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Risk Management in the Integrated NAFTA Market: Lessons from the Case of BSE



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INTRODUCTION

Globalization is changing the nature and structure of agricultural and food markets. In agriculture, globalization is providing producers with new market opportunities, as well as broader options for sourcing raw material and intermediate inputs. The globalization of the food industries is providing consumers with unprecedented choice and increased value as products are traded across borders. The result is production and marketing systems that are increasingly more integrated. The Canada-US Free Trade Agreement (CUSTA) and the North American Free Trade Agreement (NAFTA) have accelerated this integration for North American markets by reducing barriers to the flow of goods among Canada, Mexico, and the US.

Increasing integration of production systems and markets presents new risk management challenges for regulators and industry around all aspects of plant health, animal health, and food quality, particularly food safety. Increased integration is promoted by well-coordinated regulatory systems across trading partners. At the same time, increased integration means increased interdependence and a higher potential for widespread disruptions in the event of a problem. Here we examine the case of the management of bovine spongiform encephalopathy (BSE), popularly referred to as mad cow disease, in the North American beef industry. The industry and trade was greatly disrupted in 2003, and continues to be disrupted, by the discovery of a BSE case in Canada in May and another in the US in December.

BSE provides a dramatic example of the importance of risk management systems and how animal health, plant health, and food safety events

can disrupt industries and markets within NAFTA, as well as trade with non-NAFTA countries. However, it is only one of a long list of examples of such risks including Foot and Mouth Disease, Avian Influenza, microbial contamination, and bio-terrorism. They highlight the challenges for governments and industries in managing risk in integrated markets and in responding in the event of failure.

RISK MANAGEMENT IN INTEGRATED MARKETS

Market integration is a matter of degree (Robertson); it can range from integration based on market incentives, to the lowering of trade barriers through free trade agreements (e.g., NAFTA), to the elimination of internal barriers and the adoption of common policy through a new centralized government [e.g., the European Union (EU)]. Trade between countries takes place on the basis of their agreements with each other and, for most countries, within the larger context of the World Trade Organization (WTO) that sets the general rules of the road for trading relationships. A central challenge with market integration is on the regulatory side, particularly in regard to risk management.

To achieve freer access to markets, trade agreements focus on controlling tariff and nontariff barriers to trade. Tariff barriers are the familiar duties on imports and other measures, such as quotas, whose major influence is on the price of goods. Nontariff barriers include a huge array of other practices that may impede trade – including regulatory measures adopted by countries to manage risks (Roberts et al., Buzby). As tariff barriers have been reduced in recent decades, concern grew that nontariff barriers would be used as a substitute to protect domestic industries. For example, say tariffs on imports of boneless beef products are greatly reduced leading to an upsurge in imports. While the country in question may be restricted from reinstating tariffs by its trade agreements, what would prevent it from finding a safety hazard associated with the imports and setting regulations that prevent the increase in imports? To prevent this scenario, the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) of the WTO sets standards for when nontariff barriers to trade arising from regulation of plant and animal health and safety, and food safety, will be considered legitimate. The interpretation of this agreement is currently being fleshed out in the process of disputes before the WTO.

Risk management, and the regulatory programs that are designed to achieve it, are the responsibility of national governments. Under the SPS Agreement, countries have the right to choose the appropriate level of protection, based on risk assessment, and to implement programs to

achieve that level of protection in the least trade restrictive manner. Increasingly, governments base their regulatory decisions on risk analysis, which involves risk assessment, risk management, and risk communication. Governments ultimately make regulatory decisions based on the benefits and costs of taking, or not taking, action. Because factors differ between countries, as does the evaluation of risk and the regulatory infrastructure, national governments tend to make different decisions about how to control risks such as those posed by BSE or microbial contamination. Direct parallels can be drawn to regulation of risks in nearly any industry (e.g., prescription drugs, car safety).

Increased market integration usually rests, in part, on facilitating compliance of trading partners with each other's regulations. Governments can do this in three ways:

- **Policy Coordination:** gradually reducing differences in policy, frequently based on voluntary adherence to international codes of practice.
- **Equivalence Agreements:** agreeing to accept the regulatory program of the trading partner as achieving the same standard (i.e., being equivalent), although the regulatory program used to achieve the standard may differ. This is a strong form of mutual recognition.
- **Harmonization:** adopting identical standards and enforcement mechanisms.

In practice, all three routes to regulatory rapprochement have proven rocky. The benefits of a looser coordination of policy may not justify the effort needed to achieve it. Equivalence agreements are notoriously difficult to arrive at because they often involve exhaustive and exhausting reviews of each other's (frequently changing) policy. Harmonization requires agreement on regulatory goals and mechanisms that is usually not forthcoming among independent countries. Countries are loath to turn over any of their risk management and regulatory decision-making to outsiders.

Frustration with the slow pace of regulatory facilitation motivated the EU to consolidate significant regulatory functions in a central government structure in order to achieve harmonization (Harvey). The NAFTA countries, on the other hand, are practicing weaker forms of policy coordination or at most equivalence. This necessarily places limits on the degree of market integration that is achievable. Our case study explores the benefits and costs of these limits, and the implication of having an integrated market without a supporting integrated risk management infrastructure.

BSE as a Case Study

We examine the policy implications of regulatory and market integration in the context of BSE in the North American beef industry. Under NAFTA, this industry has become integrated on every level of the supply chain from feed production through to prepared food products. In 2003, North America confirmed two cases of BSE.

BSE is an excellent opportunity to study the interaction of government risk management decisions and trade effects. BSE first emerged in the UK in the 1980s (for a fact sheet on BSE see Canadian Food Inspection Agency). It is one of a group of transmissible spongiform encephalopathies (TSEs) that affect the central nervous system. BSE affects this system in cattle and thus is an animal health risk. Little is known for certain about BSE. Many experts believe that cattle become infected by the feeding of TSE infected ruminant (i.e., cattle, sheep, goats, deer, elk, bison) protein products to cattle. The disease is eventually fatal to cattle. At the peak of the outbreak, the UK reported over 37,000 BSE cases in 1992 (OIEc). BSE has been considered to pose a human health risk since 1996 when a newly recognized form of Creutzfeldt-Jacob Disease (CJD), called variant CJD (vCJD), was diagnosed. It is thought to be linked to consumption of meat products from BSE-infected cattle. To date, the OIE reports that BSE cases have been confirmed in over 20 countries around the world, including most of the EU, Japan, Canada, and the US (OIEb). The number of reported cases in countries other than the UK has been much lower, ranging from peaks of 333 cases in Ireland in 2002, 274 cases in France in 2001, and 159 in Portugal in 1999, down to a peak of 4 cases in Japan in 2003 (OIEd). No cases have been reported in Mexico.

The management of BSE-related risk requires a broad set of measures ranging from regulation of feed practices, to movement of live animals, surveillance, slaughter, distribution of beef products, rendering, and even handling of table scraps (i.e., plate waste). Given that BSE is a newly emerged risk, these systems have been under development in a swiftly changing environment. As we shall see, a failure in the systems, defined to date in the trading environment as finding one BSE case, triggers the complete closing of export markets for live animals and beef products. This closing is not mandated by international standards, but is the result of risk management decisions made by importing countries. Thus the stability of this integrated trade sector in North America, and sales to non-NAFTA countries, hinges on the effectiveness of the diverse, nonintegrated regulatory systems of the NAFTA countries. To evaluate the effects of this situation, we turn first to looking at the level of integration in North American beef markets and then to the trade shocks that resulted from the BSE cases confirmed in 2003.

HOW INTEGRATED ARE THE NAFTA BEEF INDUSTRIES?

Each NAFTA country has a successful beef industry that it considers to be an important agrifood sector. Prior to CUSTA and NAFTA, tariffs inhibited trade in cattle and beef among Canada, Mexico, and the US, and their beef industries operated relatively independently. In 1989, CUSTA opened the way for free trade in the beef industries between the US and Canada. The free trade was extended to Mexico in 1994 through NAFTA. Since CUSTA and NAFTA, there has been a dramatic increase in the interdependence of the beef markets in the three countries in both production and consumption. In this section we examine the degree of integration among the three NAFTA beef markets just prior to the BSE events that occurred in 2003. Thus 2002 is the last full year of data that reflects pre-BSE experience in NAFTA.

The beef industries in the NAFTA countries generally refers to the industries that produce live cattle and fresh, chilled, or frozen beef products, as well as processed meats or offal (which make up about 5 percent of exports in Canada). The primary production sectors in Canada and the US are quite similar. The production sector includes cow-calf operators that produce the calves, stockers, or backgrounders, that raise the calves to pre-finishing weights, and feedlot operators that finish the cows on grain rations. The Mexican industry is very different. Cattle tend to be grass fed and feedlots are less common. In the past, Mexican consumers have tended to purchase less expensive grass fed beef, but more recently consumption of premium grain fed beef has increased with improvements in income and standards of living.

