Disruption in the NAFTA Supply Chain for Beef and Cattle: An Evaluation of Possible Policy Responses

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INTRODUCTION

Before 20 May 2003 the beef and cattle sectors in North America were shining examples of harmonization and market integration under the North American Free Trade Agreement (NAFTA). They are now stunning and troubling examples of disharmony, market segregation, and confusion. The supply chain for beef, which was working well, is now a mess. Losing access to the live cattle market in the United States has motivated Canadian decision-makers in both the public and private sectors to focus almost entirely on the domestic market for solutions. In the United States, border closures have threatened the viability of beef processing plants in the Pacific Northwest and have helped raise the profile of protectionist cattle producer organizations. Mexico has fared better than its NAFTA partners since it remains free of bovine spongiform encephalopathy (BSE) and has continued to maintain access to the US market.

This chapter describes what has happened in the North American cattle industry since the BSE crisis began, discusses the programs governments in Canada implemented to assist cattle producers, and provides a preliminary empirical evaluation of potential longer-run policy responses to the situation in Canada. To better understand the current situation, a short history of government intervention in the North American cattle industry is provided. This intervention contributed to the industry's expansion and integration under NAFTA, but also to its vulnerable structure.

THE NAFTA CATTLE/BEEF MARKET SITUATION – PRESENT AND PAST

Bovine Spongiform Encephalopathy in NAFTA

Regulations enforced since 1990 have made BSE a reportable disease in both Canada and the United States. Since then, six cases have been confirmed in North America. Five of these cases involved cattle that could be traced to farms in Alberta, Canada.

The first case of BSE was discovered on 8 December 1993 in a purebred beef cow in Red Deer, Alberta that had been imported from the United Kingdom in 1987. That animal and its herd mates were destroyed along with all offspring and all remaining animals imported from the UK since 1982.[1] Cattle imports to Canada from the United Kingdom had been banned since 1990, and the discovery of BSE in 1993 prompted the Canadian government to require more stringent disease detection and control measures on farms and at slaughter plants. Then in 1997, in response to the high-profile BSE crisis in the UK, the Canadian and US governments introduced ruminant-to-ruminant feeding bans.[2] Cattle and beef exports from Canada were not affected by this first case of BSE because the infected cow had originated in the UK.

On 20 May 2003, a second BSE case was confirmed in an Angus cow in Wanham, Alberta. Unlike the earlier case, the infected animal was born, fed, and raised in Canada, but it did not enter the food system. The consequences of this discovery of BSE were devastating for cattle producers and other industry stakeholders in Canada as the potential risks to human and animal health from BSE had become a major economic and political issue. Governments of 34 countries, including the United States and Mexico, banned imports of ruminant and ruminant products originating from Canada using the same criteria established by the World Organization for Animal Health or OIE (Office International des Epizooties) that the Canadian government had used to justify its import prohibitions.[3] The resulting dislocation in the cattle industry in

[1] Between 1982 and 1990, 191 breeding cows were imported to Canada from the United Kingdom. By 1992, 80 of the British cattle had died and one or more of them could have been rendered into meat and bone meal.

[2] These feed bans prohibit feeding most mammalian proteins to ruminant animals, such as cattle, sheep, and goats.

[3] Caswell and Sparling convincingly argue the huge trade impacts from confirming a BSE case come not from the loss of BSE free status, but from the restrictions that governments in importing regions have routinely imposed upon the loss of such status. Imports are restricted by the complete prohibition of cattle and beef imports instead of the graduated restrictions recommended by the OIE. This not only results in trade disruptions that are unnecessary to protect human and animal health, but also reduces the incentive to implement effective and transparent surveillance systems.

Canada was unprecedented, and would have been even worse if the US Department of Agriculture (USDA) had not readmitted imports of boxed beef muscle cuts and veal from Canada in September 2003.

The third case of BSE in North America was found in a Holstein cow in Yakima, Washington on 25 December 2003. Unlike the earlier discovery in May, meat from this cow entered the food chain.[4] Within hours of USDA confirmation of this discovery, governments of more than 50 nations, including Canada, Mexico, Japan, South Korea, Chile, Mexico, and Taiwan banned American cattle and beef imports. As in Canada, the border closures led to a collapse of the US beef export business, a reduction in trade between backgrounders and feedlots, a decrease in the market value of slaughtered animals, and the devastation of export-oriented meat processing plants.

Following the December 2003 discovery, it appeared the BSE status of Canada and the United States would be identical. However, it was later determined that the infected cow in Washington was actually born in Alberta. As a result, the situation for the Canadian beef industry worsened. Opponents of cattle and beef trade used the cow's Canadian connection as an argument to frustrate the renormalization of live cattle trade across the Canada-US border.

Since the cattle industry in the United States was not as export dependent as the Canadian industry, the impact on cattlemen in the United States from the border closures was less severe. Beef that would normally have been shipped to Japan or South Korea remained in the US to help satisfy the domestic market. Table 3.1 shows the dramatic change in the pattern of trade in cattle and beef among the three NAFTA countries. Cattle exports from Canada and the United States fell to zero while exports from Mexico increased. With no import competition from cattle producers in Canada and sustained final consumer demand for beef, cattle producers in the United States, Canadian exporters of boneless boxed beef to the US, and cattle exporters from Mexico subsequently enjoyed some of the highest prices in recent history. As a result, beef exports to the United States increased dramatically from offshore sources, Mexico, and to a lesser extent from Canada.

Cattle producers and governments in Canada worked diligently to get past the difficult economic circumstances created by the border closure. Finally, on 29 December 2004 the USDA announced that it would reopen the US border to Canadian live cattle under 30 months of age as of 7 March 2005. The ensuing enthusiasm in Canada did not last long. On 2 January 2005 a fourth case of BSE was confirmed in an eight-year old

[4] Meat from the infected animal was traced to eight states (Washington, Oregon, California, Nevada, Alaska, Montana, Hawaii, and Idaho) and the US territory of Guam.

Table 3.1: Live Cattle and Beef Trade in NAFTA Regions, 2004 (with 2002 comparisons).

Live Cattle Trade (Number of Head)

		TO			
		US	**Canada**	**Mexico**	**Offshore**
From	**US**	- -	Prohibited (134,220)	1,409 (106,019)	110 (4,155)
	Canada	Prohibited (168,814)	- -	Prohibited (Permitted)	Prohibited (Permitted)
	Mexico	1,370,787 (816,460)	0 (0)	- -	Permitted (Permitted)
	Offshore	0 (5)	0 (0)	Permitted (Permitted)	- -

Beef Trade (Thousands of US$)

		TO			
		US	**Canada**	**Mexico**	**Offshore**
From	**US**	- -	55,287 (217,690)	371,652 (592,857)	79,784 (1,678,036)
	Canada	1,184,198 (1,096,238)	- -	212,981 (117,793)	35,734 (89,440)
	Mexico	33,208 (15,929)	0 (0)	- -	Permitted (Permitted)
	Offshore	2,089,834 (1,400,897)	173,728 (290,567)	Permitted (Permitted)	- -

Sources: Industry Canada; USDA, FAS

Holstein cow from a farm in Barrhead, Alberta. Then, on 11 January 2005, a fifth case was confirmed in a seven-year old Charolais cow from Innisfail, Alberta. While material from these two cows did not enter the food or feed systems, they raised some concerns in the United States about lifting the import ban on Canadian cattle. On 2 March 2005, a federal judge in Billings, Montana granted an immediate preliminary injunction against USDA regulations that would have allowed imports of Canadian slaughter and feeder cattle less than 30 months of age. To the relief of Canadian cattlemen, this decision was reversed by the Ninth Circuit Court of Appeals in San Francisco on 14 July 2005.

