposed a 20% tariff on live hogs. With the signing of NAFTA, this tariff was gradually eliminated and ended in January 2003. Mexico implemented a safeguard measure for its tariff rate quota, which increased by 3% every year. This measure was eliminated in January 2003.

Regarding pork, the majority of imports from the United States and Canada entered the country tariff-free, except for a certain number of processed pork products. These tariffs were gradually eliminated between Canada and the United States between 1989 and 1993. Before 1994, Mexico maintained a 20% tariff on pork imports, which was gradually eliminated between 1994 and 2003 with the inception of NAFTA. Mexico also had a safeguard measure attached to its pork tariff rate quota, which went up by 3% annually. This measure was eliminated in January 2003.

4.0.4 Results of Scenario 1 – Impact of Maintaining Tariffs Between Canada and the United States (Table B6)

The market structure of the red meat industry in Canada within the model is that of a small exporting country whose national prices are dictated by American prices, the exchange rate, tariffs and transaction costs. These costs are influenced by the size of the exportable surplus and are reflected in the estimated coefficients of the price transmission equations. Canada continuously had a large trade surplus for both types of meat during this period. It was therefore unnecessary to consider a possible price fluctuation between the import price ceiling and the export price floor.

Consequently, maintaining the tariffs for imports of cattle and beef into Canada and the United States results in an average 1.2% reduction in the price of beef in Canada over the 1988-2007 period. Since Canada is a major net exporter of cattle and beef to the United States, maintaining the tariffs causes a drop in the prices that Canadian producers and processors would receive from American importers. This price drop has a negative impact on beef production[2] in Canada, which decreases by an average of 1.7% over this period, while consumption rises by 0.3%. Net beef exports[3] from Canada fall by an average of 6.6%. The drop in Canadian exports to the United States causes prices and production to increase in that country, which leads to a drop in consumption and an increase of its net exports by an average of 2.6% per year.

For aggregates, the impact of maintaining tariffs between Canada and the United States leads to a loss in farm cash receipts for cattle and calves averaging C$171 million per year. The average losses of value added[4] and export value are C$36 million and C$175 million, respectively, over

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2. *Unless indicated otherwise, "production" refers to farm production in equivalent dw.*

3. *Unless indicated otherwise, "net exports" means exports minus imports of meat and the animals in their meat equivalent.*

the 1988-2007 period. The impact of this scenario on the Canadian pork industry is practically nil.

4.0.5 Results of Scenario 2 – Impact of Excluding Mexico from the WTO and NAFTA (Table B7)

The market structure in Mexico is the same as Canada's, but the price transmission is also affected by the peso's heavy fluctuations. If exports of feeder calves and cattle, which fall under another dynamic, are excluded over this period, Mexico has always had a large trade deficit for these two meats. As with Canada, it is therefore unnecessary to consider a possible fluctuation between the import price ceiling and the export price floor. The scenario consists of completely closing the Mexican border to red meat imports, as was the case before 1988. Pork imports are therefore set at zero, while beef is kept stable at the low pre-1988 levels (largely made up of slaughter cattle). As a result of the border closure, the domestic prices of beef and pork in Mexico are determined by an internal market clearing price over the entire study period.

Since the opening of its borders in 1988, Mexican red meat imports have increased markedly, except for a dip in 1995 as a result of the peso crisis. As can be seen in Graph 1, beef imports reached a peak of 386,000 tonnes in 2002, representing nearly one-quarter of domestic consumption. Mexican pork imports peaked at 370,000 tonnes in 2004, about 27% of domestic consumption. Because the imported volumes of red meat are relatively high, closing the Mexican border leads to major upheavals in the domestic market.

For beef, the price in Mexico goes up by an average of 14% over the entire 1988 to 2007 period, peaking at 36% in 1998. This price increase stimulates production, which increases by an average of 5.5% over the study period, reaching a high of 10.5% in 2002. Over that same period, following this price increase, average beef consumption declines by almost 4%. Because Mexico imports beef and exports feeder cattle, the increase in the price of beef in Mexico makes Mexican feedlots more willing to pay higher prices than their American competitors for this livestock, which leads to an average 36% decline in cattle exports to the United States. The impact of this scenario on beef prices and production in Canada and the United States is relatively modest, with declines of less than 1%. Net exports drop by an average of almost 4% in Canada and 11.3% in the United States.

For pork, the average price in Mexico increases by 22% over the 20-year period, which causes production to go up by an average of almost 15%. Despite this price increase, Mexican consumption is only 0.52% lower because of a relatively low demand elasticity and a hefty increase in the price of the major substitute, beef. The impact of this scenario on pork prices and production in Canada and the United States is slightly greater than for beef. However, it remains relatively modest. Pork prices and production in Canada decline by an average of 1.4% and 2.6%, respectively. Net exports decline by an average of 6%. For the United States, the declines in price and production are even lower: 1.1% and 0.86%, respectively. However, net exports decline significantly more, by 56%.

Regarding aggregates, Canadian farm cash receipts for cattle/calves and hogs decline by an average of C$112 million and C$126 million respectively per year over the study period. The average annual losses in the value of exports and value added total C$190 million and C$92 million, respectively. The value of United States production declines by an average of US$425 million (-1.5%) for the cattle sector and US$200 million (-1.9%) for the hog industry.

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4. *Unless indicated otherwise, this refers to the value added of the red meat processing sector.*

Scenario 3

5.0 SCENARIO 3: CLOSING THE PORK MARKET IN AUSTRALIA

5.0.1 History

For sanitary reasons, Australia did not allow pork imports before 1990, except for cooked, pre-served meat[5]. Beginning in 1990, new quarantine protocols were gradually introduced, allowing raw frozen pork to be imported under very strict rules from exporting countries free of animal diseases. New Zealand and Canada were the first two countries to export raw frozen pork to Australia.

In January 1995, the URAA and its related agreements came into force, thereby enabling fresh pork imports from Canada in May 1996, provided that the meat had been deboned and cooked under quarantine procedures upon arrival. In November 1997, imports of certain cuts of pork from Denmark were permitted, followed by those from the United States in May 2004.

Pork imports in Australia eventually increased markedly, reaching a peak of 205,000 tonnes in 2007 (Graph 2), which represents 40% of domestic pork consumption. Over the 1990-2007 period, average annual imports were 63,300 tonnes.

GRAPH 2: Australian pork imports
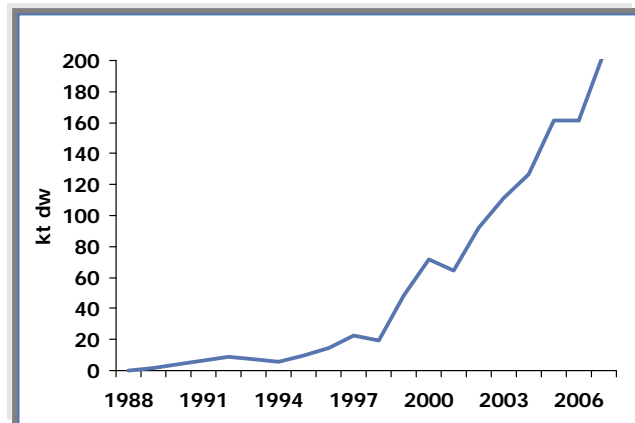
5.0.2 Results of Scenario 3 (Table B8)

Because pork imports were non-existent before 1990, they were kept at zero over the entire 1988-2007 period under this scenario. Consequently, the Australian price of pork, which is determined in the model by a price transmission equation (except for 1988 and 1989), is now determined by an internal market clearing price under this scenario.

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5. *Safeguard Inquiry into the Import of Pigmeat, Australian Government, Productivity Commission Accelerated Report, No. 42, 14 December 2007.*

Closing the Australian border to pork imports causes an increase in the domestic price of pork, which stimulates Australian production and lowers consumption.[6] The price of Australian pork increases by only 2.9% over the 1990-1999 period because the import volumes were relatively low, but beginning in the 2000s, the price jumps significantly, reaching a high of more than 55% in 2007. Over the 1990-2007 period, the price of pork in Australia increases by an average of 12.7%, but increases by an average of 25% during the 2000s. This price increase stimulates pork production, which goes up by an average of 2.7% over the 1990-2007 period, with a high of 10.4% in 2007. As a result of this price increase, pork consumption in Australia drops by 5.9% over the 1990-2007 period, with a peak decline of nearly 22% in 2007.

In North America, the impact of closing the Australian pork market is very low. Over the 1988-2007 period, the Canadian price declines by 0.43%. Production and net exports also decline by 0.38% and 0.74%, respectively. The impact on Canadian aggregates is too low to be presented here. The impact of this scenario on the United States is even lower than for Canada and is presented in an appendix.

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6.   *As a result of this price increase, Australian pork exports gradually drop to zero.*

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Scenario 4

6.0 SCENARIO 4: CLOSING THE RED MEAT MARKET IN SOUTH KOREA

6.0.1 History

Prior to 1990, the Korean red meat market was protected by tariff rate quotas that kept imports near zero. Spurred by bilateral agreements in late 1989, particularly with the United States and Australia, the Korean red meat markets gradually opened up. Liberalization continued with the implementation of the URAA in 1995.