The processing sector includes processors that slaughter and butcher the animals, further processors that produce high quality boxed beef cuts, and rendering operations that convert the processing by-products into bone meal and tallow. Economies of scale in the beef processing industry are significant; Canada and the US have several large processors who dominate the industry and a multitude of smaller processors and further processors. Concentration is high in both countries, with the four largest firms in steer and heifer slaughter holding 81 percent of the US market in 1999 (Harris et al.) and 81.6 percent of the Canadian market in 2002, according to a Standing Committee on Agriculture report.

Inputs to the cattle industry include genetics and feed inputs such as grains and protein sources. For trade purposes, products of the beef industry are separated into two main categories: live cattle and beef products. Other categories, like tallow, offal, and hides, are relatively minor compared to these two, comprising less than 1 percent of industry

Table 7.1: NAFTA beef and cattle consumption and trade, 2002.

2002 Beef Consumption and Trade (in '000 metric tons)					Net Trade as a % of
	Consumption	Imports	Exports	Net Trade	Consumption
Canada	992	307	610	303	30.54%
Mexico	2,409	489	10	-479	-19.88%
US	12,738	1,460	1,110	-350	-2.75%

2002 Cattle Slaughter and Trade (in '000 animals)					Net Trade as a % of Slaughter
	Slaughter	Imports	Exports	Net Trade	
Canada	3,753	138	1,690	1,552	41.35%
Mexico	8,310	206	948	742	8.93%
US	36,970	2,503	244	-2,259	-6.11%

Source: USDac.

trade. The relative sizes of the NAFTA beef industries are shown in Table 7.1.

Integration of Beef Markets

Trade in beef animals and products falls into two broad categories – trade in live cattle, destined for feedlots or processing, or trade in beef, which refers to the trade in the meat products from processed cattle. The US and Canada rank second and third in terms of exports of beef with 16 percent and 15 percent of the global trade in beef, respectively. However, their trade patterns are very different. As the largest consumer of beef in the world, the US market and production systems affect the activities of both of its NAFTA partners. Both the US and Mexico are net importers of beef, while Canada is a net exporter of both beef and cattle, Mexico is a net exporter of cattle, and the US is a net importer of cattle (Table 7.1).

The NAFTA beef industries are integrated at every level, from production through to the markets for end products. The nature of that integration reflects the market structures and comparative advantages of the three countries. Canada's relatively low cost production system has allowed it to expand its industry through exports of both live cattle and beef into the US. The percentage of total Canadian beef production exported to the US has increased from 12 percent in 1990 to almost 48 percent in 2002. Poulin and Boame report that ninety percent of Canadian exports go to the US, while only 11 percent of the US trade goes to Canada. Mexico's exports, which are almost exclusively cattle, are also completely focused on the US market.

Canadian beef and cattle have absorbed much of the growth in the US market, as illustrated in Figure 7.1. Mexico's industry has not experienced the same benefits from freer trade, with growth in Mexico's cattle industry on the order of 1 percent per year. The US beef industry has taken advantage of its quality advantage and its role has become one of providing higher quality beef to both Mexico and Canada.

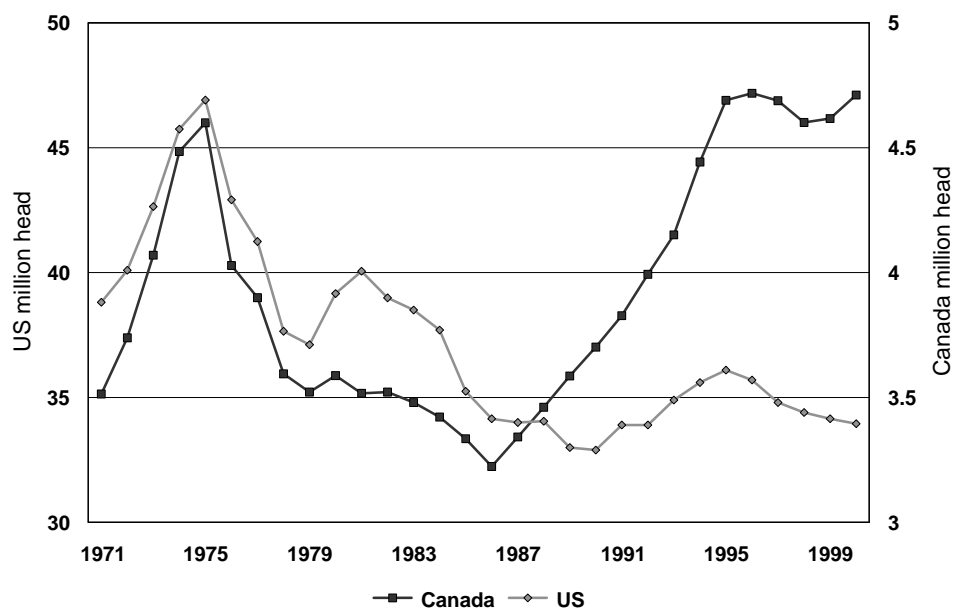
Of the NAFTA countries, only the US is a major player in non-NAFTA markets, both as an exporter (Table 7.2) and importer. Sixty-five percent of US beef exports are to non-NAFTA countries and 66 percent of beef imports are from non-NAFTA countries, mainly Australia and New Zealand.

Integration of Live Cattle Markets

Trade in cattle occurs primarily in the form of Canada and Mexico supplying US feedlot operators and processors with live animals. Canada provided 68 percent¹ of the US cattle imports in 2002, imports that have become an integral component of the US production system. Canadian cow-calf operations supply some of the young stock to US producers,

¹ The US imported 2.5 million cattle in 2002; 1.7 million came from Canada (USDAb).

Figure 7.1: Canada and US Beef Cow Numbers, July 1.



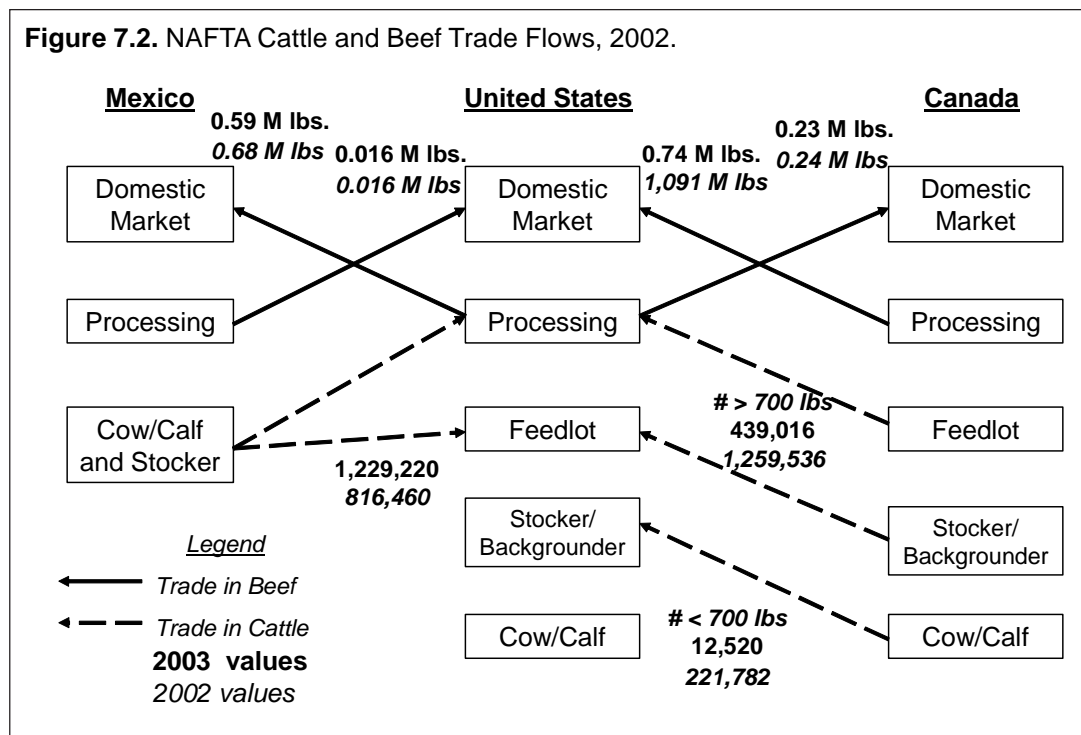
Source: Canfax and Gracey, p. 19.

Table 7.2: US Beef Exports to NAFTA and non-NAFTA Markets, 2002.

US Beef Exports 2002			
	Volume Million lbs.	Value Million US\$	Percentage
Japan	771	854	32.7%
Mexico	629	615	23.6%
South Korea	597	619	23.7%
Canada	241	286	11.0%
Other	212	236	9.0%
Total	2,450	2,610	100.0%

Source: USDAb.

but the major movement is from backgrounders to US feedlots or from feedlots to US processing facilities. This trade has advanced to the point that US feedlots, particularly in the northwestern states, are dependent on Canadian cattle for their normal operations. Mexican live cattle also figure prominently into the US production system providing almost all of the remaining cattle imports, mainly into feedlots. Figure 7.2 shows the dominant flows of live cattle (dotted lines) and beef (solid lines) among the NAFTA countries in 2002.

Figure 7.2. NAFTA Cattle and Beef Trade Flows, 2002.