An additional case of BSE in North America was confirmed by Washington on 24 June 2005 (USDA 2005). This case appears to be an American-born animal that was originally identified in November 2004. This animal did not enter the food supply and it was born prior to the implementation of the ban on the feeding of mammalian protein.

History of the Beef and Cattle Industries in the NAFTA Countries

Through much of their development, trade was not the lifeblood of the cattle industries in Canada, the United States, or Mexico. Domestic markets provided most of the demand in each country. During the twentieth century in Canada, for example, cross border trade often was hampered by tariffs, trade prohibitions, and transportation subsidies on commodities shipped from Western to Eastern Canada. Impeded access to the US market was an especially contentious issue with Western Canadian cattlemen who believed their natural market lay a few miles to the south rather than the reality of satisfying far away customers in Eastern Canada and the UK.

Nonetheless, during much of the past century, access to the American market has been considered "business as usual" by Canadian cattlemen. However, the opportunity to satisfy this market has been unreliable. While at times, open borders contributed to the expansion of the Canadian cattle industry and its dependence on the US market, frequently blocked access to the same market led to difficult and painful contractions. The boom-bust cycle resulting from border interventions in live cattle markets occurred three times in the last century, with varying consequences.

Cross border trade first expanded rapidly after US President Woodrow Wilson repealed the United States live cattle tariff in 1913. As a consequence, cattle exports to the United States increased from fewer than 10,000 head in 1912 to more than 450,000 head in 1919. In response to high war-time prices, the herd in Canada grew from six million head in 1913 to more than ten million head in 1919. However, in the early 1920s, the US government reimposed tariffs and by 1930 had increased them to 30 percent. The result was that Canadian cattle were effectively shut out of the US market and packing plants closed, prices spiraled downward, and cattle feeding activities contracted.

During the early years of the Second World War, demand for live cattle increased, prices escalated, and the Canadian herd more than doubled to 11 million head. There also was a partial reopening of the US border. Satisfying the American market again became the objective of cattlemen in Canada. This was short-lived, however, as fears of domestic shortages led the Canadian government to close this export market in 1941, and to subsidize cattle feeding activities through producer price guarantees and grain transportation subsidies. After years of lobbying the federal government, cattlemen in Western Canada were able to regain access to the US market in 1948. Despite this change, most live cattle shipped

from the region to be fattened and slaughtered continued to go east rather than south because of grain transportation subsidies.

During this time, cattle production in Mexico evolved to satisfy two distinct markets. Cattle production activities in Mexico expanded in response to increasing domestic demand for beef and US demand for feeder cattle. Cattle producers in the arid and semi-arid Northern third of Mexico focused on the production of feeder steers for export to the United States while domestic demand for beef was met by grass-fed cattle raised in the temperate and semi-tropical areas of Central and Southern Mexico.

In Western Canada, the problems created by transportation subsidies in the grains sector held back cattle production until provincial policies to remedy them provided the catalyst for expanding livestock production during the 1980s.[5] In particular, the Alberta provincial government developed major new programs to stimulate large-scale cattle production and beef processing. The pursuit of these objectives coincided with the negotiation of the Canada-United States Trade Agreement (CUSTA) which granted preferential trade status to goods produced within the member countries while continuing to levy tariffs on goods from outside the region, including beef.

The Role of the NAFTA American quantitative import restrictions under the *Red Meat Import Act* (1979) created a significant trade impediment for beef exporters in Canada and Mexico. Following the implementation of the CUSTA, beef produced in Canada became exempt from US import quotas and beef exporters in the US likewise gained unhampered access to the Canadian market. Tariffs on live cattle were eliminated. In 1994, this preferential trading system was extended to Mexico under the NAFTA while import barriers were maintained for beef producers outside the NAFTA region.[6]

Shielded from the full competitive pressure of producers outside the NAFTA region, cattle and beef producers in North America focused on satisfying consumers within the trading bloc and in high-price regions

[5] An unintended consequence of the statutory freight rates was that they dissuaded railways in Canada from reinvesting in their grain-handling infrastructure. The western Canadian grain transportation system became obsolete and was in disarray by the 1970s because the regulated freight rates fell well below the actual cost of moving grain (Vercammen). This created the problem of "shut in grain" that had no ready market except for cattle feed (Kerr and Ulmer).

[6] On 11 November 1992, tariffs on cattle and beef in Mexico increased from zero to 15 percent on live cattle, 20 percent on fresh/chilled beef, and 25 percent on frozen beef. These tariffs were then eliminated for products originating from Canada or the United States when the NAFTA came into force, and remain in place for producers outside the NAFTA region.

like Japan and South Korea. The integration of the North American cattle industry was encouraged from behind a wall of protection from the world beyond North American shores. It was boosted further in Canada through taxpayer transfers and in Mexico through reforms enhancing the private property rights of land owners.

One outcome of the multilateral Uruguay Round Agreement on Agriculture was that nontariff trade barriers like those used to limit beef imports into the NAFTA region were converted to tariff rate quotas. The objective was to improve the transparency of existing agricultural trade barriers with a view of reducing them in the future. The tariff rate quota in Canada for offshore beef is set at 76,409 tonnes and imports above that quantity face a 26.5 percent tariff or require a supplementary import permit. A supplementary import permit allows a processor or wholesaler tariff-free access to specific beef products which cannot be sourced from suppliers within the NAFTA region. Non-NAFTA beef imports into the United States above 696,621 tonnes incur a 26.4 percent tariff. In Mexico, the over-quota tariff for non-NAFTA beef is 25 percent. These tariffs benefit cattle and beef producers in the NAFTA region at the expense of producers of other goods and services and all consumers.

The Role of Domestic Policies The United States government has long had a "hands off" policy for its domestic cattle and beef sectors, with the exception of the protection provided by the tariffs noted above. The Canadian government has been more interventionist, at least partly because of grain transportation subsides which disadvantaged livestock producers. During the 1980s some provincial governments in Canada provided transfers to reduce the cost of local feed grains (offsetting other subsidies that limited cattle feeding activities in Western Canada), increase processing capacity, and develop offshore markets for Canadian cattle and beef.

Long frustrated by the effect of subsidized prairie grain freight rates on cattle feeding activities in the west, the Alberta government was the first to institute a subsidy to offset this detrimental impact. Beginning on 1 September 1985, Alberta provided subsidies of C$21/tonne for grain used for livestock feeding. While the transfer per tonne had been reduced by 1990, it still totaled C$49 million that year (Alberta Agriculture 1990). When the Alberta subsidy made cattle production more profitable in Alberta than in the other prairie provinces, both the Saskatchewan and Manitoba governments responded by announcing that they too would also subsidize livestock producers. Beginning 1 September 1989, producers in Saskatchewan received C$13/tonne for feed grain used to feed cattle and hogs on feedlots. Manitoba restricted its program to slaughter cattle only and transferred C$9/tonne for feed used (Klein *et al.*).

A second major initiative in Alberta entailed the expansion of cattle slaughter capacity in that province. Following Canada's exemption from the US Meat Import Act, multinational beef slaughtering enterprises made large investments in Alberta. In May 1989, Cargill opened a C$55 million state-of-the-art facility in High River. The cost of erecting this plant was subsidized by a C$4 million grant from Alberta's Processing and Marketing Agreement, a regional development program designed to encourage secondary manufacturing firms and to create value added agricultural products (Byfield and Johnson).