As a result of this treaty, Korea agreed to implement tariff rate quotas for red meat. The tariff rate quotas for frozen pork and for beef were eliminated in 1997 and 2000, respectively, and replaced by tariffs. Pork imports increased significantly during the 2000s, reaching 421,000 tonnes (dw) in 2007 (see Graph 3), or 27% of domestic consumption. Beef imports experienced similar growth, but collapsed in 2004 after BSE appeared in the United States. However, beef imports in 2007 still represented 52% of Korean consumption.

GRAPH 3: Korean red meat imports
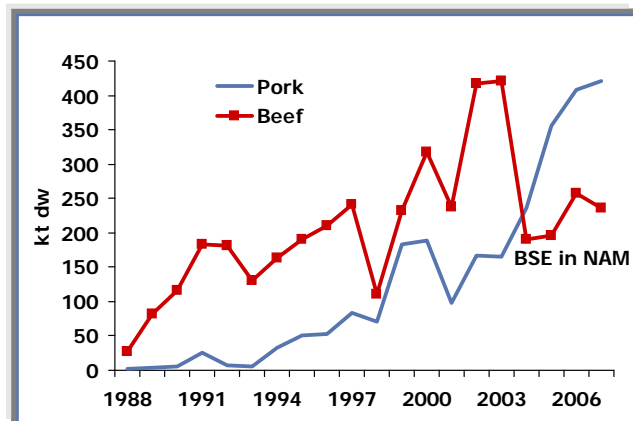
6.0.2 Results of Scenario 4 (Table B9)

As a result of changes to its trade policy, Korea's beef market structure has changed a few times over the course of history. It was necessary to modify AGLINK because the structure was limited to the one currently in place, i.e. domestic price was calculated using an import price ceiling transmission equation. Korea kept a certain amount of control on beef imports prior to the elimination of the tariff rate quota early in the millennium. This is why the market structure is represented by an internal market clearing price from 1988 to 2000, except during the years when the tariff rate quota was not binding, i.e. from 1997 to 1999. Since 2001, the market structure has been represented by an import price ceiling transmission equation.

For pork, an internal market clearing price was introduced into the model for the 1988-1994 period. The elimination of the tariff rate quota on fresh pork beginning in 1995[7] was deemed

sufficient to create a direct link between prices in Korea and the Pacific market.

Because the Korean red meat market was protected by tariff rate quotas held at near-zero levels before 1988, the scenario represents complete closure of the Korean border to red meat imports over the period 1988-2007. Domestic prices increase significantly because the volumes imported over the 1988-2007 period were relatively high, representing an average of 11% and 49% of domestic pork and beef consumption, respectively. The prices of pork and beef therefore increase by 17% and 25%, respectively. This price hike stimulates pork and beef production, which grow by 16% and 49%, respectively. This significant increase in the price of beef has a negative effect on domestic consumption, which drops by 23% over the study period; however, it has a positive effect on pork consumption because the relative price of this meat decreases with respect to beef.

On one hand, the impact of closing the Korean red meat market is relatively low for Canada, as beef prices and production drop by 1.3% and 1.4%, respectively. On the other hand, net exports decrease by a little more than 6%[8]. For pork, price and production drop by 1.4% and 1.8%, respectively, while net exports decline by an average of about 3.5% over the study period.

For aggregates, annual cash receipts losses for Canadian hogs and cattle producers over the study period total C$113 million and C$155 million on average, respectively. The loss of value added in Canada is C$86 million and export value declines by C$214 million.

In the United States, the price of beef declines by 1.1%, and production drops by 1%. Net exports decline by 17.5%. For pork, the decreases in prices and production are 1.2% and 0.7%, respectively; net exports decline by 49%. This significant decrease is due to the fact that pork exports in the U.S. represent a much lower percentage of production than in Canada. The losses in production value average US$623 million annually (-2.2%) for the cattle industry, compared to US$204 million (-1.8%) for the hog industry.

It may therefore be concluded that opening the Korean red meat market had significant effects on the agricultural markets of Pacific Rim countries. Had it not been for the Asian economic crisis in the late 90s and the BSE crisis in North America in the 2000s, the impact on the red meat market, particularly the beef market, would have been greater.

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7. *Another option would have been to introduce the market structure change in 1997, when the tariff rate quota on frozen pork was eliminated.*

8. *This impact may also include a reduction in exports to the United States because Americans must absorb quantities that had previously been exported to Korea.*

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Scenario 5

7.0 Scenario 5: Restricting Access to the Japanese Red Meat Market

7.0.1 History

Before 1988, the Japanese red meat trade was administered by a semipublic company that significantly limited pork and beef imports. Beef imports were limited by tariff rate quotas, while the Japanese government maintained and continues to maintain a system for stabilizing pork prices, using a standard import price paired with a variable import tariff in addition to an ad valorem tariff. The Japanese government gradually reduced the standard import price, thereby exposing Japanese pork producers to increased competition, ultimately resulting in an increase in imports (see Graph 4).

GRAPH 4: Japanese red meat imports
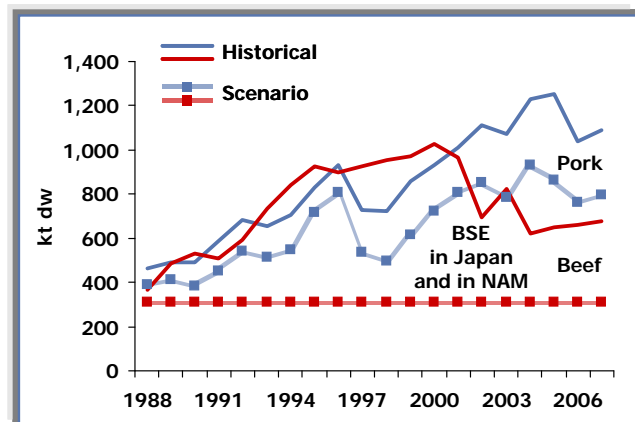
In 1988, Japan signed a bilateral agreement with the United States, which implemented a series of measures that would liberalize the Japanese red meat market[9]. In 1991, the beef tariff rate quota was replaced by a 70% tariff, which was gradually reduced to 50% in 1993.

The URAA, signed in 1995, further reduced this tariff, now set at 38.5%, and also reduced the pork tariff from 5% to 4.3%. This agreement also enabled the implementation of safeguard measures that Japan had frequently used. To maintain the relative prices between these two meats that existed prior to opening the beef market, the Japanese government needed to liberalize the pork market. The decline in the SIP of pork may therefore be attributed to the liberalization of the beef market.

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9. *U.S.-Japan Agreements on Beef Imports: A Case of Successful Bilateral Negotiations. Dyck, John. Economic Research Service, USDA, AER-771, 1998.*

7.0.2   Results of Scenario 5 (Table B10)

For beef, because import volumes were relatively high and rising before 1988, they were kept at 1987 levels throughout the entire study period. This corresponds to a 55% average annual decline in imports. By keeping beef imports stable, the price of beef in Japan is now set by an internal equilibrium, rather than by a price transmission equation to world markets. Because beef imports are much lower than historical values, the new price equilibrium of beef in Japan rises by an average of nearly 56% over the study period. This steep price increase can be explained by the fact that beef imports represented, on average, 42% of domestic consumption over the 1988-2007 period.

On one hand, this steep price increase leads to a 50% average increase in Japanese beef production. On the other hand, beef consumption in Japan drops by an average of nearly 13%. Had it not been for the BSE crisis in Japan (2001 and 2002) and in North America (beginning in 2003), the impact of this scenario would have been greater.

For pork, the SIP was kept at the average 1982-1985 level, which led to a much higher variable import tariff and a much higher price of pork. The ad valorem tariff was kept at 5%. Consequently, pork imports drop by 23%, which causes the domestic price to increase by nearly 20% on average over the 1988-2007 period. This significant price increase results from the decline in imports, which represents an average of nearly 10% of Japanese pork consumption over this period. It also causes a steep increase in production, averaging 9.4% with a peak of 17.7% in 2007, as well as an average decrease in domestic pork consumption of 3.6% over the course of this period. This relatively modest decline in pork consumption is the result of both the price of beef increasing more than the price of pork, and the elasticity of the demand for pork becoming lower after the successive BSE crises.

For Canada, the impact of this scenario on the beef sector is relatively low, but non-negligible. Prices and production decline by 2.4% and 3%, respectively, and net exports drop by an average of 13%. The impact on the United States is slightly lower, except for net exports, which decline by 41%. For pork, Canadian prices and production decline by an average of 2% and 4%, while net exports drop by 9.7%. The impact on the United States is again slightly lower, except for net exports, which decline by 25%.

The impact of this scenario on aggregates is considerable. The average annual reduction in Canadian farm cash receipts is C$293 million for cattle and C$175 million for hogs. Value added and export value drop by an annual average of C$164 million and C$381 million, respectively, which represents losses of several billion dollars over 20 years. In the United States, the value of production in the cattle sector declines annually by an average of US$1.2 billion (-4.3%), compared to a US$309 million loss (-2.9%) for the hog sector.

It may therefore be concluded that the liberalization of the Japanese red meat market generated considerable benefits for the red meat sector in Canada and the United States.