Integration of Beef Meat Markets

Trade in beef and veal products within NAFTA is less significant than the movement of cattle. In 2002, Canada provided 1.091 million lbs. (34 percent) of US imports and purchased 0.24 million lbs. in return. Exports of beef from Mexico to either country are insignificant. Although the US is a net importer of beef within NAFTA, it has taken on an export role as a source of products that are targeted for the higher end of local consumption. Higher incomes and changing tastes have led many upper end consumers in Mexico to purchase US grain fed beef, rather than the leaner grass fed local meat. Much of Canada's imports were in the form of high quality boxed beef. Canada is the leading importer of value added US beef products in the prepared/preserved category (Leuck).

Although the integration of the beef industries has increased dramatically since CUSTA and NAFTA, the degree of integration varies radically by country. For example, Canada's 1.45 million cattle exported to the US annually comprise almost 25 percent of Canadian cattle inventories but amount to less than 5 percent of US numbers. Mexico's cattle exports to the US amount to only 3 percent of Mexican cattle inventories.

BSE FREE STATUS: WHAT IS IT, HOW IS IT LOST, AND WHAT ARE THE TRADE EFFECTS OF LOSING IT?

The confirmation of BSE cases in Canada and the US resulted in both countries effectively losing their BSE free status.² The trade impacts of these cases are determined by decisions made by trading partners on what, if any, import restrictions to impose in response to the cases. The process of determining BSE status and import restrictions is a complicated one that goes to the heart of risk management decision-making in integrated markets.

International Guidance on BSE Status and Related Import Restrictions

As a transmissible animal disease, international standards and guidance regarding the management of BSE and the sanitary safety of world trade are developed by the World Organization for Animal Health (known by its original acronym OIE, Office International des Epizooties). OIE is an intergovernmental organization created by international agreement; it had 166 member countries as of March 2004. OIE standards are recognized as reference international sanitary rules by

² Canada had a previous case of BSE confirmed in 1993 in a cow that had been imported from Britain in 1987. Prior to the 2003 case, Canada's trading partners treated it as BSE-free.

the WTO. This means that a country whose standards conform to those of the OIE cannot be challenged in a trade dispute based on the legitimacy of its standards. OIE classifies BSE as a List B disease, one that is considered to be of socioeconomic and/or public health importance within countries and that is significant in the international trade of animals and animal products.

Currently OIE has five levels of BSE status outlined in its Terrestrial Animal Health Code (OIEa) and discussions are under way to simplify the categorization (OIEe). First, and of key importance, the Code lays out criteria for determining BSE status that depend on a country or zone's risk assessment and management activities. The criteria present the key risk management actions pertaining to BSE. Specifically, the Code says:

The bovine spongiform encephalopathy (BSE) status of the cattle population of a country or zone can only be determined on the basis of the following criteria:

- 1) The outcome of a risk assessment identifying all potential factors for BSE occurrence and their historic perspective, in particular:
 - a) The potential for introduction and recycling of the BSE agent through consumption by cattle of *meat-and-bone meal* or *greaves* of ruminant origin;
 - b) Importation of *meat-and-bone meal* or *greaves* potentially contaminated with a transmissible spongiform encephalopathy (TSE) or feedstuffs containing either;
 - c) Importation of animals or embryos/oocytes potentially infected with a TSE;
 - d) Epidemiological situation concerning all animal TSE in the country or zone;
 - e) Extent of knowledge of the population structure of cattle, sheep, and goats in the country or zone;
 - f) The origin of use of ruminant carcasses (including fallen stock), by-products and slaughterhouse waste, the parameters of the rendering processes, and the methods of animal feed manufacture;
- 2) On-going awareness programme for veterinarians, farmers, and workers involved in transportation, marketing, and slaughter of cattle to encourage reporting of all cases of neurological disease in adult cattle;
- 3) Compulsory notification and investigation of all cattle showing clinical signs compatible with BSE;
- 4) A BSE surveillance and monitoring system with emphasis on risks identified in point 1) above, taking into account the guidelines in

Appendix 3.8.4.; records of the number and results of investigations should be maintained for at least 7 years; and

- 5) Examination in an approved laboratory of brain or other tissues collected within the framework of the aforementioned surveillance system.

These criteria set a consistent worldwide hurdle for a country wishing to present evidence regarding its status.

The levels of BSE status for a country or zone are: BSE free, BSE provisionally free, minimal BSE risk, moderate BSE risk, and high BSE risk (OIEa). The criteria for BSE free include that the criteria listed above are met, and there has been no case, all cases have been demonstrated to originate directly from importation of live cattle (with proper actions taken in response), or the last indigenous case was reported more than 7 years ago. In addition, specified risk management programs must have been in place for at least 7 years. BSE provisionally free is similar to BSE free but is applied where appropriate risk management programs have been in place less than 7 years. The further three criteria hinge on the length of time since the last indigenous case and the incidence of BSE within the cattle herd in the country or zone.

For BSE, the OIE does not itself assign countries to the five levels. Instead, importing countries use the levels to judge other countries. In January 2004, however, the OIE noted that it “has been recently requested to examine country submissions, made on a voluntary basis, for determining whether they meet the conditions to be officially classified by an OIE decision as “BSE free” or “BSE provisionally free.” For the moment, the OIE does not give an opinion on the further 3 categories existing in the code. So far, no country has been given such recognition by the OIE.” (OIEf)

In the Code, the BSE levels are then linked to OIE judgments as to the degree of trade restrictions that may be imposed by a country that would be consistent with protecting animal and public health (OIEa), while meeting WTO requirements that regulations not be more trade restrictive than necessary and that measures applied to imports must be the same as those applied domestically. Under the Code, there are several classes of commodities, including milk and milk products, protein-free tallow, and hides and skins, which should be authorized for importation regardless of the BSE status of the exporting country or zone. The provisions for cattle, and fresh beef (bone-in and deboned) and meat products from cattle, are very detailed. The essential point, however, is that the provisions do not in any case suggest flat prohibition of imports. Instead, for example, “fresh meat may be imported safely from a country of any BSE status but with increasing restrictions so

that, for countries presenting a high BSE risk, more severe measures are applied to the cattle and to the meat itself. The experts consider that, if these measures are followed, the meat is safe.” (OIEf)

How Countries Actually Apply (or More Accurately Don’t Apply) the OIE Guidance

Importing countries make the judgment on an exporting country or zone’s BSE status. In practice, this designation is relatively straightforward, although much controversy may exist regarding the adequacy of surveillance and monitoring programs to detect BSE. But it is clear, for example, that when a case is confirmed, a country loses its BSE free or BSE provisionally free status and likely enters the minimal BSE risk level unless additional information indicates a higher incidence of BSE in its cattle herd.

The huge trade impacts from confirming a BSE case come not from the loss of BSE free status per se, but from the import restrictions that have been routinely imposed upon the loss of such status. These restrictions are total bans on cattle and beef imports, rather than the graduated restrictions recommended by OIE. The OIE is, in fact, at pains to point out that, except for short suspensions of trade during investigation following the confirmation of a case, “It is apparent that some Member Countries are applying trade bans when an exporting country reports the presence of BSE, without consulting the recommendations in the Code or conducting a risk analysis in accordance with its OIE and WTO obligations.” (OIEf) The OIE points out that this not only results in trade disruptions that are unnecessary to protect human and animal health, but also presents a perverse incentive by penalizing countries that implement well-structured and transparent surveillance systems. As a side effect, since the ban is not based on a risk analysis in the first place, it will be unclear what steps would be necessary to allow resumption of imports.

The Current Benefit-Cost Calculus for BSE Risk Management Decisions

In 2003, it was the turn of Canada and the US to experience the imposition of border closings by their trading partners, including each other and Mexico. In trade in cattle and beef products, the old recommendation to do unto others as you would have them do unto you, which is the underlying premise of international standards such as those of the OIE, seems to have completely broken down. Many countries have experienced very major disruptions in their industries from a single

case or a small number of cases when indications are that, given current regulatory programs such as feed regulations, the likelihood of more than a very small incidence of BSE is very low and the predicted human health hazard, again with regulatory controls in place, is judged to be negligible. These countries, including Canada and the US, are usually not in a strong position to argue that the importing countries are overreacting because they imposed the same restrictions against other countries upon the appearance of BSE.

Countries' choice of import bans suggests that they are either taking into account a much broader range of potential benefits and costs of restrictions than the OIE approach considers, have misguided views of the benefits and costs of restrictions, are piggy-backing protectionist policies on animal and public health regulations, or some combination of these factors. The imposition of bans when a case is confirmed raises the stakes for losing BSE free status, and makes them particularly high for a country with a significant export sector. If keeping a no or low risk status is important, then it will also likely be a disincentive for countries to integrate their management programs for the risk because they fear a resultant loss of control over the outcomes and the costs of achieving them.

THE IMPACT OF BSE CASES IN THE NAFTA INTEGRATED MARKET

Factors that Influence the Impact of Risk Events

There is no doubt that integration of the NAFTA beef industries has allowed countries to take advantage of their inherent capabilities and competencies resulting in both producer and consumer benefits. However, integration implies interdependence, and interdependence affects risk, as well as efficiency. In highly integrated systems, problems in one country can have significant impacts on both the production systems and markets of the others. In the case of food safety, plant health, and animal health risks, the nature and severity of a challenge depends on the following factors.