To help diversify export destinations for beef, a third major initiative involved developing a beef export promotion agency. The market development division of Alberta Agriculture worked closely with Alberta meat processors, packers, exporters, and the Alberta Cattle Commission to develop an industry organization to address the market opportunities presented by the liberalization of the Japanese beef market (Alberta Agriculture 1989). The Canadian Beef Export Federation opened its first trade office in the Canadian Embassy in Tokyo in November 1989. Eighty percent of the office's C$800,000 initial budget was financed through taxpayer transfers (Edmonton Journal).[7]

Finally, the federal-provincial National Tripartite Stabilization Program supported production of several agricultural commodities in Canada from 1985 to 1994, including cattle. Financed by producer fees and taxpayer transfers, the National Tripartite Stabilization Program encouraged cattle production by guaranteeing prices and financial margins at 90 percent of a ten-year moving average. The program was terminated due to its cost, its production-distorting effects, and the threat of a countervail action by the United States government (Brinkman).

The central and regional governments in Mexico were less interventionist in the cattle and beef sector than their Canadian counterparts. During the 1980s and early 1990s the Mexican government implemented policies that provided cattle producers (and all citizens) with a more stable, long-term decision-making framework. In 1986, the Mexican government became a signatory to the General Agreement on Tariffs and Trade (GATT) and began the process of reducing import barriers. Telecommunication services were privatized as were public warehouses, ports, some banks, and some state-owned enterprises. In 1992, Article 27 of the Mexican Constitution was reformed to increase the scope and

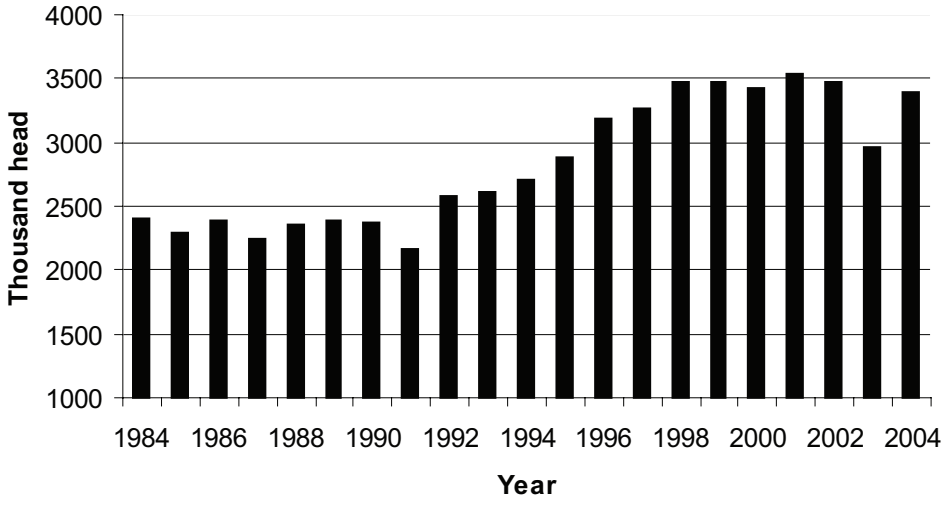
[7] The selection of Tokyo for its first office was a direct result of the liberalization of the Japanese beef market through the Beef Market Access Agreement between Japan, the United States, and Australia. The Alberta government and the Alberta Cattleman's Association forecasted a possible market for Canadian beef of C$300 million per year (Edmonton Journal). This proved to be a little optimistic since sales in this market peaked at C$171 million in 2001 and declined to only C$96 million in 2002 – ahead of the BSE problem in Canada.

security of private agricultural land ownership. The reform enabled farmers to own, sell, rent, or mortgage land that was previously communally owned. This provided Mexican cattle producers with additional incentives to use resources effectively to satisfy the wants of their customers.

Realization of Intended Outcomes Policies in the 1980s and early 1990s were directed at increasing cattle production and processing activities within the NAFTA region. Prima facie evidence suggests that these objectives were realized.

In Canada, cattle production activities and slaughtering capacity expanded in the west – especially in Alberta – and exports became very important. Between the mid 1980s and 2002, the cattle inventory in Canada increased from 11 million head to almost 14 million (Agriculture and Agri-Food Canada 2004a). Over the same time period, Figure 3.1 shows that fed cattle production in Canada increased by more than one million head per year. Net exports of live cattle, which were relatively small and occasionally negative prior to 1987, grew to about 1.5 million head by 2002 (Figure 3.2). The cattle industry became an important part of the agrifood economy and the second largest earner (after wheat) of foreign exchange in the agricultural sector. In 2002, farm cash receipts

Figure 3.1: Canadian fed cattle production, 1984-2004.



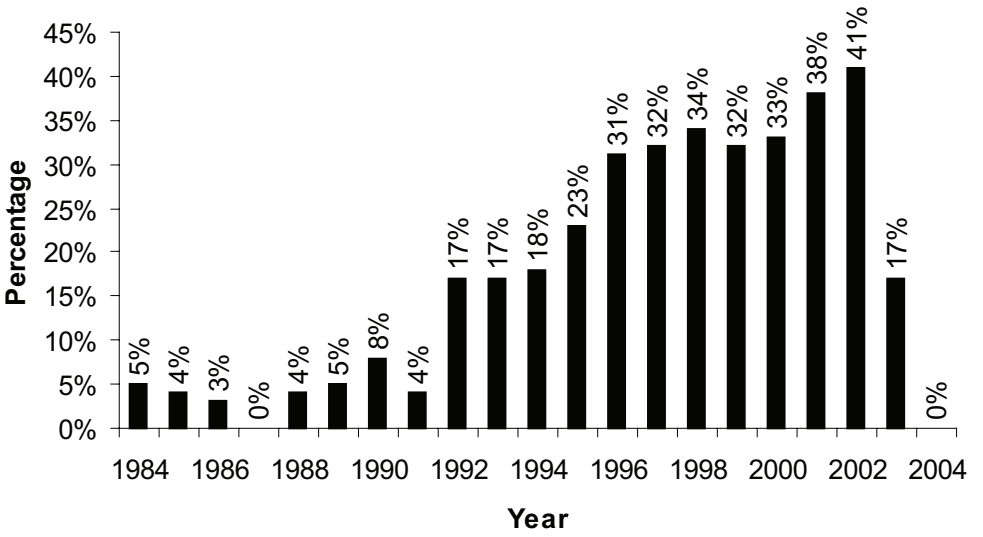
Source: Agriculture and Agri-Food Canada (2004a).

from cattle and calves totaled nearly C$8 billion, 21 percent of the C$36 billion in total farm cash receipts (Statistics Canada). Net exports of dressed beef increased from 1989 to 2002 by almost 500 percent to about 350,000 tonnes (Agriculture and Agri-Food Canada 2004b). By 2002, beef export earnings of about C$4 billion dwarfed the C$1 billion in beef imports (Canfax 2004).

In the United States, beef exports doubled from one billion pounds in 1989 to 2.3 billion pounds in 2001 and over the same period, beef imports increased from 2.3 billion pounds to 3.2 billion pounds (USDA 2004). While cross border beef trade had increased, the United States remained a major importer of beef. Between 1980 and 2002, live cattle imports to the United States from Canada and Mexico increased from about 600,000 to 2.5 million head.

From 1990 to 2004, cattle production in Mexico increased from 1.11 million tonnes to an estimated 1.53 million tonnes (SAGARPA 2003, 2005) while the value of live cattle exports to the United States from Mexico increased from $420 million to an estimated $546 million (US Department of Commerce). Live cattle exports from Mexico to Canada remained nonexistent over this time period.