Scenario 6

8.0 SCENARIO 6: TRADE RESTRICTIONS FOR OTHER COUNTRIES (PORK IN THE PHILIPPINES AND BEEF IN INDONESIA)

8.0.1 History

Pork imports from the Philippines were not authorized prior to the URAA. With this agreement, the Philippines created a tariff rate quota of 32,000 tonnes in 1995, which was gradually increased to 54,000 tonnes in 2004. The in-quota tariff is 30%. This quota was binding only in 1999. The Philippines' component was modified to take into account changes in the market structure over the period under analysis. The Philippines are therefore excluded from the Pacific markets prior to 1995, and their prices are linked to the price in the Pacific Region from 1995 to 2007, except for 1999, when they are calculated by an internal market clearing price mechanism. Over this period, net imports always represented less than 10% of consumption, and the price is therefore not set at exactly the import ceiling price[10].

Beef and cattle imports from Indonesia have always been subject to a certain level of government control. They did not exceed 6,000 tonnes (meat plus cattle on a meat-equivalent basis) before 1992. It seems that for whatever reason, the government decided to allow a substantial increase in imports that coincided with the inception of the URAA. Prior to this period, import levels were not sufficient for the national price to be determined by the price in the Pacific Region. However, since 1995, imports have always represented more than 15% of consumption, except during the 1998 macroeconomic crisis. Given this percentage, along with the fact that the majority of these imports come from Australia and New Zealand, the national price in the model is set at the Pacific import ceiling price (except for 1998) in the Pacific Region.

8.0.2 Results of Scenario 6 (Table B11)

For the Philippines and Indonesia, pork and beef imports are set at the average level prior to the URAA over the 1995-2007 period. For the Philippines, this constitutes an average decline of 99%. This significant decline only causes the domestic price of pork to increase by an average of 2.3% annually over this period because imports represent an average of only 2.6% of domestic con-

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10. *All of the Cosimo components of the model include an arbitrary rule for determining national prices. The prices are set at the export floor when net exports constitute more than 10% of consumption. When net imports constitute more than 10% of consumption, the prices are set at the import ceiling instead. For all other possibilities, the prices are set between the two of them.*

sumption. This price increase stimulates production, which increases by an average of 1.6%. As a result of this price increase, domestic consumption declines by almost 1%. In the Indonesian beef industry case, imports decrease by an average of 87% under this scenario over the 1995-2007 period, which increases prices by almost 14%. This price increase leads to an increase of more than 14% in production and an average decrease in consumption of 5% per year.

For Canada, the impact of this scenario leads to a drop of 0.6% and 0.36% in the prices of cattle and hogs, respectively, over the 1995-2007 period. This decline in prices causes beef and pork production to decline by an average of 0.46% and 0.47%, respectively. Net exports decline by 1.53% for beef and 0.85% for pork. The impact on aggregates is relatively small.

Finally, in the United States, the average annual decrease in production value is relatively modest in percentage terms over the period 1995-2007: 0.33% for the cattle industry and 0.19% for the hog industry. However, this decline corresponds to average losses of US$245 million and US$56 million, respectively.

Scenario 7

9.0 Scenario 7: Cumulative Impact of Scenarios 1 to 6 (Tables B1 to B5)

This section describes the cumulative effect of the scenarios analyzed in the previous sections. Taking into account the simultaneity of the model, the results of this scenario do not correspond to the sum of the individual scenarios, a summary of which is given in the graphs A1 to A4 of appendix A.

GRAPH 5: American price of steers and hogs
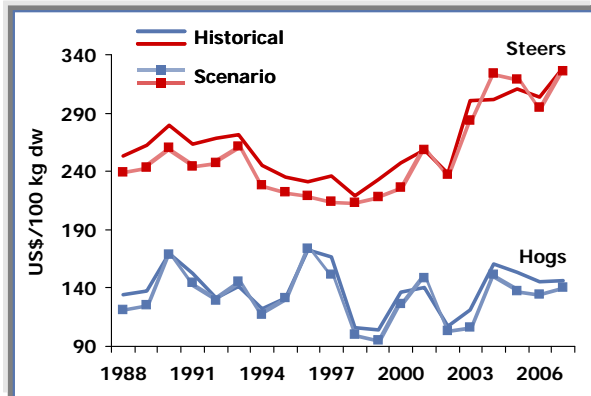
GRAPH 6: American production of beef and pork*
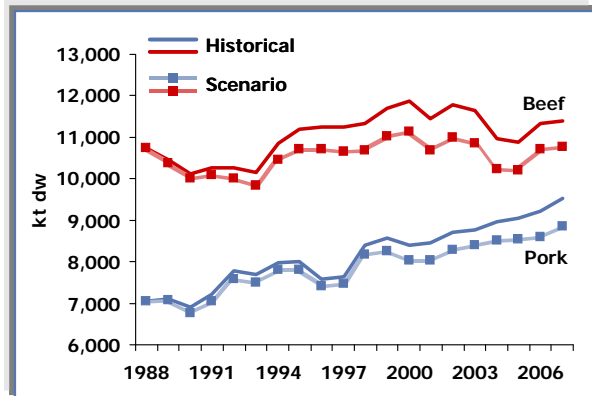
*At the farm in meat equivalent.

GRAPH 7: United States – Net exports of cattle/beef and of hogs/pork
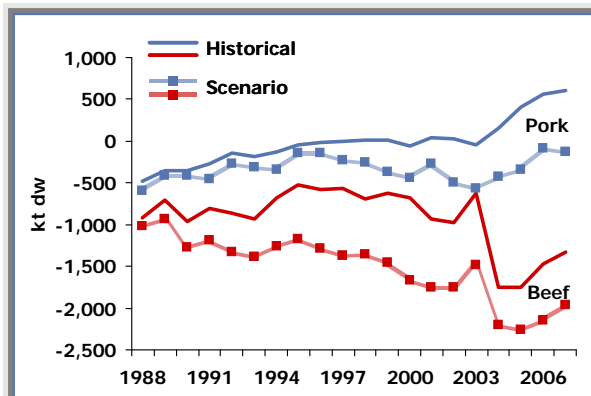
GRAPH 8: Value of production in the United States
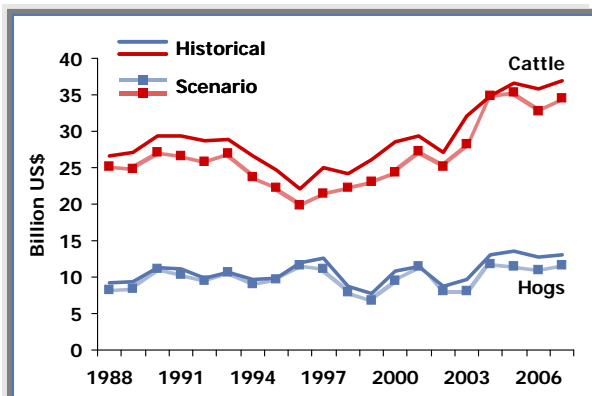
For the beef market, reducing access to and, in some cases, completely closing the market lowers the American price by an average of 4.2% over the 1988-2007 period. If we examining the period prior to the appearance of BSE, i.e. 1988-2000, the decline is equal to 6.4%. The decline in American pork prices for the study period is 4.8% annually, on average (see Graph 5). This price reduction causes an average 4.5% and 3.4% drop in American beef and pork production, respectively (see Graph 6). Net beef exports decrease by 76%, and those for pork never turn positive (see Graph 7). Lower prices and production combine to reduce production value in the United States by an average of US$2.4 billion (-8.5%) and US$870 million (-8%) for the cattle and hogs sectors, respectively (see Graph 8).

Within the Canadian beef market, on average, prices and production are 6.3% and 7.7% lower, respectively, over the 20-year period. Domestic consumption is slightly higher, increasing by only 0.5%. For pork, the average annual decline in prices and production are about 6% and nearly 10%, respectively, while consumption holds steady over the 20-year period. Because Canadian pork production is 18% lower in 2007, it can be concluded that at least 43% of the significant increase since 1988 is due to market liberalization. For beef, the results suggest that this market liberalization is responsible for 28% of the significant increase in production prior to the BSE crisis.[11] This decline in production causes an average drop in net beef exports of about 31%, compared to 21% for pork (Graphs 9, 10, 11).

GRAPH 9: Canadian price of steers and hogs
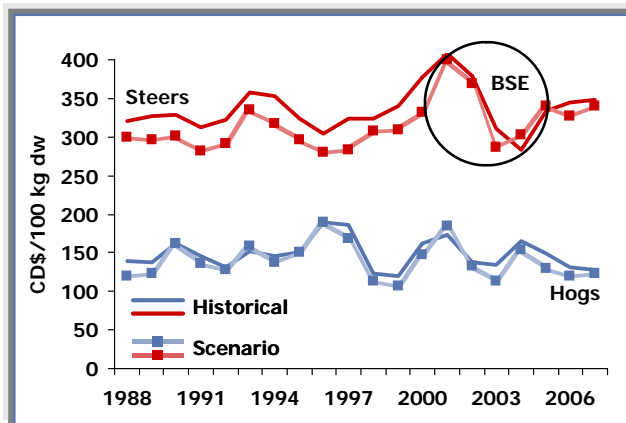
GRAPH 10: Canadian production of beef and pork*
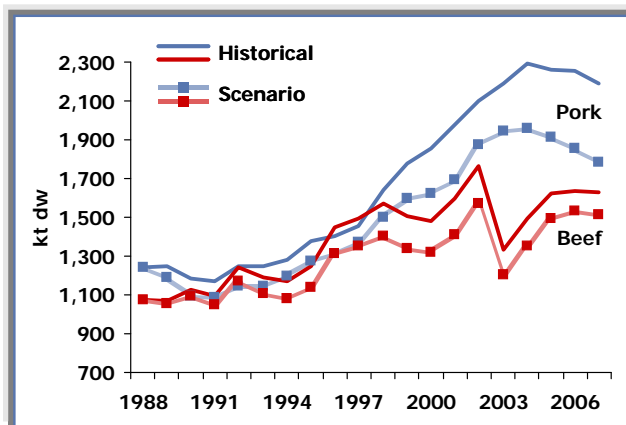
*At the farm in meat equivalent.