1. The nature of the event.
2. The country where the event occurs and the degree of integration of that country's production system and markets with those of the other nations.

We examine both of these in the context of BSE in the NAFTA beef industries.

The Nature of the Event

The risk and impact of food safety, plant health, or animal health events are highly dependent on the nature of the underlying hazard and the distribution of products involved. The movement of animals between countries can increase risk in two ways, by increasing the probability of an event occurring, and by increasing the scale of the event through wider distribution. We may classify challenges to food systems into two broad categories, private events where impacts are primarily limited to an individual supply chain (e.g., a set of companies that are related in production, processing, and distribution) and its customers, and public events, where the impacts extend beyond a single supply chain and can affect an entire national industry.

Private Events Limited to Single Food Supply Chains The impact of hazards like *E. coli* or *Salmonella*, although dangerous to the public, may be limited to the food chains directly handling and distributing the affected products (e.g., a hamburger grinding facility and the fast food company that buys from it). If those chains involve NAFTA partners, then there may be trade impacts, but those will still be primarily limited to firms in the distribution chain.

Immediate government responses to private events tend to be in the nature of censure (prosecution), recalls, fines, and increased monitoring of the firm(s) responsible for allowing the hazard into the chain. The policy response is frequently the introduction or further enforcement of regulations governing food safety, including those that affect the incentives for firms to adopt food safety systems, such as Hazard Analysis Critical Control Points (HACCP), to improve food safety in their products. Consumer response to such outbreaks tends to be focused on the products and firms involved, through reduced consumption and legal action in the form of individual or class action lawsuits. If the event is particularly serious there may be spillover effects on demand in other chains but these tend to be relatively short-lived.

Public Events That Impact Regional/National Industries Due to government import decisions, the impacts of events such as BSE or Foot and Mouth Disease extend far beyond the chain where they are discovered. Although the public health risk may actually be smaller than with other hazards, government reactions have been immediate and industry-wide. Borders in foreign markets close immediately. In such public events it is common for government and industry to work together to control the hazard and reopen export markets. Government response includes identifying the extent of the event, informing trading partners of the nature of the problem, and assisting industry in controlling the hazard and dealing with the economic impacts of the

event. Policy reactions include further risk assessment, supporting or requiring changes in the production/processing system, improving detection/identification systems, supporting research aimed at reducing the risk, and assisting the industry in recovering from the negative financial and reputational effects. Policy decisions for trading partners concern conditions that result in closing the border, what products will be affected, and when to reopen the border to all or selected products. They also deal with ensuring that negative impacts of the event on their own industry and markets are mitigated.

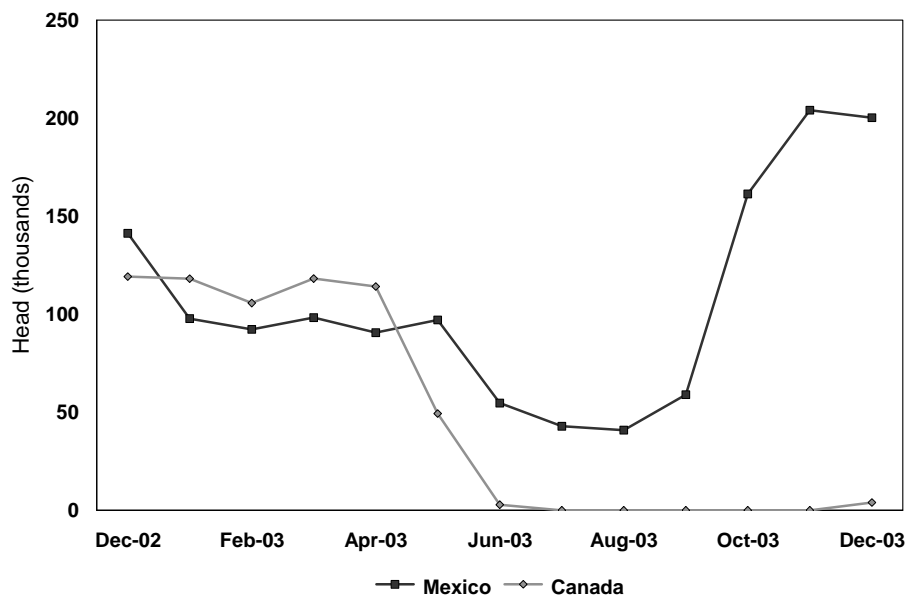
For both private and public food safety events, consumer perceptions are key determinants of the ultimate impact. In the case of the BSE events in Canada and the US in 2003, domestic consumer confidence in the safety of beef held firm and demand for beef remained strong. This was due, in part, to the relatively isolated nature of the occurrences.

Trade Patterns of the Country Where the Event Occurs

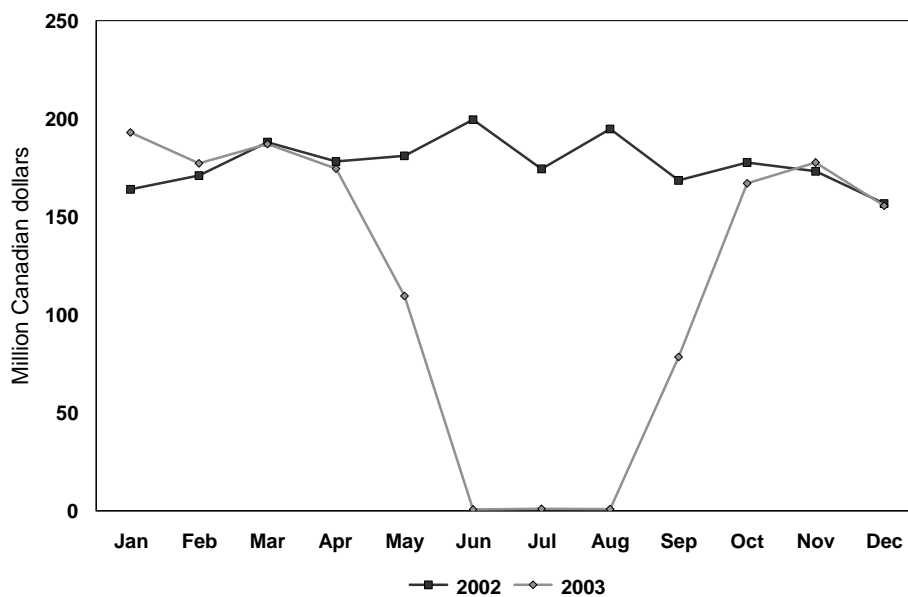
Although the trade effects of a BSE event are immediate and substantial for the country involved, the ultimate economic impact is highly dependent on its trade dependency, its cattle and beef trade patterns, and, most importantly, the export intensity of the national beef industry. This difference in economic impacts is dramatically illustrated in the case of the discoveries of BSE in Canada and the US. The Canadian beef industry is highly focused on exports, particularly to the US.

Canada's single BSE event, discovered on 20 May 2003, and the border closings that followed, including with the US and Mexico, effectively curtailed exports of live cattle to the US starting in June 2003 as shown in Figure 7.3. As well as the decline in Canadian shipments to the US, there also appeared to be an initial negative spillover effect on cattle trade with Mexico (Figure 7.3). It appears as though US buyers simply cut imports until they had time to fully assess the risks associated with any imported cattle. The effect for Mexico was relatively short-lived since the US beef production system is highly dependent on imports of cattle. By autumn 2003, Mexican cattle had replaced most of the Canadian cattle exports to the US.

Canadian beef exports to the US also completely collapsed after the BSE case confirmation in May 2003 (Figure 7.4). The Canadian domestic consumer market was too small to absorb the 47 percent of Canadian beef produced for export and prices plummeted at the farm gate. Retail prices decreased, but not to the same extent (Figure 7.5). Imports into Canada rose marginally in June before falling as domestic prices plummeted, knocking out foreign competition (Figure 7.6). For the remainder of 2003 imports into Canada remained at 50 percent of their

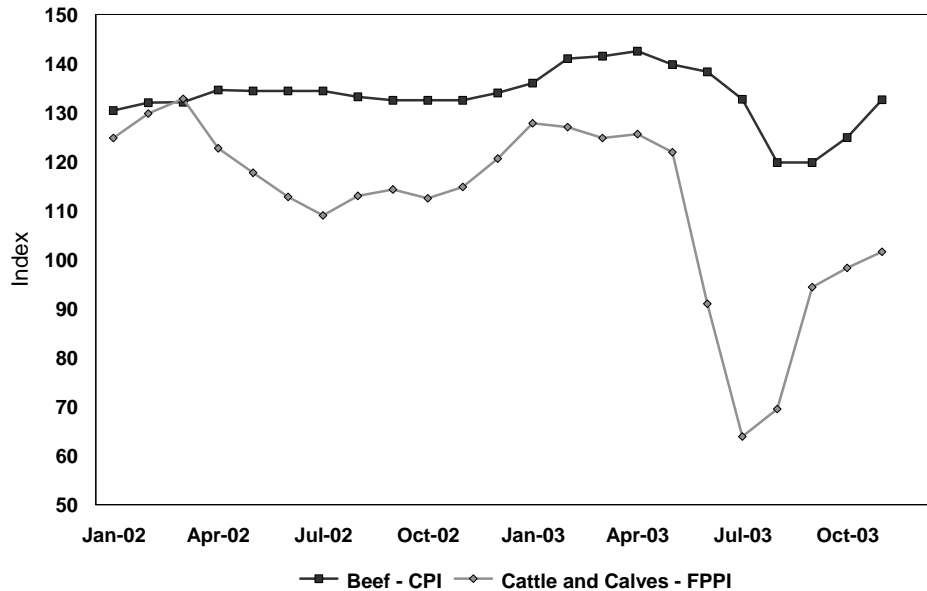
Figure 7.3: Live cattle imports into the US from Canada and Mexico, 2003.