Figure 3.2: Net exports of live cattle from Canada as a percentage of production, 1984-2004.



Source: Agriculture and Agri-Food Canada (2004b).

Unintended Outcome: Vulnerability A long history of producing mostly for domestic and internal NAFTA markets led to institutions and ways of thinking that left producers in North America ill-prepared when these markets were shut as a result of BSE. As a large and growing portion of beef production in Canada was exported, producers became increasingly dependent on access to foreign markets, particularly the US. Though beef can be frozen and stored for some time before serious deterioration in quality takes place, producers can ill afford lengthy embargoes on exports. With the increased integration of the North American beef market, slaughter capacity in Canada was inadequate to handle all domestically produced animals. This was particularly critical for older breeding stock which was culled regularly as new replacements entered the herd. A large proportion of culls had been exported from Canada and slaughtered at plants located in the United States. Prices offered for culled cattle fell when the American border was closed to live cattle imports as the major slaughtering plants in Canada became overwhelmed with deliveries of more profitable high-grade, younger animals.

Efforts by governments to negotiate international trade accords that would prevent indiscriminate border closures proved fruitless in the face of the BSE discovery in Canada.[8] In fact, the degree to which the cattle market in North America was integrated came back to haunt primary producers and policy-makers. The consequences to primary producers were negligible when NAFTA governments banned imports of meat produced in non-NAFTA countries experiencing an incident of BSE. When BSE appeared in parts of South America and Europe the NAFTA governments prohibited cattle and beef imports from the affected regions without fear of reprisal. They had the legal authority to ban such imports under the Uruguay Round Agreement on the Application of Sanitary and Phytosanitary Measures. However, when BSE was discovered in Canada and the NAFTA borders were closed to Canadian product, cattle producers in Canada and packers in the US Pacific Northwest came under severe economic hardship.

The vulnerability of the Canadian cattle industry to arbitrary trade policies underscores the need for better methods to deal with border closures. Although the OIE has a protocol to limit trade upon the discovery of BSE and other serious diseases, there is no similar science-based mechanism to reopen borders when scientific procedures ensure there is limited risk to humans or animals from the disease. The discovery of BSE in North America demonstrates the devastating

[8] Article 712.2 of the NAFTA enables a signatory to establish appropriate levels of protection in accordance with Article 715 in order to protect human, animal, or plant life or health.

effects of this shortcoming on producers of a perishable product who are reliant on export markets.

GOVERNMENT RESPONSES TO BSE IN CANADA

Several disaster assistance programs were developed in full consultation with cattle and beef industry representatives and implemented by governments in Canada. In addition to programs developed jointly by federal and provincial governments, each provincial government implemented their own assistance programs. Because most live cattle are located in Alberta, much of the description of the programs which follows focuses primarily on programs designed and delivered in that province.

Short Term Relief Grants

Within weeks of the 20 May 2003 BSE case, laid-off packing plant workers in Alberta qualified for short-term training and a relief grant to cover the two-week waiting period for Employment Insurance benefits. They were offered two weeks of workplace safety or other job-related training and received a relief grant of up to C$330 a week for participating in this program without affecting their Employment Insurance benefits. The provincial government estimated the cost of this program to be C$1 million.

Federal-Provincial BSE Recovery Program

On 18 June 2003 the federal government announced a major assistance scheme for the beef industry to offset prices devastated by BSE. The federal government initially committed C$190 million, to which it expected provincial governments to add another C$126 million. The objective of the Federal-Provincial BSE Recovery Program was to bridge the difference between actual prices and a trigger price set by Ottawa. Payments were made on a maximum of 900,000 head of cattle or until exports to the United States resumed. The scheme also set aside C$30 million to offset the decline in the price of meat in storage as of 20 May. This program, which ran until 31 August 2003, was intended to stabilize the market and get urgent help to producers facing a sharp reduction in demand and prices after the ban on exports to the United States. Despite its laudable objective, the aid program gave producers the incentive to sell cattle, as slaughter was required to trigger payments and domestic cattle prices plummeted further. Somewhat ironically, packers in Alberta, as large owners of cattle themselves, received C$45 million of the total assistance package, which was not paid on the basis of financial need, but according to the number of cattle owned. At the same time,

retailers were selling beef at close to normal prices thanks to stable consumer demand and the lack of processing capacity to increase the supply of beef. On 25 July 2003 cattle producers in Alberta were eligible to receive an additional C$79 million on top of the federal-provincial compensation program announced in June. This program was later expanded on 7 August 2003 to include additional livestock industries affected by BSE, such as bison, elk, deer, and sheep. Specifics of the program included a C$65 million Fed Cattle Competitive Bid Program, a C$4 million Stranded Beef Export Container Initiative, and a loan guarantee program.

Alberta Fed Cattle Competitive Bid Program

This program was designed to eliminate some of the backlog of animals on Alberta feedlots by allowing buyers to purchase fed cattle, which they were required to hold for a minimum of eight weeks. Initial sellers were eligible for payments on the same basis as cattle sold for slaughter under the federal-provincial compensation plan. These cattle were not eligible for any further program payments.

Stranded Export Beef Container Initiative

This initiative paid for the storage and demurrage costs of Canadian beef that had been turned away or held in warehouses in foreign markets. It was hoped this program would maintain long-term trade relationships with foreign buyers and allow for easier reentry into those markets when the borders reopened.

Loan Guarantees

To address cash flow issues facing Alberta producers, loan limits were increased to C$1 million for all primary producers, and loan terms and conditions were adjusted under the Alberta Farm Development Loan Guarantee Program and the Alberta Disaster Assistance Loan Program. The cost of this program was estimated at C$10 million per year.
In addition to these federal and federal-provincial programs, the government of Alberta designed and delivered seven additional assistance programs between August and November 2003 for producers in that province. The specifics of the additional programs for producers in Alberta are described below.

Alberta Fed Cattle Competitive Market Adjustment Program

This program was implemented on 25 August 2003 for the purpose of increasing live cattle sales and prices until the US border reopened.

Unlike the Alberta Fed Cattle Competitive Bid Program announced on 25 June 2003, purchasers were not required to delay slaughter or transportation of the eligible animals. All cattle were required to enter the "competitive" marketplace and were then branded with an "X" to avoid double-dipping. This program initially was intended to continue until the US border opened to live cattle, but was terminated on 13 September 2003.

Alberta BSE Slaughter Market Adjustment Program

Until 23 September 2003 producers of other ruminants like bison, veal, sheep, goat, elk, and deer had not received any compensation and this program, similar to the Federal-Provincial BSE Recovery Program, was implemented for producers of these species. The Alberta BSE Slaughter Market Adjustment Program was forecast to cost C$3 million. Producers who sold animals for slaughter were eligible for compensation on a sliding scale equal to the difference between a base price and an average weekly market price.

Alberta Steer and Heifer Market Transition Program

The objective of this program was to provide additional support for animals on feed at 20 May 2003 and still on feed as of 12 September 2003. The projected taxpayer transfer associated with this program was C$55 million.

Beef Product and Market Development Program

Announced on 24 October 2003, the purpose of this program was to find new uses for beef in processed foods, especially beef from cattle over 30 months old. The original budget for this program was C$4 million. As food processors submitted applications and project proposals, forecasted transfers doubled to C$8 million.

Food Processor Assistance Initiative

The aim of this program was to provide financial assistance to companies who normally export products into markets that were closed due to BSE. Payments were designed to help companies resume business in export markets once they reopened or to divert products to the domestic market. Announced on 24 October 2003, taxpayer transfers associated with this program were expected to total C$400,000.