**GRAPH 11: Canada – Net exports of cattle/beef and of hogs/pork**

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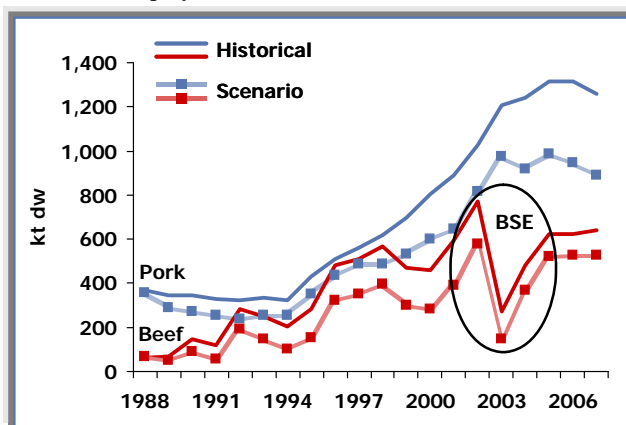
11. *Had this crisis not occurred, the portion resulting from liberalization would have been much closer to the one for the pork industry.*

As for aggregates over the entire 20-year period, the decline in Canadian beef production and prices causes this sector's farm cash receipts to drop by an average of 14.2%, which represents average losses of about C$776 million. The average annual decline in hog receipts is 16.7%, for an average loss of C$486 million per year (see Graph 12). Under this scenario, the value of red meat exports declines by an average of 25%, for annual losses of C$1.04 billion. Value added declines by 14.7%, for annual losses of C$430 million (Graph 13). The cumulative impact over the 20-year period is striking. For cattle and calves, total losses in farm cash receipts are C$15.5 billion, compared to C$9.7 billion for hogs. The cumulative loss in value added is C$8.6 billion, while the total loss in export value is C$20.8 billion (Graph 14).

The differences between the historical data and this scenario would have been even greater in the absence of the following events:

◆ From 1984 to 1999, the United States maintained countervailing duties on hogs arriving from Canada;

◆ From 1998 to 2003, Mexico imposed a countervailing duty on live hogs arriving from the United States;

◆ The BSE crisis in Japan, which caused consumption and imports to significantly decline; and

◆ The BSE crisis in North America beginning in 2003, and the resulting embargoes.

GRAPH 12: Farm cash receipts for cattle and hogs in Canada
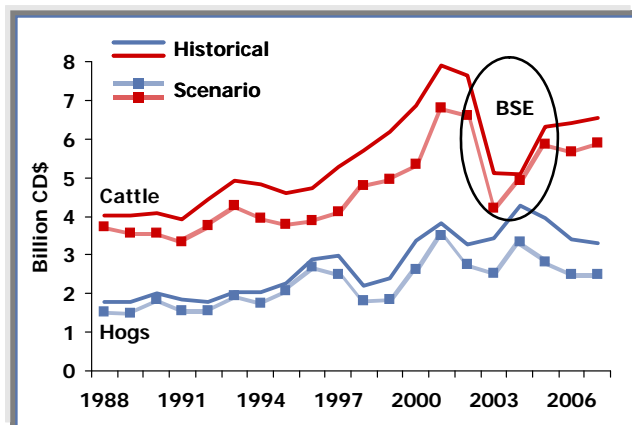
GRAPH 13: Export value and value added or the red meat chain in Canada
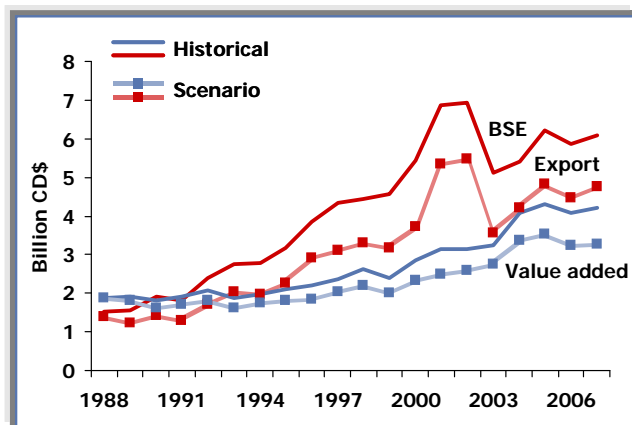
GRAPH 14: Total gain over 20 years from market liberalisation
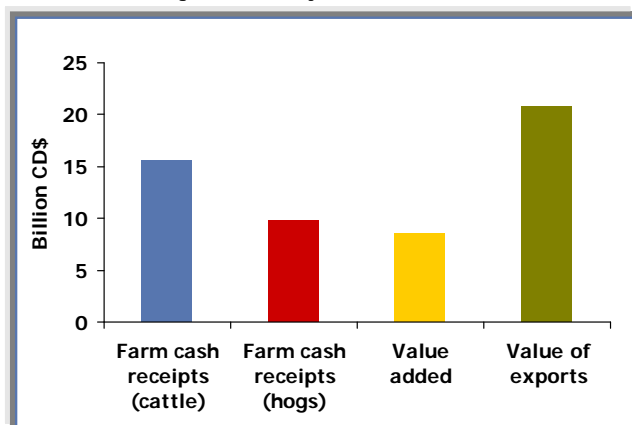
SECTION 10

Conclusion

10.0 CONCLUSION

The analysis has demonstrated that the impact of each of these market liberalizations, taken individually, is not very significant, and that the liberalization of the Japanese market had the biggest impact. However, it also demonstrated that the combination of all of these agreements had a significant impact on the red meat industries in Canada and the United States. The liberalization of the Pacific beef and pork markets since 1988 is therefore a good example of government action leading to significant gains for the Canadian and American red meat industries. The impact would have been even greater in the absence of the BSE crises in Japan and North America.

The study also demonstrated that in order to accurately determine the benefits of market liberalization, it is preferable to conduct an analysis over a longer period, in such a way as to properly take into account the gradual increase in production capacity. These results also demonstrate that at least 43% of the strong growth in Canadian pork production since 1990 is due to the market liberalization that began in 1988. For beef, the results suggest that it is responsible for 28% of the strong growth in production prior to the BSE crisis.

The overall scenario has demonstrated that these agreements have had a significant effect on beef and pork prices and production in Canada. In their absence, farm cash receipts drawn from the cattle and hog markets would have averaged C$776 million and C$486 million less per year, respectively, for a grand total of C$25.7 billion for the entire agriculture industry over this 20-year period. Additionally, the value added of the red meat processing industry would have dropped by an average of C$432 million per year, for a total loss of C$8.6 billion. Finally, the value of exports of the red meat supply chain would have dropped by an average of C$1.044 billion per year, for a grand total of C$21 billion over this 20-year period.

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Graphs A1 to A4

GRAPH A1: Scenarios comparison – US steer and hog prices
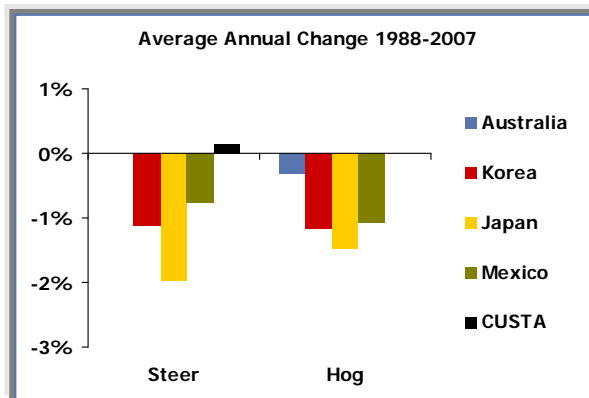
GRAPH A2: Scenarios comparison – Canadian steer and hog prices
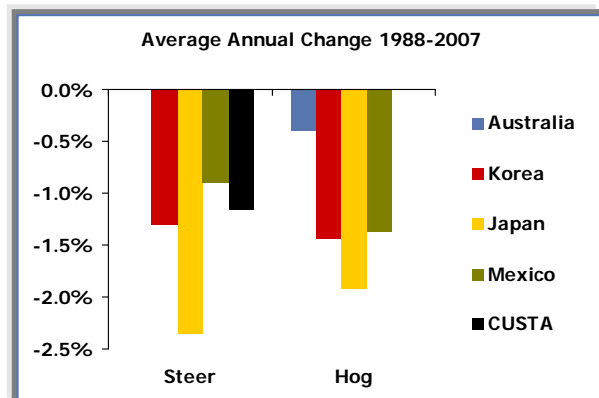
GRAPH A3: Scenarios comparison – US net exports of cattle/beef and of hogs/pork
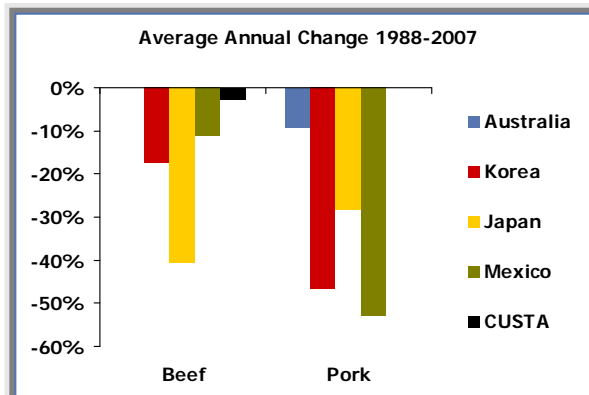
GRAPH A4: Scenarios comparison – Canada net exports of cattle/beef and of hogs/pork
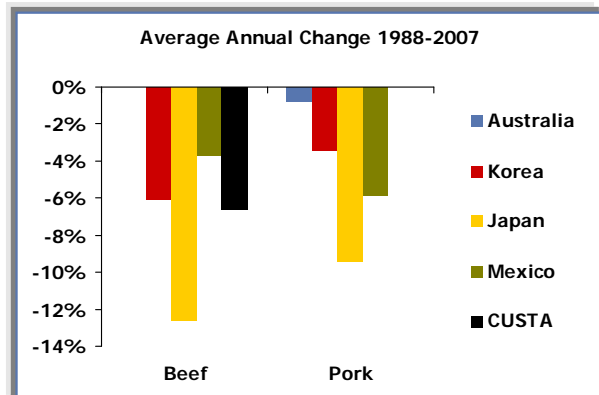
Tables