Source: USDAe.

Figure 7.4: Canadian beef exports, 2002-2003.

Source: Boame et al.

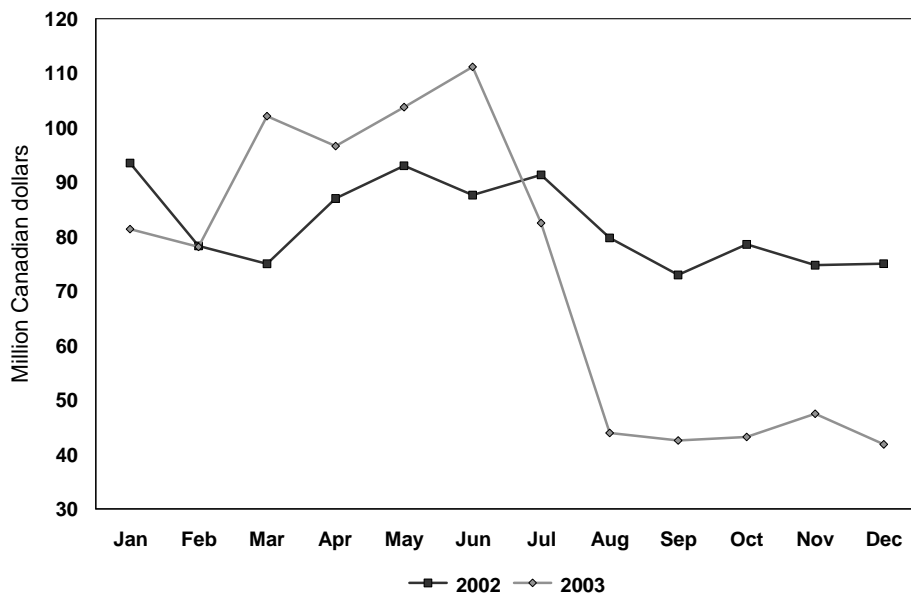
Figure 7.5: Canadian farm price index of cattle compared to retail price, 2002-2003.



Note: Beef CPI numbers are estimates.

Source: Agriculture Division, Statistics Canada

Figure 7.6: Canadian beef imports, 2002-2003.



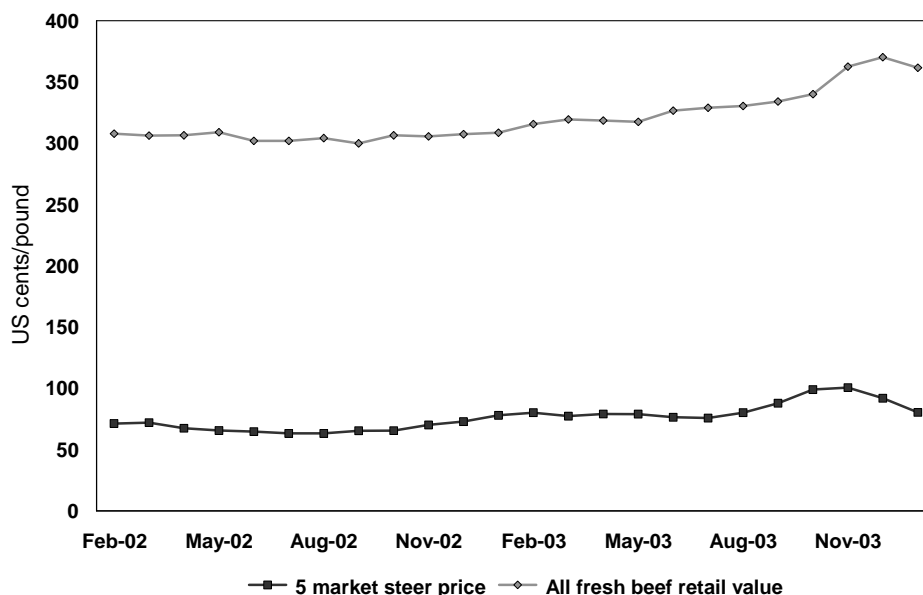
Source: International Trade Division, Statistics Canada.

usual level. As discussed further below, Canadian beef exports began to recover in September 2003 when the US partially reopened its border by beginning to issue permits for the importation of boneless beef from cattle under 30 months of age as well as boneless sheep or goat meat from animals under 12 months of age, boneless veal from calves 36 weeks of age or younger at slaughter, and fresh or frozen bovine liver (Acord, Feldman, and Binkley). By mid-November the weekly sales volume had fully recovered (Binkley 2003b), although exports of cattle have yet to resume. On April 23, 2004 Canada reciprocated, allowing the importation of US beef produced from cattle less than 30 months of age.

In the US, prices for both beef and cattle rose throughout 2003 as the industry struggled to cope with increasing demand and a reduced supply from traditional suppliers in Canada (Figure 7.7). As a net importer, the US was able to redirect its traditional exports into serving the domestic market. The fact that the US event occurred in December 2003, when the Canadian border was not fully reopened, meant that the market remained under-supplied compared to traditional levels putting upward pressure on prices for live cattle and retail beef.

The disruptions created by the Canadian event were compounded when BSE was confirmed in the US on 23 December 2003, effectively closing export markets for cattle and beef products. The cessation of beef exports

Figure 7.7: US cattle and beef prices, 2002-2003.



Source: Hahn.

from the US to Mexico provided an opportunity for Mexican producers to capture more of the higher end market. In 2004, imports to Mexico are forecast to fall to 20 percent of previously forecast levels. It is anticipated that Mexican cattle producers will hold back 80 percent of the approximately 1.25 million cattle previously forecasted to be exported to the US in the absence of BSE (Trejo).

By the beginning of 2004, cattle stocks in Mexico and the US had dropped 4.8 percent and 1.2 percent, respectively, to historically low levels. US beginning beef inventories were down 24.2 percent from a year earlier. Tight supplies in both the US and Mexico had dramatic impacts on the prices of both cattle and beef. In March 2004, US retail beef prices were at record levels, up 11.6 percent from a year earlier (Hahn). Although Mexican prices are more difficult to obtain, Trejo estimates that retail prices have increased 15 percent since the ban on imports from the US.

Initial Steps toward Reopening Borders and Refining BSE Status

Regaining BSE free status is an ultimate objective for both Canada and the US but this will likely take several years according to OIE guidelines. In the meantime, the countries are eager to resume their previous levels of exports under some sort of low risk status based on demonstrating that adequate risk assessment and management measures are in place to assure that exports pose very low risks to animal or public health. This demonstration is also important to assure domestic consumers. A factor in favor of Canada and the US being able to show minimal risk, barring confirmation of many additional cases, is that investigations concluded that the two cows that were confirmed with BSE both were born in Canada in 1997 before current bans on feeding ruminant protein to cattle were in place.

There are essentially two routes to accomplish border reopenings. The first is to demonstrate compliance with the OIE Code and encourage other countries to conform to the Code. This would involve demonstrating that the country meets the criteria to be classified as minimal BSE risk and encouraging importing countries to follow the trade restriction guidelines, which are not very restrictive, for a country with minimal BSE risk. This would also involve countries practicing what they preach, that is applying the same standards to others who want to import into their countries. The approach would be to say, "Look, we all fell off the bandwagon in terms of ignoring OIE standards and imposing overly strict trade sanctions in the case of BSE. Let's all climb back on the bandwagon."

The second option is to negotiate border reopenings on an ad hoc basis. This is the route being taken at least in the short term, as governments are reluctant to lift trade restrictions pending demonstration of compliance with OIE and their own criteria. For example, the US is very anxious to resume exports to lucrative markets in Japan and South Korea. After its own BSE outbreak, Japan instituted requirements that every cow be tested for BSE at slaughter and is to date indicating that it will reopen its border to US beef when the same requirement is instituted for exports to Japan. The US argues that this level of testing is not warranted by the likelihood of risk, particularly for young animals used for beef products. It is unclear how this type of standoff can be resolved but discussions continue (USDA).