Alberta Mature Market Animal Transition Program

This program was one of two targeted at resolving the problem of increasing inventories of cull animals. A federal program required that producers slaughter cull animals to receive transfers. Officials at Alberta Agriculture and Rural Development believed this strategy was flawed as the market for the resulting beef would not maximize returns to producers. Instead, the Mature Market Animal Transition Program offered producers in Alberta two alternatives. Producers could choose to receive a payment on a per head basis or they could market eligible cull animals and receive a deficiency payment. The objectives of the provincial program were to: 1) redevelop market price discovery for culls and other mature ruminants after a partial border opening; 2) provide an incentive to minimize on-farm killing and disposal; and 3) to support transition to a restructured, domestic-focused cull animal market. The budget transfer with this program was C$60 million.

Winter Feed Program

Taxpayer transfers under this program announced on 24 November 2003 were directed to producers of deer, elk, llamas, and alpacas on a per head basis. The purpose of the program was to provide C$4 million to help overcome marketing difficulties.

Summary of BSE Compensation Programs to June 2004

Between 25 June 2003 and 4 June 2004 the BSE compensation programs for livestock enterprises in Alberta covered 972,721 animals and transfers were made to 22,312 enterprises on a per animal basis. Table 3.2 reveals the anticipated and actual transfers associated with each of these programs. The actual sum transferred to livestock producers totaled over C$400 million (Alberta Agriculture 2004) and was the subject of a major audit (Alberta Attorney General).

Outside of Alberta, the federal and other provincial governments transferred hundreds of millions of dollars to help cattle producers deal with the fallout from BSE. The federal and provincial governments provided C$520 million through the BSE Recovery Program. The federal government provided an additional C$120 million to help producers deal with a growing surplus of older cull animals and it announced a C$488 million strategy to reposition the livestock industry on 10 September 2004.

Table 3.2: Program Transfers in Alberta as of 4 June 2004.

Program Name	Date Announced	Forecasted Transfer ($000)	Number of Applications	Number of Animals Covered	Actual Transfer ($000)	Transfer Structure
Canada-Alberta BSE Recovery Program	18 June 2003	C$297,046	4,369	478,024	C$248,091	Federal (60%) Provincial (40%)
Alberta Fed Cattle Competitive Bid Program	25 July 2003	C$60,909	423	106,750	C$58,527	Alberta (100%)
Alberta Fed Cattle Competitive Market Adjustment Program	25 August 2003	C$66,606	979	149,991	C$64,863	Alberta (100%)
Alberta BSE Slaughter Market Adjustment Program for other Ruminants	23 September 2003	C$3,000	1,014	36,975	C$1,443	Alberta (100%)
Alberta Steer and Heifer Market Transition Program	9 October 2003	C$55,000	975			Alberta (100%)
Beef Product and Market Development Program	24 October 2003	C$8,000				Alberta (100%)
Food Processor Assistance Initiative	24 October 2003	C$400,000	7			Alberta (100%)
Alberta Mature Market Animal Transition Program	24 November 2003	C$60,000	22,565	146,317	C$26,051	Alberta (100%)
Winter Feed Program for deer, elk, llama and alpaca producers	24 November 2003	C$4,000	734	54,744	C$3,906	Alberta (100%)
TOTAL		**C$554,964**		**C$972,721**	**C$402,882**	

Source: Auditor General of Alberta.

Federal-Provincial Livestock Industry Repositioning Initiative

This joint federal-provincial initiative was aimed at continuing efforts to reopen the United States border, taking steps to increase ruminant slaughter in Canada (C$66 million), introducing measures to sustain the cattle industry until capacity comes online (C$385 million), and expanding access to export markets for both livestock and beef products (C$37 million). The Alberta government's 40 percent share of two new national cattle programs in that province and funds to help cover BSE surveillance costs were estimated at C$230 million. In Alberta, the initiative was announced as a six point plan including: 1) establishing a loan loss reserve to increase lenders' willingness to support projects to increase ruminant slaughter capacity; 2) finding new uses for beef in processed foods, especially beef from cattle over 30 months old; 3) implementing set-aside programs for fed and feeder cattle in which producers were eligible for transfers on a per head basis if they held back market ready livestock; 4) providing BSE surveillance subsidies for producers of C$150 per eligible sample (abattoirs received C$75 per head to compensate for their additional costs); 5) providing research initiatives; and 6) providing funding for a new income safety net program – the Canadian Agricultural Income Stabilization Program – that would provide transfers to producers who have experienced a loss of income as a result of BSE or other factors.

Other Recent Programs

On 7 March 2005 an additional C$37 million transfer was announced for BSE recovery initiatives in Alberta. C$30 million was directed toward a Beef Market Development and Retention Fund to help find more export markets and increase sales in existing ones. The remaining C$7 million was designated to create commercial uses for discarded specified risk materials.

On 7 April 2005, C$2.1 million was made available to assist sheep, goat, deer, elk, reindeer, and bison producers. A total of C$1.1 million will be distributed through the Diversified Livestock Fund of Alberta, to subsidize marketing activities in domestic and international markets. The other C$1 million will be a grant used by elk producers to expand local and international markets for both meat and velvet antler.

Altogether, governments in Canada transferred close to C$2 billion to offset the negative economic impact of BSE on primary producers. In Alberta, where more than one-half of cattle in Canada are located, the provincial government reported C$632 million in direct transfers, excluding income stabilization payments made to producers in the last two fiscal years.

The government assistance programs were aimed at short-term solutions as policy-makers and industry representatives mistakenly believed the live cattle import ban in the United States would be lifted within weeks.[9] A compounding problem was that existing government assistance programs in Canada were undergoing a major change. The federal-provincial disaster-based safety net compensation program, called the Farm Income Disaster Program, expired on 31 March 2003. In the spring of 2003, policy-makers were negotiating its replacement, the Agricultural Policy Framework. By 20 May 2003, federal and provincial governments had committed to the Agricultural Policy Framework, but they had not worked out the details of the farm safety net program. Given the expectations of a near term border reopening and without the specifics of a farm safety net program in place, assistance programs were implemented quickly and in an ad hoc fashion.

POLICY PROPOSALS AND AN EVALUATION OF THEIR IMPACT ON THE CANADIAN MARKET

The BSE related border closures created significant negative economic impacts on the Canadian cattle market and the federal and provincial governments in Canada implemented a number of programs to mitigate the impacts of the trade disruption. To quantify the economic impacts of the border closure and the impact of potential future mitigation mechanisms, a static, partial equilibrium model of the Canadian cattle and beef industry was developed and calibrated to 2004 conditions. The following section briefly describes the structure of the model and its predictions. A full description of the model and detailed results are provided in Weerahewa, Meilke, and LeRoy.

It is assumed that there are two types of cattle in the market: 1) cattle less than 30 months of age (young cattle) consisting of calves, steers, and heifers; and 2) cattle more than 30 months of age (old cattle) that form the breeding herd. The slaughter of old cattle reflects the size of the breeding herd and culling decisions. The production of young cattle is determined by calving rates, normal restocking decisions, and the size of the breeding herd. The model abstracts from the dynamics of cattle production and focuses solely on medium-term impacts. Because the model is a static, single-period model calibrated to 2004, the results are discussed as if all the adjustments take place in a single year. In fact, three to four years would be required for the adjustments predicted by the model to take place, and the model does not capture the short-run adjustments necessary to move from 2004 conditions to the new medium-term equilibrium. In this model, young and old cattle are

[9] In retrospect, this was an optimistic assumption given that seven years is the usual period before a government reopens its border after an exporting region reports a case of BSE. Once beef shipments resumed, many in Canada believed that trade in live cattle would recommence also.

produced in fixed proportions. On the demand side, beef produced from young cattle is assumed to be a good substitute for beef produced from old cattle. However, beef produced from old cattle is a weak substitute for the beef produced from young cattle. Finally, the model reflects the fact that in the base year, the border was open only for beef produced from cattle less than 30 months of age and closed to all live cattle and old beef trade.