Table B1: Global Scenario (#7) – United States Pork Sector

| PRICE, BARROWS AND GILTS, IOWA/MINNESOTA (US$/100kg) dw					FARM PRODUCTION (kt)				
	HISTORICAL	SCENARIO	CHANGE	% CHANGE		HISTORICAL	SCENARIO	CHANGE	% CHANGE
1988	135	121	-13.8	-10.2%	1988	7,058	7,058	0.0	0.0%
1989	137	126	-11.4	-8.3%	1989	7,109	7,062	-47.3	-0.7%
1990	169	169	-0.5	-0.3%	1990	6,909	6,773	-135.9	-2.0%
1991	152	145	-7.3	-4.8%	1991	7,207	7,037	-170.5	-2.4%
1992	132	129	-2.3	-1.7%	1992	7,785	7,589	-195.2	-2.5%
1993	141	146	4.4	3.1%	1993	7,701	7,486	-215.2	-2.8%
1994	123	117	-5.8	-4.7%	1994	7,989	7,792	-197.0	-2.5%
1995	131	132	0.2	0.1%	1995	7,996	7,810	-185.5	-2.3%
1996	173	174	0.7	0.4%	1996	7,591	7,405	-185.9	-2.4%
1997	166	152	-14.5	-8.7%	1997	7,641	7,472	-168.6	-2.2%
1998	106	100	-6.7	-6.3%	1998	8,394	8,177	-217.3	-2.6%
1999	104	95	-9.4	-9.0%	1999	8,566	8,267	-299.4	-3.5%
2000	137	126	-10.7	-7.8%	2000	8,388	8,029	-358.9	-4.3%
2001	140	149	8.3	5.9%	2001	8,451	8,020	-430.8	-5.1%
2002	107	103	-3.7	-3.4%	2002	8,706	8,286	-419.7	-4.8%
2003	121	106	-14.9	-12.3%	2003	8,765	8,398	-367.4	-4.2%
2004	161	152	-9.0	-5.6%	2004	8,971	8,522	-449.6	-5.0%
2005	153	137	-16.1	-10.5%	2005	9,058	8,531	-527.0	-5.8%
2006	145	134	-10.5	-7.3%	2006	9,206	8,610	-595.4	-6.5%
2007	147	141	-5.8	-4.0%	2007	9,533	8,846	-687.0	-7.2%
Average	139.0	132.6	-6.4	-4.8%	Average	8,151.1	7,858.5	-292.7	-3.4%

NET EXPORTS (kt)					VALUE OF PRODUCTION (Bil. US$)				
	HISTORICAL	SCENARIO	CHANGE	% CHANGE		HISTORICAL	SCENARIO	CHANGE	% CHANGE
1988	-484	-596	-112.1	23.2%	1988	9.2	8.2	-0.9	-10.2%
1989	-351	-415	-64.3	18.3%	1989	9.3	8.5	-0.8	-8.9%
1990	-354	-418	-63.9	18.0%	1990	11.3	11.1	-0.3	-2.2%
1991	-273	-450	-177.0	64.8%	1991	11.1	10.3	-0.8	-7.1%
1992	-141	-267	-126.1	89.3%	1992	9.9	9.4	-0.4	-4.2%
1993	-189	-316	-127.4	67.6%	1993	10.7	10.7	0.0	0.2%
1994	-134	-347	-213.1	159.5%	1994	9.7	9.0	-0.7	-7.1%
1995	-45	-143	-98.4	220.6%	1995	9.8	9.6	-0.2	-2.2%
1996	-14	-146	-131.6	947.5%	1996	11.9	11.7	-0.2	-2.1%
1997	-8	-225	-217.3	2,770.5%	1997	12.6	11.2	-1.3	-10.7%
1998	10	-251	-260.5	-2,655.5%	1998	8.7	8.0	-0.8	-8.7%
1999	12	-370	-381.9	-3,189.3%	1999	7.8	6.8	-0.9	-12.2%
2000	-64	-433	-369.2	578.3%	2000	10.8	9.5	-1.3	-11.7%
2001	37	-275	-312.1	-853.3%	2001	11.4	11.5	0.1	0.5%
2002	22	-495	-517.0	-2,334.2%	2002	8.7	8.0	-0.7	-8.1%
2003	-50	-561	-510.7	1,021.3%	2003	9.7	8.1	-1.5	-16.0%
2004	154	-429	-582.7	-379.2%	2004	13.1	11.7	-1.4	-10.3%
2005	412	-347	-759.0	-184.3%	2005	13.6	11.5	-2.1	-15.7%
2006	568	-87	-654.8	-115.3%	2006	12.7	11.0	-1.7	-13.2%
2007	607	-132	-738.7	-121.7%	2007	13.1	11.7	-1.4	-10.9%
Average	-14.2	-335.1	-320.9	-192.7%	Average	10.7	9.9	-0.872	-8.0%

Table B2: Global Scenario (#7) – United States Beef Sector

PRICE, CHOICE STEERS, NEBRASKA (US$/100kg) dw				FARM PRODUCTION (kt)			
	HISTORICAL	SCENARIO	CHANGE	% CHANGE	HISTORICAL	SCENARIO	CHANGE	% CHANGE

	HISTORICAL	SCENARIO	CHANGE	% CHANGE		HISTORICAL	SCENARIO	CHANGE	% CHANGE
1988	253	239	-13.9	-5.5%	1988	10,741	10,732	-9.8	-0.1%
1989	263	243	-19.9	-7.6%	1989	10,447	10,389	-57.7	-0.6%
1990	279	260	-19.1	-6.8%	1990	10,115	9,997	-118.1	-1.2%
1991	264	244	-20.1	-7.6%	1991	10,274	10,094	-180.0	-1.8%
1992	268	248	-20.3	-7.6%	1992	10,256	9,999	-256.6	-2.5%
1993	272	261	-10.2	-3.8%	1993	10,158	9,832	-325.4	-3.2%
1994	245	228	-17.0	-6.9%	1994	10,860	10,458	-402.0	-3.7%
1995	236	222	-13.4	-5.7%	1995	11,194	10,714	-479.6	-4.3%
1996	231	219	-12.3	-5.3%	1996	11,256	10,718	-538.8	-4.8%
1997	236	214	-21.5	-9.1%	1997	11,243	10,662	-581.0	-5.2%
1998	219	213	-5.8	-2.7%	1998	11,326	10,677	-649.1	-5.7%
1999	233	218	-14.7	-6.3%	1999	11,711	11,011	-699.6	-6.0%
2000	248	226	-22.0	-8.9%	2000	11,879	11,124	-754.7	-6.4%
2001	259	258	-0.6	-0.2%	2001	11,459	10,674	-784.7	-6.8%
2002	238	237	-1.4	-0.6%	2002	11,800	11,009	-791.3	-6.7%
2003	301	284	-17.1	-5.7%	2003	11,639	10,865	-774.5	-6.7%
2004	301	324	22.6	7.5%	2004	10,964	10,221	-742.6	-6.8%
2005	310	319	8.2	2.7%	2005	10,878	10,217	-661.0	-6.1%
2006	304	294	-9.2	-3.0%	2006	11,344	10,709	-635.7	-5.6%
2007	329	326	-3.4	-1.0%	2007	11,396	10,757	-638.8	-5.6%
Average	264.4	253.8	-10.6	-4.2%	Average	11,046.9	10,542.9	-504.0	-4.5%

NET EXPORTS (kt)				VALUE OF PRODUCTION (Bil. US$)			
	HISTORICAL	SCENARIO	CHANGE	% CHANGE	HISTORICAL	SCENARIO	CHANGE	% CHANGE