In the meantime, the NAFTA countries have taken steps to reopen borders on an ad hoc basis. Because of the integrated cattle and beef markets, an important consideration in such reopenings is their effect on trade with non-NAFTA countries. The reopenings themselves constitute an integration of risk management systems. In any case, Canada needs full trade with the US to relieve the over-supply in the Canadian market. The resumption of a normal flow of exports from Canada into the US and from the US into Mexico should relieve the price pressure caused by the shortages in the US and Mexican markets.

In August and September 2003, the US took the first step toward reopening the border with Canada by awarding a special low risk BSE classification to Canada. Since then, the US began allowing importation of boneless Canadian beef products and other products from cattle less than 30 months of age based on a permit system. Mexico took similar action toward Canada (Binkley 2003a). These actions are consistent with OIE guidelines for a country with minimal risk. This has resulted in only moderate price relief. The USDA estimates that reopening the border to Canadian feeder cattle would result in a return to more normal pricing levels, a shift of roughly US\$631 million from producer surplus to consumer surplus, and a net gain of US\$12.6 million (USDAa). Reopening the border to all beef imports would result in a shift of US\$1.3 to US\$1.5 billion and a net gain of US\$91 to US\$101 million depending on pricing assumptions.

Mexico partially lifted its ban on US beef imports in March 2004 after closing its border immediately after the confirmation of the US BSE case in December 2003 (Lewis). The Mexican trade was resumed with strict controls, for example requiring the use of certain border posts and Mexican importers. On 23 April 2004 Canada reopened its border to US beef under the same rules used by the US to reopen its border to Canada.

A wild card in the current NAFTA situation would be the impact on trade if Mexico were to confirm a BSE case. Insufficient time has probably elapsed for its NAFTA trading partners to have learned from their own BSE experiences. It is likely that immediate border closings would ensue and the under-supply situation in the US market would be exacerbated.

LIVING WITH BSE POSITIVE STATUS: REGULATORY RESPONSES

What Role Should Governments Play in Food Markets?

Risk management programs for BSE are complex because actions to manage the animal and public health risks associated with BSE must be implemented in feed production, cattle ranching, feedlots, slaughter, processing, and rendering. Managing BSE risk also involves additional risks, including financial risk to supply chain participants, loss of competitiveness in domestic and international markets, and loss of consumer confidence. Governments balance different objectives when dealing with any food industry. The roles that they play during the normal operation of an industry may differ from those they play when a shock like BSE hits. Both roles are complicated when the industry is heavily integrated across national borders.

Government objectives toward an industry like the beef industry include:

1. Protecting the public health. Actions include enacting regulations and standards related to the safety of the products (e.g., regulations on production, distribution, trade, and labeling), enforcing regulations and standards, and censuring or prosecuting firms that do not meet standards.
2. Helping to ensure the viability of the industry. Actions include protecting all members of the industry from the actions of a few under-performers by ensuring the safety of all products produced in the industry, establishing financial risk management strategies, particularly for cyclical industries, and facilitating and promoting trade (e.g., enforcement of existing trade rules, coordinating or harmonizing of regulatory standards, aiding local industries to connect to trading opportunities).
3. Responding in the case of a major challenge or shock, which will include aspects of both 1 and 2 above. Actions include changes in product flow (e.g., border closings or restrictions, herd disposal, quarantines), addressing the initial impact on the industry involved and developing mitigation strategies where possible, assisting industry members to survive the period of disruption, and taking actions to reopen borders.

Governments increasingly claim that their regulatory decisions are based on “sound science,” generally meaning based on risk assessment, and it is the case that regulations increasingly do have a basis in risk assessment. However, ultimate risk management decisions by governments rest on a complex processing of plant, animal or human health risks; financial risks to industries; and market risks. Sandman and Lanard capture this reality in their characterization of US BSE policy prior to a case being found in December 2003, “The US government was protecting public health from vCJD as much as it wanted – not as much as possible, but as much as it thought appropriate. And its judgment about how much protection was appropriate was influenced, sensibly enough, by the fact that so far the US hadn’t found any mad cows at all.”

Revamping Regulations in Crisis Mode

Countries around the world responded to the BSE epidemic in the UK, and the related public health risk, by putting in place numerous regulations to control the establishment and spread of BSE in their cattle herds. A central element in these regulations was restrictions on the feeding of ruminant proteins to ruminants. Another central element was setting up surveillance systems to detect the presence of BSE. Canada and the US instituted feed restrictions in 1997, with Canada’s restrictions being broader than those imposed in the US. The 2003 cases in North America exposed major weaknesses in animal tracing systems, as tracking the affected cows to their source, tracing offspring and cohorts, and tracking feed sources proved time consuming, laborious, and in the end not definitive.

In both countries, the immediate reaction to having a BSE case was the institution of new anti-BSE measures. These new regulations were particularly sweeping in the US, leading critics to argue that the prior regulations were clearly inadequate and giving the impression that the public health had not been adequately protected. Ironically, as Sandman and Lanard, among others, point out, in the US case the government did a better job of protecting the public health than it did of protecting beef sales. In other words, there is little argument that the policies in place reduced public health risk from BSE to a minimal level, but they did not go as far as possible to reduce the risk of finding a BSE case and triggering border closings. However, again ironically, the major opposition to stricter controls before the US case was confirmed came from the industry itself, which feared higher costs associated with new controls. The US industry remains extremely concerned about the costs of new risk management requirements (Acord and Feldman).

Regulatory decision-making always involves tensions between the level of public health protection to be achieved and other goals that may be being pursued such as minimizing the cost impact of regulations or risk of loss of markets in case of an adverse event. Part of the explanation for market disruptions as the result of adverse events, such as the confirming of a BSE case, can be found in inadequate risk management decision-making at the national level. A further issue that must be dealt with at the national level is the degree to which companies are allowed to pursue quality assurance programs beyond those instituted by the government and, if so, under what rules. For example, a meat processing company in the US wants to test every animal for BSE in order to sell its products into the Japanese market. To date, the US Department of Agriculture has refused to allow it to do so (Adamy).

Compensating Industry

One of the issues in an integrated agricultural market is compensation and subsidies in the event of a public event impacting a domestic industry. In the face of curtailed exports, the Canadian government took several actions to stabilize and support the domestic beef industry. On 4 June 2003 the government announced an end to supplementary beef imports where Canadian products could be supplied. On 12 June 2003, the government implemented a work share program to keep processing facilities open and workers employed and on 18 June 2003 announced a support program based on a sliding scale between the Canadian base price and the US weekly average market price (Statistics Canada). The Canadian government has recently devoted C\$995 million to compensating farmers and, to a much lesser extent, processors for their losses related to the trade disruptions caused by the Canadian BSE case.

Although proving that the extent of the loss exceeds the value of the compensation is relatively easy, the issue remains of whether such relief programs provide an unfair advantage to one member of the trading region. If governments invest heavily in systems designed to prevent or control BSE, can that investment also be seen as a subsidy that provides an unfair trade advantage, potentially allowing an industry to underinvest in safety related areas? In this particular instance, the differences in impact among the three NAFTA countries are obvious but the ultimate result of compensation is less clear. To date, BSE farm disaster relief has not become a subsidy issue at the WTO or within NAFTA. However, the potential for challenges exists. Due to curtailed trade with Canada and domestic conditions, compensation was not an issue in the US where the industry is experiencing tight supplies and high prices.

The Benefit-Cost Calculus for BSE Differs By Country

Risk management is a complicated business that has to take into account a broad range of factors that ultimately determine what a country chooses as the correct policy. With BSE, as with most regulatory decisions, there is uncertainty about the severity of the risks involved, the efficacy of steps that can be taken to mitigate them, and the costs of those steps. In other words, there is uncertainty about the benefits and costs of taking action. This uncertainty is particularly a problem with newer risks and what are believed to be low probability risks. In the BSE case, the twist is added that export restrictions have been based unnecessarily on a zero/one criterion of whether a country or zone has confirmed one BSE case.

Countries end up with different regulatory programs that reflect the nuances of their own benefit-cost calculation. An example of a factor that may be forecasted and evaluated differently across countries is consumer response to the presence of BSE. Based on what it thinks is necessary to sustain consumer confidence, Japan is currently testing every cow used for beef products. The US views this requirement as unreasonable given its own benefit/cost calculus. When countries' views differ, there are two avenues to take: negotiate a compromise or initiate a dispute at the WTO. For country groups moving toward integrating their economies, such as NAFTA, and for important trading partners in general, the latter avenue is not recommended. The dilemma, however, is that the former avenue of negotiation and cooperation usually does not go very far. This is the problem of integrated markets without integrated risk management.

Countries cannot coordinate policy closely, let alone seek equivalence or harmonization, unless they agree on which benefits and costs to count and how to weigh them, along with what risk assessment and regulatory mechanisms to use. Making risk management decisions is a core responsibility of governments. There are good reasons for them to want to keep the decision-making process under their own control in order to tailor programs to their own situations. The key in integrated markets is to find a way to make a commitment to integrated risk management that has mutual benefits. The EU may not be the clearest model for NAFTA because it involves the building of a regulatory structure under a centralized government. Food Standards Australia New Zealand may be where to look for a model for NAFTA, because it seeks to integrate standards across the two nations.