A series of simulations were performed to: 1) to assess the impacts of closing the border on the markets for – young beef, young cattle, old beef, and old cattle; and 2) to assess the impacts of potential BSE recovery programs under different trade regimes.

Baseline Equilibrium

The baseline scenario replicates market conditions in 2004 when the US border was open only for young Canadian beef (Table 3.3). In 2004, 518 thousand head of old cattle and 3.738 million head of young cattle were slaughtered in Canada. Since the border was closed to live animal trade, all of these animals were processed in Canadian slaughtering plants. As a consequence, the domestic demand for cattle equaled the domestic supply. Average prices for old and young cattle were C$287 and C$980 per head, respectively. The production of beef from old cattle was 162.8 thousand tonnes all of which was consumed in Canada. The production of beef from young cattle was 1,280.3 thousand tonnes of which 491.4 thousand tonnes were exported and the rest was consumed in Canada. Suppliers of young beef in Canada received US equivalent prices, which were C$4,960 per tonne. The domestically determined price of old beef was C$2,238 per tonne. In 2004, the total revenue of the cattle industry was C$3.813 billion. Producer surplus totaled C$3.226 billion which was distributed between producers of old cattle (C$147.8 million) and producers of young cattle (C$3.078 billion).[10]

Outcomes with Alternative Trade Regimes

During 2004, beef produced from young cattle could be exported from Canada, but beef from old cattle and live cattle could not – the situation that prevails in May 2005. By changing the restrictions on beef and cattle trade, the model can be used to quantify the effects of three alternative trade regimes, namely: 1) autarky (no trade in cattle or beef); 2) partial free trade (trade in young beef and cattle only); and 3) free trade (trade in all cattle and beef).

[10] The old cattle producer surplus applies only to cull cows and bulls – the return on feeder animals by cow-calf operators is captured in the young cattle producer surplus calculation.

Trade Regime 1: Autarky Suppose the US border had been closed to young Canadian beef in 2004 (regime 1), as well as all other beef and live animals. With this export marketing opportunity unavailable to Canadian suppliers, all young beef would have had to be consumed domestically. The results suggest that in this situation young beef prices would have fallen from C$4,960 to C$2,680 per tonne (a 46 percent decline). The reduction in young beef price would cause a downward shift in the slaughter demand for young cattle lowering the price of young cattle from C$980 to C$396 per head (60 percent). As a result, the equilibrium quantity of young cattle supplied and demanded would have declined from 3.738 to three million head (20 percent) and the old cattle price would have dropped from C$287 to C$136 per head (53 percent). The decrease in price and quantity results from shifts in both the old cattle demand and supply functions. The old cattle demand function shifts to the left because of the drop in the old beef price from C$163 to C$131 per tonne (19.6 percent) and because young beef is a good substitute for old beef. Due to changes in cattle prices and supply levels, total producer surplus drops from C$3.226 to C$1.149 billion, a 64 percent reduction from the base level. The gross revenue of cattlemen falls from C$3.813 to C$1.245 billion, a 67 percent reduction from the base level where trade in young beef was allowed. This simulation shows that the reopening of the US border for young beef was a crucial response – things were bad in 2004, but they could have been much worse.

Trade Regime 2: Partial Free Trade If the US border had been reopened for young Canadian cattle in 2004 (regime 2), our results suggest that cattlemen would have received higher prices for young cattle and young cattle supply would have increased 9.7 percent from 3.738 to 4.102 million head (Table 3.3). The increase in the quantity of young cattle supplied results from an increase in the breeding herd. However, the larger supply of old cattle that had to be slaughtered and consumed in Canada would have depressed its price from C$287 to C$94 per head (67 percent). The large price decrease is a result of a shift to the right of the old cattle supply curve along a very inelastic domestic demand curve, given the current constraints on slaughter capacity. Exports of young cattle and young beef would have been 1.325 million head and 166.7 thousand tonnes compared to zero old cattle exports and 491 thousand tonnes of young beef in the baseline. Clearly, when the border is closed to young cattle trade, beef instead of live cattle move south. The gross revenue of the industry would have increased from C$3.813 to C$5.404 billion, an increase of 41.7 percent from the base level. Total producer surplus increases from C$3.226 to C$4.366 billion, a 35 percent increase from the base level. For cattlemen, prosperity requires at least a partially open border for young cattle and beef.

Table 3.3: Cattle and beef demand, supply, prices, and surplus measures under different trade regimes.

Variable		Current regime: baseline	Regime 1: autarky	Regime 2: partial trade	Regime 3: free trade
Cattle supply (thousand head)	Old	518.48	416.08 (-19.75)	568.86 (9.71)	584.43 (12.72)
	Young	3,738.42	3,000.10 (-19.75)	4,101.64 (9.71)	4,213.93 (12.72)
Cattle demand (thousand head)	Old	518.48	416.08 (-19.75)	568.86 (9.71)	297.52 (-42.61)
	Young	3,738.42	3,000.14 (-19.75)	2,776.54 (-25.73)	2,776.54 (-25.73)
Cattle prices (packers) (C$ per head)	Old	287.01	136.44 (-52.46)	94.24 (-67.16)	757.64 (163.97)
	Young	980.24	396.13 (-59.58)	1304.58 (33.08)	1304.58 (33.08)
Beef supply (thousand metric tons)	Old	162.84	130.67 (-19.75)	178.66 (9.71)	93.44 (-42.61)
	Young	1,280.31	1,027.45 (-19.75)	950.88 (-25.73)	950.88 (-25.73)
Beef demand (thousand metric tons)	Old	162.84	130.68 (-19.75)	178.66 (9.71)	145.18 (-10.84)
	Young	788.95	1,027.45 (30.23)	784.19 (-0.60)	794.25 (0.67)
Beef prices (C$ per metric ton)	Old	2,238.09	1,391.31 (-37.83)	1,924.32 (-14.01)	2,588.28 (15.68)
	Young	4,960.00	2,679.90 (-45.97)	4,960.00 (0.00)	4,960.00 (0.00)
Gross revenue (C$ million)		3,813.38	1,245.21 (-67.34)	5,404.54 (41.72)	5,940.20 (55.77)
Producer surplus (C$ million)	Old	147.84	56.55 (-61.74)	53.51 (-63.80)	436.05 (194.94)
	Young	3,078.23	1,092.68 (-64.50)	4,312.39 (40.09)	4,458.88 (44.85)
	Total	3,226.08	1,149.21 (-64.37)	4,365.90 (35.33)	4,894.93 (51.73)

Source: Weerahewa, Meilke and LeRoy.

Trade Regime 3: Free Trade If there were no trade impediments in 2004 (regime 3) – the pre-BSE situation – our results show that producers in Canada would have received higher prices for all types of cattle and beef. The free trade regime would have generated larger supplies of cattle and beef, and net exports of cattle and young beef. The

supply of old and young cattle both would have increased 12.7 percent, equaling 584 and 4.214 million head, respectively, while the exports of old and young cattle would have been 287 thousand and 1.437 million head compared to zero in the actual BSE environment of 2004. Domestic demand for cattle and the production of beef would have been lower under a free trade regime. Old beef production would have been 93.4 thousand tonnes, a reduction of 67 percent, resulting in 51.7 thousand tonnes of old beef being imported to meet domestic demand. Young beef production would have been 951 thousand tonnes, of which 157 thousand tonnes would have been exported. Again, open borders result in Canada trading more cattle and less beef. Total producer surplus, would have been higher at C$4.895 billion, an increase of 52 percent from the base level and C$529 million (10 percentage points) more than when the border was open only to young cattle and beef. Gross revenue in the cattle industry would have increased from C$3.813 to C$5.940 billion, a 56 percent increase from the base level.