	HISTORICAL	SCENARIO	CHANGE	% CHANGE		HISTORICAL	SCENARIO	CHANGE	% CHANGE
1988	-916	-1,023	-107.1	11.7%	1988	26.6	25.1	-1.5	-5.6%
1989	-711	-933	-222.2	31.3%	1989	27.1	24.9	-2.2	-8.1%
1990	-962	-1,274	-312.7	32.5%	1990	29.3	27.0	-2.3	-7.9%
1991	-813	-1,181	-368.7	45.4%	1991	29.4	26.7	-2.7	-9.3%
1992	-862	-1,328	-465.1	53.9%	1992	28.6	25.8	-2.8	-9.9%
1993	-937	-1,382	-445.3	47.5%	1993	28.8	26.9	-2.0	-6.9%
1994	-678	-1,258	-579.9	85.5%	1994	26.5	23.8	-2.8	-10.4%
1995	-519	-1,169	-649.4	125.0%	1995	24.7	22.3	-2.4	-9.7%
1996	-582	-1,280	-698.6	120.0%	1996	22.0	19.9	-2.2	-9.8%
1997	-565	-1,371	-806.2	142.7%	1997	24.9	21.5	-3.4	-13.8%
1998	-691	-1,361	-669.3	96.8%	1998	24.2	22.2	-2.0	-8.2%
1999	-622	-1,453	-830.8	133.5%	1999	26.1	23.0	-3.1	-11.9%
2000	-676	-1,663	-987.6	146.2%	2000	28.5	24.3	-4.2	-14.7%
2001	-929	-1,749	-819.5	88.2%	2001	29.4	27.3	-2.1	-7.1%
2002	-977	-1,756	-779.5	79.8%	2002	27.1	25.1	-2.0	-7.3%
2003	-621	-1,484	-863.1	139.1%	2003	32.1	28.3	-3.8	-12.0%
2004	-1,757	-2,201	-444.3	25.3%	2004	34.8	34.9	0.1	0.2%
2005	-1,755	-2,256	-501.6	28.6%	2005	36.6	35.3	-1.3	-3.6%
2006	-1,476	-2,153	-676.5	45.8%	2006	35.7	32.7	-3.0	-8.5%
2007	-1,329	-1,970	-640.4	48.2%	2007	37.0	34.5	-2.4	-6.6%
Average	-918.9	-1,512.3	-593.4	76.4%	Average	29.0	26.6	-2.4	-8.5%

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Table B3: Global Scenario (#7) – Canadian Pork Sector

PRICE, INDEX 100, ONTARIO (CD$/100kg)					FARM PRODUCTION[a] (kt)				
	HISTORICAL	SCENARIO	CHANGE	% CHANGE		HISTORICAL	SCENARIO	CHANGE	% CHANGE
1988	139	121	-18.5	-13.3%	1988	1,245	1,245	0.0	0.0%
1989	138	123	-15.1	-10.9%	1989	1,248	1,191	-57.0	-4.6%
1990	162	161	-0.6	-0.4%	1990	1,184	1,093	-90.9	-7.7%
1991	146	137	-9.4	-6.4%	1991	1,168	1,086	-82.0	-7.0%
1992	132	128	-3.6	-2.7%	1992	1,249	1,145	-104.0	-8.3%
1993	152	159	6.9	4.6%	1993	1,248	1,144	-104.2	-8.4%
1994	146	137	-9.2	-6.3%	1994	1,278	1,199	-78.4	-6.1%
1995	151	151	0.3	0.2%	1995	1,377	1,275	-102.7	-7.5%
1996	189	190	0.9	0.5%	1996	1,406	1,312	-93.6	-6.7%
1997	187	168	-19.0	-10.2%	1997	1,455	1,371	-84.7	-5.8%
1998	122	113	-9.8	-8.0%	1998	1,641	1,502	-139.1	-8.5%
1999	120	106	-13.7	-11.4%	1999	1,775	1,595	-179.6	-10.1%
2000	162	147	-15.1	-9.3%	2000	1,854	1,620	-234.0	-12.6%
2001	173	185	12.0	6.9%	2001	1,976	1,697	-279.7	-14.2%
2002	138	132	-5.9	-4.3%	2002	2,099	1,871	-227.3	-10.8%
2003	134	114	-20.5	-15.2%	2003	2,188	1,947	-241.2	-11.0%
2004	165	154	-11.5	-6.9%	2004	2,293	1,956	-336.9	-14.7%
2005	149	129	-20.0	-13.4%	2005	2,261	1,915	-346.0	-15.3%
2006	132	120	-11.9	-9.1%	2006	2,253	1,852	-400.9	-17.8%
2007	129	122	-6.4	-5.0%	2007	2,193	1,783	-409.7	-18.7%
Average	148	140	-8.5	-6.0%	Average	1,670	1,490	-179.6	-9.8%

NET EXPORTS (kt)					CASH RECEIPTS (Bil. CD$)				
	HISTORICAL	SCENARIO	CHANGE	% CHANGE		HISTORICAL	SCENARIO	CHANGE	% CHANGE
1988	368	359	-9.0	-2.4%	1988	1.79	1.52	-0.27	-15.1%
1989	343	290	-53.5	-15.6%	1989	1.79	1.49	-0.31	-17.0%
1990	345	273	-71.9	-20.8%	1990	2.02	1.84	-0.18	-9.0%
1991	327	257	-69.6	-21.3%	1991	1.84	1.57	-0.27	-14.8%
1992	321	237	-83.9	-26.1%	1992	1.79	1.57	-0.22	-12.4%
1993	334	254	-80.2	-24.0%	1993	2.04	1.95	-0.10	-4.7%
1994	323	257	-65.3	-20.2%	1994	2.03	1.76	-0.28	-13.5%
1995	431	351	-80.5	-18.7%	1995	2.25	2.07	-0.18	-8.1%
1996	512	439	-73.1	-14.3%	1996	2.88	2.69	-0.19	-6.7%
1997	559	486	-72.9	-13.0%	1997	2.99	2.49	-0.50	-16.7%
1998	617	488	-129.3	-21.0%	1998	2.20	1.81	-0.39	-17.6%
1999	700	535	-165.1	-23.6%	1999	2.40	1.85	-0.54	-22.6%
2000	805	599	-206.2	-25.6%	2000	3.36	2.61	-0.75	-22.3%
2001	888	649	-239.2	-26.9%	2001	3.83	3.49	-0.33	-8.7%
2002	1,025	818	-207.1	-20.2%	2002	3.28	2.77	-0.52	-15.8%
2003	1,205	977	-227.9	-18.9%	2003	3.44	2.53	-0.91	-26.5%
2004	1,239	917	-322.7	-26.0%	2004	4.27	3.34	-0.93	-21.8%
2005	1,315	985	-330.8	-25.1%	2005	3.94	2.82	-1.12	-28.4%
2006	1,315	949	-366.1	-27.8%	2006	3.41	2.49	-0.93	-27.1%
2007	1,259	887	-371.8	-29.5%	2007	3.31	2.50	-0.81	-24.5%
Average	712	550	-161.3	-21.1%	Average	2.74	2.26	-0.486	-16.7%

a 18 kt is assumed to be used in Canada for non-food application.

Table B4: Global Scenario (#7) – Canadian Beef Sector

PRICE, GRADE A SLAUGHTER STEERS, ONTARIO (CD$/100kg) dw					FARM PRODUCTION (kt)				
	HISTORICAL	SCENARIO	CHANGE	% CHANGE		HISTORICAL	SCENARIO	CHANGE	% CHANGE
1988	321	300	-21.4	-6.7%	1988	1,075	1,073	-1.7	-0.2%
1989	326	296	-30.5	-9.3%	1989	1,071	1,058	-12.9	-1.2%
1990	329	301	-28.0	-8.5%	1990	1,129	1,094	-34.8	-3.1%
1991	313	283	-30.7	-9.8%	1991	1,094	1,046	-48.9	-4.5%
1992	322	291	-31.5	-9.8%	1992	1,244	1,173	-70.9	-5.7%
1993	357	336	-21.4	-6.0%	1993	1,188	1,106	-82.0	-6.9%
1994	353	318	-35.0	-9.9%	1994	1,171	1,080	-91.7	-7.8%
1995	324	296	-27.8	-8.6%	1995	1,250	1,141	-109.1	-8.7%
1996	305	280	-25.0	-8.2%	1996	1,448	1,312	-135.7	-9.4%
1997	324	283	-40.8	-12.6%	1997	1,491	1,349	-141.8	-9.5%
1998	324	308	-16.7	-5.2%	1998	1,571	1,405	-166.8	-10.6%
1999	340	309	-31.5	-9.2%	1999	1,506	1,340	-166.2	-11.0%
2000	378	333	-45.4	-12.0%	2000	1,478	1,317	-161.1	-10.9%
2001	407	400	-7.8	-1.9%	2001	1,595	1,406	-188.8	-11.8%
2002	379	370	-9.4	-2.5%	2002	1,767	1,571	-196.0	-11.1%
2003	311	287	-24.4	-7.9%	2003	1,331	1,202	-129.2	-9.7%
2004	283	303	20.4	7.2%	2004	1,492	1,350	-142.3	-9.5%
2005	334	340	5.6	1.7%	2005	1,622	1,491	-130.5	-8.0%
2006	345	328	-17.1	-5.0%	2006	1,637	1,533	-103.8	-6.3%
2007	348	340	-8.6	-2.5%	2007	1,631	1,514	-117.3	-7.2%
Average	336	315	-21.4	-6.3%	Average	1,390	1,278	-111.6	-7.7%