POLICY IMPLICATIONS OF BSE: INTEGRATED MARKETS – INTEGRATED RISK MANAGEMENT?

Management of BSE Risk

The NAFTA markets for cattle and beef products were becoming closely integrated prior to the confirmation of BSE cases in Canada and the US in 2003. The confirmation of these cases caused severe disruption and reversed the degree of integration, at least temporarily. The NAFTA governments are on the road to rebuilding the integrated market through ad hoc regulatory and import restriction decisions (e.g., the US granting Canada a special low risk status for some beef imports and vice versa). Is there a way to build a more secure integrated market based on integrated risk management so that day-to-day trade is smoother and crises do not result in major disruptions? What would be the payoffs and drawbacks of doing so?

Governments influence industry actions primarily through regulation, taxation, and funding. They influence industry success through, among other things, trade negotiations and actions. There are several areas related to protecting the public and industry in regard to preventing and controlling BSE that require policy decisions by NAFTA governments.

Regulations Regarding Feed Content, Feeding Practices, and Traceability As noted above, all three governments had put feed regulations in place to deal with the challenge of BSE. Generally speaking, these dealt primarily with the issue of feeding animal protein to ruminants. All three also took the step of discontinuing trade in beef and cattle with countries where BSE was present. The regulations were put in place too late in the Canadian BSE case and the case of the US dairy cow found to have BSE. Both were traced to Canada, with birth before the feed regulations were enacted.

Regulations must be adopted by industry and enforced if they are to be effective. In integrated markets, importers must have confidence that a system of safeguards is in place and effectively protecting them. The BSE cases in Canada and the US highlighted the fact that the level of traceability for animals and beef products in the system is inadequate.

Systems for Detecting and Controlling BSE Currently, testing for BSE is very likely insufficient to detect BSE at an acceptable level of sensitivity. Surveillance systems require testing regimes and technologies, monitoring of those systems, traceability systems, and strategies for responding to outbreaks.

Avoiding BSE outbreaks and minimizing their impact requires a rigorous, complete systems approach to industry quality and tracking. There are several components to a quality/traceability system in the NAFTA beef industries, including slaughter and processing standards. Because the beef production systems and markets are integrated, the quality systems and processes must be as well. A special challenge is assuring the comparability of enforcement activity and industry compliance. Governments have indicated a willingness to invest in new technologies and systems to assist industry in improving its detection and tracking capabilities.

BSE Management in the Face of NAFTA Market Integration

Managing systems that are integrated across several jurisdictions poses real challenges for governments, particularly in addressing the integration or interaction of quality and food safety systems across international borders. Although this integration is rudimentary within NAFTA at this point,³ the governments are moving toward a greater understanding and awareness of each other's regulatory, industrial, animal health, and food safety environments. For example, in fall 2003, the USDA Animal and Plant Health Inspection Service did a complete review of "Canada's veterinary infrastructure, disease history, practices for preventing widespread introduction, exposure, and/or establishment of BSE, and measures taken following detection of the disease" (USDAA, p. 3). This requires coordination of multiple regulatory programs. Although industry can adapt to different standards in different markets, having to deal with different standards has a cost.

BSE challenged NAFTA governments in terms of managing consumer response to negative events. To date, North American governments have not had to deal with a domestic consumer backlash. In Canada's case, a single cow was identified as having BSE and that animal had already been removed from the food system. When the discovery was made, public confidence in the safety of Canadian beef was tested, but the general perceptions around the safety of the Canadian food system were not significantly altered. In the US, a dairy cow with BSE found in December 2003 did not appear to affect public confidence. Demand for beef in the US actually appeared to strengthen, probably due to dietary trends. However, government actions toward trading partners have the potential to alter public perceptions of risk and coordinating both the actions and communications related to those actions can have an impact on consumer attitudes.

³ The NAFTA countries have a standing North American Animal Health Committee that includes the chief veterinary officers of the three countries. The group has developed and is working to implement a North American BSE strategy.

A key area where the integrated NAFTA market complicates the response to BSE is in trade with non-NAFTA countries. For example, if an importing country authorizes beef imports from Canada but not the US, Canada must be able to show that US product is not present in Canadian exports. This is an additional respect in which the integrated market puts a premium on an integrated risk management system. If the NAFTA countries had harmonized systems, approval of one for export would imply approval of all and no need for monitoring of cross shipping between countries.

What Would a NAFTA BSE Management Program Look Like?

To be fully effective, a higher level of market integration requires increasing levels of regulatory integration – moving from looser coordination or equivalence agreements toward harmonization. From a BSE risk management perspective, a preferred system would be harmonized and borderless with the same standards and risk management strategies used throughout the NAFTA beef production and marketing system. There are three overall components to implementing a common NAFTA BSE management program:

1. Establishing regulations or standards.
2. Applying those standards in the operation of the industry.
3. Monitoring the application of the regulations or standards throughout the industry.

While defining the exact scientific and system details is beyond the scope of this chapter, in Table 7.3 we examine the requirements for a harmonized BSE risk management strategy, the status of the NAFTA beef industries in meeting each requirement, and the likelihood of achieving NAFTA consensus and implementation in the near term.

The list in Table 7.3 is quite daunting and does not begin to reflect the complexity of the underlying risk management policies and regulations. The main drawbacks or roadblocks to harmonization are this complexity, the effort needed to harmonize policy, and the potential loss of the ability to tailor programs to domestic circumstances. However, since each country must have a regulatory structure in place to accomplish BSE management, there may be benefits in terms of efficiencies in joint development of a BSE management plan. The major benefit of harmonized policy would be to have an integrated regulatory system that supports market integration and provides increased assurance against market disruption.

Table 7.3: Requirements for an integrated NAFTA BSE management program.

Requirement	State of the Industry and Regulations	Likelihood of NAFTA Agreement
Harmonization of feed regulations concerning the use of animal protein in cattle and dairy feed.	Regulations are in place and fairly consistent across NAFTA. However, testing and monitoring regimes vary.	High for standards. Moderate for monitoring and testing.
Standards for production, shipping, and slaughter.	US has moved to a common process-based system for meat products by requiring HACCP for firms shipping processed meat into the US. However, this is only for one range of products and one level of the beef supply chain.	Reasonable for HACCP but much lower at other levels of the chain, in part due to national differences in production systems.
Common requirements for tracking animals through the system. Requires common data standards and formats, and the integration of systems for exchanging information and trace-back in the event of a problem.	Systems are rudimentary in most cases. Resistance to mandatory implementation is high, particularly in the US. Capabilities among small farming operations in all three countries are low.	While traceability systems will continue to be implemented, particularly in Canada, complete NAFTA implementation and integration is unlikely in the near term.
A common testing regime where participants in each country use: <ul style="list-style-type: none"> a. Technologies approved by all parties. b. Common standards for testing frequency. c. Common standards for storage and reporting (format, timing, and distribution of the reports). Terms of storage would also be required. d. Common approaches to exception testing. 	Testing regimes are broadly based on OIE standards but vary in terms of testing frequency. Standards for tracking and reporting are not common across NAFTA. In Canada, tracking is mandated for individual animals. In the US, roughly 30% of animals have individual tracking capabilities. Tracking rate is lower in Mexico.	Agreement on testing regimes and technologies is possible. Coordinating testing programs, tracking capabilities, and data standards is less likely.
Jointly planned response to outbreaks anywhere in the system.	Recent outbreaks have revealed deficiencies in planning. Some are being addressed under BSE and bio-terrorism programs.	Although there are discussions, nations are working on internal plans first.
Agreement on subsidy levels <ul style="list-style-type: none"> a. For investments in traceability and testing systems. b. For industry participants in the event of an outbreak. 	Subsidies for systems are not yet addressed. Canada has compensation program for BSE disruptions.	Agreement unlikely.
A common approach to monitoring the execution of the regulations regarding inputs, processing, testing, and tracing.	Common thought on the principles of HACCP as a process-based support for ensuring safety and monitoring. No consensus on specifics for BSE.	There will likely be an equivalence situation.

CONCLUSIONS

There are usually two likely culprits when agricultural and food markets are disrupted because of plant health, animal health, or food safety risks: inadequate risk management within a country or lack of harmonized

risk management approaches between countries. Both are present in the case of BSE in NAFTA. First, risk management programs in Canada and the US were inadequate to prevent the confirmation of cases causing both to lose their presumptive BSE free status. An alternative perspective is that the countries failed to structure a risk management program under which the confirmation of a case could be convincingly presented as being within the bounds indicating very low risk. To date, Mexico has avoided the BSE positive fate of Canada and the US.

Second, the NAFTA market has suffered from poor harmonization of policy on several fronts. Part of this suffering has been common across the world and results from the practice of countries in regard to BSE of imposing border closings rather than following the import restriction guidance of OIE, the relevant international standards body. This is a generalized problem and one that the NAFTA countries cannot solve for the world. It requires a return to discipline on the part of all OIE members.