Impacts of Different Policy Proposals

The simulations described above provide a prediction of the equilibrium outcomes under different trade regimes. The results of three different BSE mitigation policies in Canada are now evaluated under each of the three possible trade regimes – autarky, partial free trade, and free trade. The specific mitigation policies include: 1) increasing old cattle slaughter capacity; 2) conducting a mass cull; and 3) providing an old cattle slaughter subsidy.

Scenario 1: The Impact of an Increase in Slaughter Capacity
The first policy simulation quantifies the economic consequences of a ten percent increase in Canadian domestic slaughter plant capacity for old cattle. Table 3.4 shows the impacts of expanding the slaughter capacity on the supply, demand, prices, revenue, and producer surplus of cattlemen assuming no change in the 2004 trade regime. The higher slaughter capacity shifts the demand curve for old cattle to the right and hence, increases the price of old cattle from C$287 to C$389 per head (35.5 percent).[11] Under this scenario, the price of young cattle would drop slightly from C$980 to C$976 per head. The price changes and the extra capacity would have resulted in only slightly higher levels of slaughter for old and young cattle because of the inelastic nature of the supply response. The increased supply of cattle would have been processed in Canadian slaughter plants and hence the production of old (0.3 percent) and young beef (0.3 percent) would have been slightly higher. However, the increase in the supply of old beef would have depressed the old beef price by 0.5 percent and the young beef price would be unchanged with

[11] It is assumed that with increased capacity, processors are willing to purchase more old cattle at all prices.

Table 3.4: Cattle and beef demand, supply, prices, and surplus measures under different policy scenarios in the current trade regime.

Variable		Baseline	Policy 1: Slaughter capacity	Policy 2: Mass cull	Policy 3: Slaughter subsidy
Cattle supply (thousand head)	Old	518.48	520.18 (0.33)	482.76 (-6.89)	520.83 (0.45)
	Young	3,738.42	3,750.70 (0.33)	3,480.83 (-6.89)	3,755.35 (0.45)
Cattle demand (thousand head)	Old	518.48	520.18 (0.33)	482.76 (-6.89)	520.83 (0.45)
	Young	3,738.42	3,750.70 (0.33)	3,480.83 (-6.89)	3,755.35 (0.45)
Cattle prices (packers) (C$ per head)	Old	287.01	389.22 (35.61)	423.72 (47.63)	278.03 (-3.13)
	Young	980.24	976.10 (-0.42)	1067.10 (8.86)	974.35 (-0.58)
Beef supply (thousand metric tons)	Old	162.84	163.37 (0.33)	151.62 (-6.89)	163.57 (0.45)
	Young	1,280.31	1,284.50 (0.33)	1,192.08 (-6.89)	1,286.10 (0.45)
Beef demand (thousand metric tons)	Old	162.84	163.37 (0.33)	151.62 (-6.89)	163.57 (0.45)
	Young	788.95	788.78 (-0.02)	792.32 (0.43)	788.72 (-0.03)
Beef prices (C$ per metric ton)	Old	2,238.09	2,227.50 (-0.47)	2,460.63 (9.94)	2,223.48 (-0.65)
	Young	4,960.00	4,960.00 (0.00)	4,960.00 (0.00)	4,960.00 (0.00)
Gross revenue (C$ million)		3,813.38	3,863.55 (1.31)	3,918.96 (2.77)	3,861.37 (1.25)
Producer surplus (C$ million)	Old	147.84	200.69 (35.74)	202.66 (37.08)	198.39 (34.19)
	Young	3,078.24	3,079.68 (0.04)	3,089.04 (0.35)	3,071.03 (-0.23)
	Total	3,226.08	3,280.38 (1.68)	3,291.70 (2.03)	3,269.43 (1.34)

Source: Weerahewa, Meilke and LeRoy.

the open border. The increased slaughter capacity would have increased cattlemen's gross revenue from C$3.813 to C$3.863 billion, a 1.3 percent increase from the base level.

Table 3.5 summarizes the impacts of a ten percent expansion in old cattle slaughter capacity under each of the three different trade regimes. Table 3.5 shows the equilibrium values with higher slaughter capacities,

Table 3.5: Cattle supply, prices, and surplus measures under different policy scenarios and different trade regimes.

Variable			Baseline	Policy 1: Slaughter capacity	Policy 2: Mass cull	Policy 3: Slaughter subsidy
Cattle supply (thousand head)	Old	Autarky	416.08	416.65	402.22	416.84
		Partial	568.86	570.33	516.23	570.33
		Free trade	584.43	584.43	525.99	586.87
	Young	Autarky	3,000.10	3,004.18	2,900.14	3,005.56
		Partial	4,101.64	4,112.28	3,722.16	4,112.28
		Free trade	4,213.93	4,213.93	3,792.54	4,231.53
Cattle prices (packers) (C$ per head)	Old	Autarky	136.44	208.53	273.73	128.94
		Partial	94.24	157.08	295.65	53.08
		Free trade	757.64	757.64	757.64	757.64
	Young	Autarky	396.13	389.47	559.23	387.22
		Partial	1,304.58	1,304.58	1,304.58	1,304.58
		Free trade	1,304.58	1,304.58	1,304.58	1,304.58
Gross revenue (C$ million)		Autarky	1,245.21	1,256.95	1,731.94	1,260.92
		Partial	5,404.53	5,454.39	5,008.48	5,454.39
		Free trade	5,940.20	5,940.20	5,346.18	6,026.05
Producer surplus (C$ million)	Old	Autarky	56.55	86.37	109.31	96.46
		Partial	53.51	89.30	151.69	89.30
		Free trade	436.05	436.05	392.48	436.05
	Young	Autarky	1,092.68	1,077.49	1,450.09	1,068.92
		Partial	4,312.39	4,326.26	3,921.17	4,314.78
		Free trade	4,458.88	4,458.88	4,012.92	4,470.36
	Total	Autarky	1,149.24	1,163.87	1,559.40	1,165.38
		Partial	4,365.90	4,415.57	4,072.87	4,404.08
		Free trade	4,894.93	4,894.93	4,405.44	4,967.32
Government expenditure (C$ million)		Autarky	0.00	0.00	0.00	43.35
		Partial	0.00	0.00	0.00	59.31
		Free trade	0.00	0.00	0.00	61.03

Source: Weerahewa, Meilke and LeRoy.

however in evaluating these results, recall that the base case situation is different for each simulation. For example, the autarky results show what the impact of an increase in slaughter capacity would be, if in 2004 the border had been closed to all cattle and beef trade. The results indicate that the adverse impacts of the border closure would have been smaller if Canada had more old cattle slaughter capacity. The autarky

price for old cattle of C$136 per head would have risen to C$209 per head with increased slaughter capacity. The young cattle price under autarky would have decreased from C$396 to C$389 per head due to this policy. Producer surplus would have increased from C$1.149 million to C$1.164 billion and gross revenues would have risen from C$1.245 million to C$1.257 billion. If all borders had been closed to all Canadian exports in 2004, the economic situation would have been a disaster for cattlemen and beef processors, and would only have been slightly mitigated with more old cattle slaughter capacity in place.