NET EXPORTS (kt)					CASH RECEIPTS (Bil. CD$)				
	HISTORICAL	SCENARIO	CHANGE	% CHANGE		HISTORICAL	SCENARIO	CHANGE	% CHANGE
1988	61	66	5.3	8.8%	1988	4.01	3.72	-0.29	-7.3%
1989	70	52	-18.2	-26.1%	1989	4.01	3.56	-0.45	-11.1%
1990	149	92	-57.1	-38.4%	1990	4.06	3.58	-0.49	-12.0%
1991	118	54	-63.8	-54.0%	1991	3.91	3.33	-0.58	-14.7%
1992	283	191	-92.2	-32.6%	1992	4.45	3.75	-0.70	-15.7%
1993	249	145	-104.2	-41.8%	1993	4.92	4.28	-0.65	-13.1%
1994	206	99	-106.9	-51.8%	1994	4.81	3.95	-0.86	-17.9%
1995	285	153	-132.3	-46.4%	1995	4.61	3.80	-0.81	-17.5%
1996	480	322	-158.1	-32.9%	1996	4.73	3.90	-0.84	-17.7%
1997	509	351	-157.9	-31.1%	1997	5.29	4.13	-1.16	-21.9%
1998	565	400	-165.8	-29.3%	1998	5.70	4.80	-0.91	-15.9%
1999	469	299	-170.1	-36.3%	1999	6.18	4.94	-1.24	-20.1%
2000	461	284	-177.7	-38.5%	2000	6.87	5.33	-1.54	-22.5%
2001	596	391	-205.3	-34.4%	2001	7.89	6.79	-1.10	-14.0%
2002	773	578	-194.7	-25.2%	2002	7.65	6.60	-1.05	-13.7%
2003	271	149	-121.2	-44.8%	2003	5.12	4.21	-0.91	-17.7%
2004	481	370	-111.3	-23.1%	2004	5.07	4.91	-0.16	-3.2%
2005	623	522	-101.3	-16.3%	2005	6.30	5.88	-0.43	-6.8%
2006	625	525	-100.1	-16.0%	2006	6.40	5.67	-0.73	-11.4%
2007	641	527	-114.7	-17.9%	2007	6.55	5.90	-0.64	-9.9%
Average	396	278	-117.4	-31.4%	Average	5.43	4.65	-0.776	-14.2%

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Table B5: Global Scenario (#7) – Canadian Red Meats

VALUE OF EXPORTS (Bil. CD$)				VALUE ADDED (Bil. CD$)			
	HISTORICAL	SCENARIO	CHANGE	% CHANGE		HISTORICAL	SCENARIO	CHANGE	% CHANGE
1988	1.54	1.39	-0.15	-9.7%	1988	1.89	1.89	0.00	-0.1%
1989	1.54	1.22	-0.32	-21.0%	1989	1.90	1.81	-0.10	-5.0%
1990	1.90	1.44	-0.46	-24.4%	1990	1.80	1.62	-0.18	-9.8%
1991	1.81	1.29	-0.51	-28.5%	1991	1.90	1.70	-0.20	-10.7%
1992	2.39	1.71	-0.68	-28.4%	1992	2.07	1.81	-0.26	-12.8%
1993	2.75	2.04	-0.71	-25.8%	1993	1.88	1.61	-0.27	-14.1%
1994	2.80	1.98	-0.82	-29.2%	1994	1.98	1.73	-0.24	-12.2%
1995	3.16	2.27	-0.89	-28.1%	1995	2.12	1.81	-0.31	-14.5%
1996	3.86	2.92	-0.93	-24.2%	1996	2.20	1.86	-0.33	-15.2%
1997	4.33	3.10	-1.23	-28.4%	1997	2.38	2.04	-0.33	-14.1%
1998	4.42	3.30	-1.13	-25.5%	1998	2.63	2.19	-0.44	-16.6%
1999	4.57	3.19	-1.38	-30.3%	1999	2.40	2.00	-0.40	-16.6%
2000	5.45	3.71	-1.74	-31.9%	2000	2.85	2.33	-0.52	-18.3%
2001	6.87	5.35	-1.53	-22.2%	2001	3.15	2.49	-0.65	-20.8%
2002	6.92	5.46	-1.45	-21.0%	2002	3.14	2.59	-0.55	-17.5%
2003	5.11	3.56	-1.54	-30.2%	2003	3.25	2.74	-0.52	-15.9%
2004	5.42	4.20	-1.22	-22.5%	2004	4.09	3.36	-0.73	-17.8%
2005	6.21	4.84	-1.37	-22.1%	2005	4.32	3.54	-0.78	-18.1%
2006	5.86	4.47	-1.39	-23.7%	2006	4.08	3.25	-0.83	-20.3%
2007	6.08	4.76	-1.32	-21.8%	2007	4.22	3.26	-0.96	-22.8%
Average	4.15	3.11	-1.04	-24.9%	Average	2.71	2.28	-0.430	-14.7%

Table B6: Scenario 1 – Canada-United States Trade Agreement (CUSTA)

UNITED STATES	AVERAGE (1988-2007)		MAXIMAL IMPACT	
	Change	%	Change	%
PORK				
Price (US$/100 kg)	0.00	0.00	0.00	0.00
Disappearance (kt)	1.56	0.02	3.93	0.05
Net exports (kt)	-1.16	-0.84	-1.76	-22.50
Value of production (bil. US$)	0.00	0.00	0.01	0.00
BEEF				
Price (US$/100 kg)	0.37	0.15	1.00	0.43
Production (kt)	16.20	0.14	29.55	0.25
Net exports (kt)	20.60	2.60	29.01	5.14
Value of production (bil. US$)	0.08	0.28	0.12	0.56
CANADA	AVERAGE (1988-2007)		MAXIMAL IMPACT	
	Change	%	Change	%
PORK				
Price (CD$/100 kg)	0.00	0.00	0.00	0.00
Disappearance (kt)	-1.54	-0.19	-2.40	-0.27
Net exports (kt)	1.64	0.28	3.06	0.50
Cash receipts (bil. CD$)	0.00	0.00	0.00	0.00
BEEF				
Price (CD$/100 kg)	-3.95	-1.16	-6.25	-1.65
Production (kt)	-24.63	-1.67	-39.02	-2.50
Net exports (kt)	-27.66	-6.60	-43.40	-5.60
Cash receipts (bil. CD$)	-0.17	-2.93	-0.31	-3.90
RED MEATS (BIL. CD$)				
Value added	-0.04	-1.30	-0.06	-1.30
Value of exports	-0.18	-3.94	0.19	-6.02

Table B7: Scenario 2 – Mexico Entry to WTO and North American Free Trade Agreement (NAFTA)

MEXICO	AVERAGE (1988-2007)		MAXIMAL IMPACT		UNITED STATES	AVERAGE (1988-2007)		MAXIMAL IMPACT	
	Change	%	Change	%		Change	%	Change	%
PORK					**PORK**				
Price (Peso/100 kg)	328.5	22.0	1,556.1	98.0	Price (US$/100 kg)	-1.3	-1.1	-6.5	-4.8
Production (kt)	142.5	14.6	348.9	32.6	Production (kt)	-73.1	-0.86	-164.80	-1.73
Disappearance (kt)	-6.5	-0.52	-80.24	-8.90	Net exports (kt)	-81.2	-55.9	-133.9	-604.0
					Value of production (bil. US$)	-0.200	-1.9	-0.400	-4.6
BEEF					**BEEF**				
Price (Peso/100 kg)	245.8	13.6	794.0	35.8	Price (US$/100 kg)	-1.8	-0.8	-6.5	-3.0
Production (kt)	74.8	5.5	151.2	10.5	Production (kt)	-81.2	-0.7	-151.1	-1.3
Disappearance (kt)	-56.0	-4.0	-91.9	-6.4	Net exports (kt)	-95.8	-11.3	-145.3	-21.5
Net exports (kt)	-72.0	-36.1	-115.9	-54.9	Value of production (bil. US$)	-0.430	-1.5	-0.850	-3.5

CANADA	AVERAGE (1988-2007)		MAXIMAL IMPACT	
	Change	%	Change	%
PORK				
Price (CD$/100 kg)	-1.8	-1.4	-8.7	-6.3
Production (kt)	-48.6	-2.6	-103.2	-4.6
Net exports (kt)	-44.4	-5.9	-31.4	-9.4
Cash receipts (bil. CD$)	-0.13	-4.40	-0.25	-7.20
BEEF				
Price (CD$/100 kg)	-3.1	-0.9	-11.5	-3.5
Production (kt)	-13.9	-1.0	-23.3	-1.7
Net exports (kt)	-13.8	-3.6	-17.7	-6.5
Cash receipts (bil. CD$)	-0.11	-1.95	-0.32	-4.20
RED MEATS (BIL. CD$)				
Value added	-0.09	-3.09	-0.22	-5.29
Value of exports	-0.19	-4.47	-0.17	-7.21