However, the overwhelming bulk of the trade affected by the NAFTA BSE cases was internal to NAFTA. This reflects the importance of the trading partners to each other and the increasing integration of North American agricultural and food markets, as well as the fact that the effect of the closing of non-NAFTA markets was somewhat muted in the US due to a tight supply situation. Regardless of whether the world decides to abide by OIE guidance, the NAFTA countries could have done so, developed more closely coordinated risk management programs around OIE guidance, and thereby avoided a large share of the trade disruption. This would have further strengthened the NAFTA market even in the face of the BSE crisis. There was adequate time to develop such an approach, because the BSE risk, as well as the consequences of a case confirmation, has been known for many years. Rather than having a response in place, the NAFTA countries relied on never finding a BSE case.

This BSE case study suggests several lessons relating to the role of regulation in an integrated market:

- NAFTA countries are pursuing high levels of market integration through the elimination of tariff barriers but have a relatively primitive level of coordination in regard to nontariff barriers, such as regulations dealing with plant health, animal health, and food safety.
- As a result, the economic integration of markets can outrun regulatory integration, leaving industries extremely vulnerable to disruption within NAFTA based on regulatory decision-making, e.g.,

the closing of the US border to Canadian cattle and beef upon confirmation of a BSE case.

- In addition, market integration within NAFTA poses problems for exports to non-NAFTA countries when plant health, animal health, and food safety issues arise, e.g., assuring importers that products are sourced only from those NAFTA countries that meet their standards.
- There are legitimate reasons why countries may be reluctant to harmonize regulatory policy. But they must recognize the downside of not doing so in the context of an economically integrated market.
- NAFTA currently has no mechanism to move toward regulatory integration except on a very fragmented, ad hoc basis. This will prove to be a continuing drag on market integration.
- Serviceable mechanisms exist (e.g., mutual adherence to OIE standards) for closer coordination of regulatory policy. However, the complexity of the required regulatory systems will in many cases seriously limit the success of coordination or equivalence strategies. The NAFTA countries will have to decide to what extent to take the next step toward policy harmonization.
- Harmonization itself depends on further development of risk management policy capabilities in each country.
- Failure to address regulatory integration will leave the market vulnerable to recurring market disruptions.

How far can NAFTA get toward market integration without fuller regulatory integration? The answer may be pretty far when it comes to the management of well understood risks but not so far when it comes to newer and fast changing situations such as BSE. Market integration will require more effort toward regulatory integration or the disruptions caused by new events may eventually reverse the integration trend and its associated economic benefits.

REFERENCES

- Acord, D. and B. Feldman. "Meat Industry Says USDA 'Grossly Underestimates' Cost of New BSE Rules." *Food Chemical News* 12 (April 2004):13 - 14.
- Acord, D., B. Feldman, and A. Binkley. "USDA Begins Issuing Permits for Canadian Beef Imports." *Food Chemical News* 1 (September 2003):32 - 33.
- Adamy, J. "US Rejects Meatpacker's Bid to Conduct Mad-Cow Testing." *Wall Street Journal*, 12 April 2004, p. B6.
- Binkley, A. "US, Mexico Ease Beef Bans; Canadian Producers Face Massive Backlog." *Food Chemical News*, 18 August 2003a, p. 8.
- . "Canadian Beef Sales to the United States, Mexico Rebound." *Food Chemical News*, 17 November 2003b, p. 14.
- Boame, A., W. Parsons and M. Trant. "Mad Cow Disease and Beef Trade: An Update." <<http://www.statcan.ca/english/research/11-621-MIE/2004010/issue.htm>>. (9 March 2004).

- Buzby, J.C., ed. *International Trade and Food Safety: Economic Theory and Case Studies*. Washington, DC: ERS Agricultural Economic Report No. AER828, 2003.
- Canadian Food Inspection Agency. "Transmissible Spongiform Encephalopathies (TSEs): Questions and Answers." 14 November 2003. <<http://www.inspection.gc.ca/english/anima/heasan/disemala/spong/encephe.shtml>>. (13 April 2004).
- Hahn, W. "Choice Beef Values and Spreads and the All-Fresh Retail Value." *US Beef and Cattle Prices*. Economic Research Service. 2004. <<http://www.ers.usda.gov/BRIEFING/FOODPRICESPREADS/MEATPRICESPREADS/BEEF.HTM>>. (19 March 2004).
- Harris, J.M., P. Kaufman, S. Martinez, and C. Price. *The US Food Marketing System, 2002*. ERS Agricultural Economic Report No. AER811, August 2002.
- Harvey, D.R. "European Perspective on Market Integration." Paper presented at the First Annual North American Agrifood Market Integration Workshop, Cancun, Mexico, May 2004.
- Leuck, D. "The New Agricultural Trade Negotiations: Background and Issues for the US Beef Sector." *Electronic Outlook Report*. Economic Research Service. December 2001. <<http://www.ers.usda.gov/publications/ldp/dec01/>>. (8 March 2004).
- Lewis, S. "Mexico Imposes Strict Controls on US Beef Imports." *Food Chemical News*. 22 (March 2004):9 - 10.
- OIEa. World Organization for Animal Health. "Chapter 2.3.13 Bovine Spongiform Encephalopathy." *Terrestrial Animal Health Code 2003*. 26 August 2003. <http://www.oie.int/eng/normes/mcode/a_00068.htm>. (13 April 2004).
- _____. b. "Geographical Distribution of Countries that Reported at Least One BSE Confirmed Case from 1989 to 9 January 2004." <http://www.oie.int/Cartes/BSE/a_Monde_BSE.htm>. (13 April 2004).
- _____. c. "Number of Cases of Bovine Spongiform Encephalopathy (BSE) Reported in the United Kingdom." <http://www.oie.int/eng/info/en_esbru.htm>. (13 April 2004).
- _____. d. "Number of Reported Cases of *Bovine Spongiform Encephalopathy (BSE) Worldwide (Excluding the United Kingdom)*." <http://www.oie.int/eng/info/en_esbmonde.htm>. (13 April 2004).
- _____. e. "OIE Addresses Demands on Clarification of BSE Standards." 2 October 2003. <http://www.oie.int/eng/press/en_031002.htm>. (13 April 2004).
- _____. f. "The OIE Standards on BSE: A Guide for Understanding and Proper Implementation." 9 January 2004. <http://www.oie.int/eng/press/en_040109.htm>. (13 April 2004).
- Poulin, D. and A. Boame. "Mad Cow Disease and Beef Trade." Statistics Canada. 6 November 2003. <<http://www.statcan.ca/english/research/11-621-MIE/11-621-MIE2003005.htm>>. (8 March 2004).
- Roberts, D., L. Unnevehr, J.A. Caswell, I. Sheldon, J. Wilson, T. Otsuki, and D. Orden. "The Role of Product Attributes in the Agricultural Negotiations." Commissioned Paper #19 presented at the IATRC conference on Agriculture in the WTO, Washington, DC, May 2001.
- Robertson, R. "Defining North American Economic Integration." Paper presented at the First Annual North American Agrifood Market Integration Workshop, Cancun, Mexico, May 2004.

- Sandman, P.M. and J. Lanard. "Misleading Toward the Truth: The US Department of Agriculture Mishandles Mad Cow Risk Communication." The Peter Sandman Risk Communication Website. 18 March 2004. <<http://www.psandman.com/col/madcow.htm>>. (8 April 2004).
- Standing Committee on Agriculture. "Chapter 2 Industry Structure, Performance and Competition" *Report on BSE and its Impact on the Canadian Beef Industry*. 2004. <http://www.parl.gc.ca/InfocomDoc/Documents/37/3/parlbus/commbus/house/reports/agrirp02/11-ch2-e.htm#TOCLink_11_2>. (21 May 2004).
- Statistics Canada, Agriculture Division. "Cattle Statistics." *Catalogue no. 23-012-XIE*. February 2004. <<http://www.statcan.ca/english/freepub/23-012-XIE/23-012-XIE2003002.pdf>>. (29 March 2004).
- Trejo, S. *GAIN Report: Mexico Livestock and Products Semi Annual 2004*. Washington, DC: USDA Foreign Agricultural Services GAIN Report Number MX4014, 2004.
- USDAA. "Economic Analysis Proposed Rule Bovine Spongiform Encephalopathy: Minimal Risk Regions and Importation of Commodities." *APHIS Docket No. 03-080-1*. Animal and Plant Health Inspection Service, 24 October 2003. <http://www.aphis.usda.gov/lpa/issues/bse/bsecan_econ_anal.doc>. (8 March 2004).
- ___b. Economic Research Service. "Newsroom: Background Statistics on US Beef and Cattle." 2004. <<http://www.ers.usda.gov/News/BSECoverage.htm>>. (15 April 2004).
- ___c. Foreign Agricultural Service. *Production, Supply & Distribution Online*. <<http://www.fas.usda.gov/psd/>> 11 February 2004.
- ___d. "The Third Japan-US Consultation on the BSE Issue." News Release No. 0165.04, 24 April 2004. <<http://www.usda.gov/Newsroom/0165.04.html>>. (25 April 2004).
- ___e. Economic Research Service. "U.S. Meat and Livestock Trade, 2002 and 2003." <<http://www.ers.usda.gov/BRIEFING/CATTLE/DATA/MONTHLYLIVESTOCKTABLE.XLS>>. (9 March 2004).