In regime two (partial trade liberalization), if the border was open for young cattle and young beef then more old cattle slaughter capacity would have increased old cattle supply from 569 to 570 thousand head, the price of old cattle by 67 percent from C$94 to C$157 per head, young cattle supply from 4.102 to 4.112 million head, total producer surplus from C$4.366 to C$4.416 billion dollars, and gross revenue from C$5.404 to C$5.454 billion. While most of the changes are small, the extra slaughter capacity of old cattle is important for cow-calf producers when old cattle cannot be exported.

If the border was open for all types of beef and cattle (free trade) an increase in slaughter capacity in Canada would not have changed the producer surplus of cattle producers through prices or supply levels. An increase in slaughter capacity would not have helped cattlemen because under free trade it is assumed that old cattle in Canada receive the US price adjusted for transfer costs.

Scenario 2: The Impact of a Mass Cull The second policy simulation evaluates the impact of a deliberate cull of beef cows. Table 3.4 shows the impact on the supply, demand, prices, revenue, and producer surplus of cattlemen when ten percent of the breeding herd is destroyed under the 2004 trade regime. The loss of ten percent of the breeding herd would lower the supply of old and young cattle by ten percent, ceteris paribus. However, because of the feedback effects in the medium-run model, a ten percent cow cull would only reduce the medium-term supply of old and young cattle by 6.9 percent. This shift in the supply curves would increase the price of both old and young cattle by 47.6 percent and 8.9 percent, respectively. Total producer surplus increases from C$3.226 to C$3.292 billion, a two percent increase from the baseline. Gross revenue increases from C$3.813 to C$3.919 billion, a 2.8 percent increase from the baseline suggesting that in the medium-term, under the 2004 trade regime, cattlemen benefit slightly from a mass cull. It is important to note that this analysis does not account for the costs of the cow cull and disposal – costs that would be substantial.

Table 3.5 shows the impacts of culling the cattle herd under different trade regimes. Under autarky, mass culling of the cattle herd would have increased the producer surplus and gross revenue of cattlemen through an increase in cattle prices. The old cattle price would have increased from C$136 to C$274 per head while the young cattle price would have increased from C$396 to C$559 per head. The cull would have increased the total producer surplus from C$1.149 to C$1.559 billion and gross revenue from C$1.245 to C$1.732 billion. However, if the border were open for young cattle and/or beef (trade regimes two and three), the mass cull would have led to reductions in gross revenue for the industry as the capacity to export would be reduced. Old cattle supply would have decreased from 569 to 516 (9.3 percent) thousand head under partial opening (trade in young cattle and beef) and from 584 to 526 (9.9 percent) thousand head under free trade. Young cattle supply would have decreased from 4.102 to 3.722 (9.3 percent) million head under partial opening and from 4.214 to 3.792 (9.9 percent) million head under free trade. Reductions in producer surplus and gross revenue would have been observed under both the partial trade and free trade regimes. As a consequence, a mass cow cull would not be a wise policy if trade were to resume for young cattle or all types of cattle and beef.

Scenario 3: The Impact of Introducing a Slaughter Subsidy The final policy scenario assesses the impact of introducing a slaughter subsidy for old cattle. Table 3.4 shows the detailed impacts of an imposition of a slaughter subsidy equal to C$104 per head for old cattle assuming the baseline trade regime does not change. Table 3.5 shows the impacts under different trade regimes. A slaughter subsidy would have lowered the price paid by packers for old cattle and increased the price received by cow-calf producers (market price plus subsidy). An imposition of a slaughter subsidy equivalent to C$104 per head would have led to a drop in the packer's price of old cattle from C$287 to C$278 per head, and for young cattle from C$980 to C$974 per head under the 2004 trade regime. Since producers would receive a subsidy of C$104 per head on top of the prices paid by the packers, the old and young cattle supply levels would have been about one percent higher. As there is no trade in live cattle under the 2004 trade regime, cattle would have to be slaughtered in Canadian plants and hence local old and young beef supplies would also increase. Exports of young beef would have increased by 5.9 thousand tonnes (1.2 percent). The gross revenue and producer surplus of the industry would have increased by 1.2 percent and 1.3 percent from the baseline, respectively.

The results suggest that the adverse impacts of the border closure on cattlemen would have been slightly smaller if a slaughter subsidy were present. With slaughter subsidies, gross revenue for cattlemen would increase from C$1.245 to C$1.261 billion under autarky. Total

producer surplus would rise from C$1.149 to C$1.165 billion. If the border were open for young cattle, a slaughter subsidy would have increased gross revenue from C$5.404 to C$5.454 billion and under the free trade scenario it would have increased from C$5.940 to C$6.026 billion. Total producer surplus would have increased from C$4.366 to C$4.404 billion under partial free trade (free trade in young cattle and young beef) and from C$4.895 to C$4.967 billion under free trade. The government expenditures on the subsidy program would have been C$54, C$43, C$59 and C$61 million if it had existed under the 2004 baseline, autarky, partial opening, and free trade regimes, respectively. It is clear from these results that an old cattle slaughter subsidy program would expand output under all trade regimes. However, in all of these cases additional output is either not wanted or not necessary.

Lessons Learned from Policy Evaluations

The results of the policy simulations help to increase our understanding of the impacts of various BSE recovery programs in Canada under different trade regimes. The results show it is difficult to design a program to mitigate the adverse effects of a border closure when exports represent a large portion of sales. In addition, the usefulness of various policy measures depends crucially on the long-run border situation. Encouraging the expansion of slaughter capacity, mass culling of cows, and provision of old cattle slaughter subsidies involve sizable taxpayer transfers and other significant costs not captured in this analysis, especially for the proposed cow cull program.

Among the policies proposed, the expansion of old cattle slaughter capacity seems sensible if the border remains closed for old cattle and the costs of implementation are not too high. However, if the border is open for all cattle and beef, this program provides few benefits to producers. The imposition of an old cattle slaughter subsidy could also increase the welfare of cattlemen, but it seems unwise to expand the size of the cattle herd if the border remains closed. The destruction of part of the cow herd might be a viable policy under autarky but would be foolish under the other trade regimes given its undoubtedly high cost.

CONCLUDING REMARKS

This chapter describes the role of the NAFTA and domestic policies that promoted the integration of the North American cattle industry and the economic impact on this industry of the discovery of BSE in North America. It reviews several programs implemented in Canada aimed at mitigating the economic consequences of BSE and quantifies the effects of alternative policy scenarios on prices, output, revenues, and welfare.

The high cost of the BSE crisis underscores the need for better methods to deal with future border closures. Although the OIE has a protocol to close borders immediately on discovery of BSE or other serious diseases, there is no similar science-based mechanism in the NAFTA (or the WTO) to reopen borders when there is no significant chance of further incidence of the disease. This shortcoming has been devastating for suppliers of a perishable product that are highly dependent on export markets. Cattlemen and processors in the NAFTA region have learned a painful lesson about existing institutions and trade rules and the need to be ever aware and prepared for the seeming capriciousness of their intended foreign customers and their governments.

It would be a serious setback to growth and productivity in the NAFTA region if the freedom of individuals to exchange live animals and beef products continues to be restricted. Consumers in both countries have come to rely on safe and nutritious beef made available at reasonable cost. The best way to ensure long-term competitiveness is through minimal government interference in market processes throughout North America. Attempts to manipulate the outcomes of market processes have led to the current difficult situation that central authorities could neither specifically predict nor effectively prevent.

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