Table B8: Scenario 3 – Opening of the Australian Pork Market

AUSTRALIA	AVERAGE (1990-2007)		AVERAGE (1988-2007)		MAXIMAL IMPACT	
	Change	%	Change	%	Change	%
Price (AU$/100 kg)	31.75	12.68	28.6	11.44	153.0	55.00
Production (kt)	10.19	2.68	9.2	2.42	37.6	10.40
Disappearance (kt)	-26.1	-5.88	-23.5	-5.31	-111.40	-21.78

UNITED STATES	AVERAGE (1990-2007)		AVERAGE (1988-2007)		MAXIMAL IMPACT	
	Change	%	Change	%	Change	%
Price (US$/100 kg)	-0.54	-0.38	-0.5	-0.35	-2.4	-1.65
Production (kt)	-12.64	-0.14	-11.4	-0.13	-49.2	-0.52
Net exports (kt)	-18	-10.61	-16.24	-9.54	-14.8	-123.85
Value of production (bil. US$)	-0.06	-0.52	-0.06	-0.52	-0.28	-2.15

CANADA	AVERAGE (1990-2007)		AVERAGE (1988-2007)		MAXIMAL IMPACT	
	Change	%	Change	%	Change	%
Price (CD$/100 kg)	-0.68	-0.47	-0.6	-0.43	-2.6	-2.04
Production (kt)	-8.9	-0.42	-8.0	-0.38	-32.4	-1.48
Net exports (kt)	-8.52	-0.82	-7.7	-0.74	-31.3	-2.50
Cash receipts (bil. CD$)	-0.033	-0.96	-0.030	-0.87	-0.125	-3.80

Table B9: Scenario 4 – Opening of Korean Red Meats Market

KOREA	AVERAGE (1988-2007)		MAXIMAL IMPACT		UNITED STATES	AVERAGE (1988-2007)		MAXIMAL IMPACT	
	Change	%	Change	%		Change	%	Change	%
PORK					**PORK**				
Price (Won/100 kg)	29.2	17.0	83.8	49.5	Price (US$/100 kg)	-1.6	-1.2	-7.3	-5.3
Production (kt)	152.8	16.1	355.9	30.4	Production (kt)	-56.7	-0.65	-194.00	-2.04
Disappearance (kt)	36.6	4.69	169.20	13.00	Net exports (kt)	-62.8	-49.4	-106.9	-482.0
					Value of production (bil. US$)	-0.204	-1.8	-0.786	-5.9
BEEF					**BEEF**				
Price (Won/100 kg)	141.5	24.5	664.7	120.8	Price (US$/100 kg)	-2.9	-1.1	-10.7	-3.5
Production (kt)	107.3	48.5	294.2	147.2	Production (kt)	-117.1	-1.0	-201.2	-1.8
Disappearance (kt)	-97.4	-23.1	-259.4	-48.3	Net exports (kt)	-141.3	-17.5	-276.0	-44.5
					Value of production (bil. US$)	-0.623	-2.2	-1.630	-5.1

CANADA	AVERAGE (1988-2007)		MAXIMAL IMPACT	
	Change	%	Change	%
PORK				
Price (CD$/100 kg)	-2.1	-1.4	-8.8	-5.9
Production (kt)	-36.3	-1.8	-131.6	-6.0
Net exports (kt)	-32.9	-3.5	-120.5	-9.6
Cash receipts (bil. CD$)	-0.113	-3.5	-0.258	-10.4
BEEF				
Price (CD$/100 kg)	-4.5	-1.3	-14.6	-3.9
Production (kt)	-20.3	-1.4	-39.1	-2.6
Net exports (kt)	-21.1	-6.1	-32.3	-12.0
Cash receipts (bil. CD$)	-0.155	-2.8	-0.322	-6.3
RED MEATS (BIL. CD$)				
Value added	-0.086	-2.7	-0.291	-6.9
Value of exports	-0.214	-4.80	-0.468	-8.25

Table B10: Scenario 5 – Opening of the Japanese Red Meats Market

JAPAN	AVERAGE (1988-2007)		MAXIMAL IMPACT		UNITED STATES	AVERAGE (1988-2007)		MAXIMAL IMPACT	
	Change	%	Change	%		Change	%	Change	%
PORK					**PORK**				
Standard import price	24.7	56.7	28.0	68.3	Price (US$/100 kg)	-2.0	-1.5	-6.9	-5.1
Import	-197.1	-22.7	-389.9	-31.2	Production (kt)	-119.6	-1.44	-178.74	-1.87
Price (Yen/100 kg)	5.9	19.51	9.60	29.92	Net exports (kt)	-119.9	-25.25	-223.00	-1,267.0
Production (kt)	120.2	9.4	212.2	17.7	Value of production (bil. US$)	-0.309	-2.9	-0.680	-5.3
Disappearance (kt)	-79.5	-3.6	-146.8	-6.3					
BEEF					**BEEF**				
Import	-433.2	-55.1	-719.3	-70.0	Price (US$/100 kg)	-5.0	-2.0	-15.0	-5.9
Price (Yen/100 kg)	29.4	55.6	47.1	94.8	Production (kt)	-265.7	-2.4	-435.0	-3.7
Production (kt)	263.9	49.9	457.6	90.6	Net exports (kt)	-312.0	-41.0	-39.7	-82.2
Disappearance (kt)	-169.3	-12.7	-315.6	-20.8	Value of production (bil. US$)	-1.200	-4.3	-2.050	-7.7

CANADA	AVERAGE (1988-2007)		MAXIMAL IMPACT	
	Change	%	Change	%
PORK				
Price (CD$/100 kg)	-2.8	-2.0	-9.3	-6.7
Production (kt)	-69.4	-4.1	-115.3	-5.7
Net exports (kt)	-61.900	-9.7	-103.670	-16.7
Cash receipts (bil. CD$)	-0.175	-6.60	-351.00	-9.81
BEEF				
Price (CD$/100 kg)	-7.9	-2.4	-24.4	-6.9
Production (kt)	-43.7	-3.0	-77.5	-4.8
Net exports (kt)	-46.400	-12.6	-77.780	-24.1
Cash receipts (bil. CD$)	-0.293	-5.59	-530.35	-10.44
RED MEATS (BIL. CD$)				
Value added	-0.164	-6.04	-0.244	-8.81
Value of exports	-0.381	-10.00	-610.0	-16.8

Table B11: Scenario 6 – Opening of Philippines Pork and Indonesia Beef Markets

PHILIPPINES	AVERAGE (1995-2007) Change	%	AVERAGE (1988-2007) Change	%	MAXIMAL IMPACT Change	%
PORK						
Price (Peso/ckg)	158.24	2.30	102.86	1.49	594.70	6.56
Production (kt)	19.28	1.58	12.53	1.03	31.34	3.11
Disappearance (kt)	-10.9	-0.90	-7.08	-0.59	-38.53	-2.53

INDONESIA	AVERAGE (1995-2007) Change	%	AVERAGE (1988-2007) Change	%	MAXIMAL IMPACT Change	%
BEEF						
Imports (kt)	-76.05	-86.8	-49.40	-56.40	-114.73	-91.90
Price (Rupiah/100 kg)	196,217	13.84	127,541	9.00	567,526	50.62
Production (kt)	53.6	14.18	34.83	9.22	79.86	19.44
Disappearance (kt)	-22.34	-5.09	-14.52	-3.31	-73.00	-16.90

CANADA	AVERAGE (1995-2007) Change	%	AVERAGE (1988-2007) Change	%	MAXIMAL IMPACT Change	%
PORK						
Price (CD$/100 kg)	-0.57	-0.36	-0.37	-0.24	-2.18	-1.69
Production (kt)	-9.42	-0.47	-6.12	-0.31	-16.42	-0.83
Net exports (kt)	-8.22	-0.85	-5.34	-0.56	-14.53	-1.64
Cash receipts (bil. CD$)	-29.6	-0.9	-19.24	-0.59	-74.75	-2.26
BEEF						
Price (CD$/100 kg)	-1.85	-0.57	-1.20	-0.38	-5.92	-1.91
Production (kt)	-7.13	-0.46	-4.63	-0.30	-11.18	-0.71
Net exports (kt)	-7.98	-1.53	-5.19	-1.00	-10.63	-1.99
Cash receipts (bil. CD$)	-61.43	-1.08	-39.90	-0.70	-124.50	-2.36
RED MEATS (BIL. CD$)						
Value added	0.0244	-0.75	-0.016	-0.49	-0.041	-1.17
Value of exports	-0.074	-1.45	-0.048	-0.94	-0.137	-2.62

UNITED STATES	AVERAGE (1995-2007) Change	%	AVERAGE (1988-2007) Change	%	MAXIMAL IMPACT Change	%
PORK						
Price (US$/100 kg)	-0.46	-0.30	-0.30	-0.20	-2.00	-1.36
Production (kt)	-16.70	-0.19	-10.84	-0.12	-25.74	-0.28
Net exports (kt)	-16.20	-38.90	-10.50	-25.30	-30.20	-252.30
Value of production (bil. US$)	-0.0565	-0.49	-0.036	-0.32	-0.91	-1.59
BEEF						
Price (US$/100 kg)	-1.31	-0.49	-0.9	-0.32	-3.72	-1.61
Production (kt)	-37.61	-0.33	-24.4	-0.21	-51.10	-0.44
Net exports (kt)	-50.51	-6.14	-32.8	4.00	-69.10	-12.20
Value of production (bil. US$)	-0.245	-0.83	-0.159	-0.54	-0.56	-1.78