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Severing the Link between Farm Program Payments and Farm Production: Motivation, International Efforts, and Lessons

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Decoupling Farm Payments: Experience in the United States, Canada and Europe

Historically, farm program provisions distorted agricultural production and resource use, in turn affecting agricultural prices, trading partner relationships, levels of government support, and environmental quality. Recognizing this, the United States moved to "decouple" program payments from production in 1996, but it subsequently stepped back from this position in 2002 when it reestablished program yields and base acreages in certain payment formulas.

Although the EU and Canada have less experience with decoupling mechanisms, they are pursuing different and potentially useful options. In this paper, we review experience with decoupling in the United States, Canada and Europe, attempting to glean something about options for future farm policies.

Why Might We Want to Decouple?

Price-support payments often provide incentives for farmers to increase production, which typically involves expanded use of chemicals and cropping on marginal lands. Decoupling government payments from production eliminates incentives to overproduce. Decoupling also addresses depressed regional and global prices that are the result of overproduction in the major grain-growing regions of the world. This can be important both domestically and internationally. Domestically, reducing production incentives tends to reduce supply, which raises commodity prices and lessens the need for farm income support. Internationally, decoupling enhances compliance with World Trade Organization (WTO) rules that encourage countries either to decouple—to sever the link between income support for farmers and production—or to reduce the level of support payments, with sanctions recommended against those countries that fail to achieve progress in this regard. Finally, decoupling initiatives address the domestic environmental damage that results when price-support programs encourage greater use of pesticides and fertilizers (which are pollutants), while decreasing the damage from increased conversion of marginal lands (including wetlands and other natural areas) to cropland as well as effect other environmentally sensitive practices (tillage intensity, irrigation, etc.).

Background

Initiatives to liberalize trade in Europe and North America have included modifications of the formulas used in making payments to farmers. In 1996, the United States adjusted the yield and base acreage used in computing farmers' payments in ways that reduced their distorting effects on input use, trade, and the environment. A yield history and fixed-base acreage had already become a feature of Canadian and European Union (EU) agricultural support payments in 1991 and 1992, respectively. But when the EU undertook their decoupling initiative in 2003/04, some member states began to modify the base acreage used in their payment formula (Kelch & Normile, 2004), in a manner reminiscent of the United States' backtracking on decoupling in 2002.

The similarities in approach make it relatively easy to describe US, Canadian and EU decoupling options and

compare their effectiveness, although subtle differences can greatly influence their effectiveness. The stakes are high because payments that encourage farmers to produce more will undermine world prices, pressure the domestic environment, and increase the cost of everyone's farm programs.

Recent Decoupling Initiatives in the United States, Canada, and the EU

We begin with the US experience, because the United States was first to attempt complete decoupling of the links between payments and farm production processes. Further, we find that Canada and the EU pursue options similar to those in the United States, so they face similar challenges.

Decoupling in the United States. The United States attempted to decouple payment programs in 1996 by (a) freezing the yield history used in computing farmer payments (rather than basing payments on recent cropping history), (b) allowing planting flexibility (rather than requiring farmers who choose to participate to plant within their prior base acreage for all crops), and (c) permitting farmers to cease farming while still receiving payments.

Although the first option was implemented for nearly two decades prior to 1996 without major controversy, severing the link between farming and payments (the third option) proved difficult to accomplish politically, because it went against most people's sense of fairness—producers should be paid for producing something, not for sitting idly by. As a consequence, the idea of decoupling was looked upon by some with skepticism. In 2002, the United States allowed farmers to reestablish the payment yields and/or base acreage used in certain payment formulas.

Decoupling in Canada. Canada's agricultural programs, at least in the West, are partly driven by the Canadian Wheat Board (CWB) marketing regime that bases quotas for eligible grains on farmed area and thus encourages farmers to cultivate as much land as possible (Schmitz & Furtan, 2000). In addition, the "Crow" transportation subsidy and feed freight assistance raised farm gate prices, leading farmers to expand cropland and farm more intensively. It was not until 2000 that the effects of the Crow subsidy and feed freight assistance were eliminated. Meanwhile, there has been a move to implement programs that enable farmers to remain eligible for CWB quota while converting some lands to a long-term conservation use (such as permanent pasture).

Canada replaced existing farm programs in 1991 with the Net Income Stabilization Account (NISA), which is based on a five-year average of recent net income, and the Gross Revenue Insurance Program (GRIP), which is based on a system of base acreage and yield history, much like the pre-1985 US approach. NISA is decoupled from the production decisions of farmers, because it is paid on a lump-sum basis, but GRIP bases payments on individual farmer's recent yields and base acreage, excluding pasture and forage crops, whereas other programs provide producers with fuel rebates and tax incentives. Such programs encourage greater input use and production to the detriment of the environment (van Kooten & Folmer, 2004; Schmitz & Furtan, 2000). Unlike the United States, Canada relies on subsidies rather than conservation compliance to counter adverse effects of agricultural programs and promote good environmental land uses.

Decoupling in Europe. The framework for price and support policy in the EU, known as common market organizations (CMOs), was developed over the period 1962–1969. The 1992/93 MacSharry reforms were the first attempt to decouple agricultural payments from production, although their primary purpose was to reduce the overall level of support. The reforms sought to lower EU prices toward the world price, compensate farmers for the lower prices via an income payment, and impose land set asides on larger crop producers. Agenda 2000 deepened the MacSharry reforms and emphasized the environment and provision of public goods.

The decoupling initiatives in these reform packages were not very effective, as they were only implemented on the largest farms (because small farmers could not handle the reporting requirements); many countries simply lacked the needed governance structures to implement the reforms (Brümmer & Koester, 2004). The June 2003 Luxembourg reform attempts to address problems by moving away from using a base acreage, relying instead on a payment based on *past payments* (Kelch & Normile, 2004). This avoids the temptation for nations to reestablish their acreage base, which shifts over time in any event.

Effectiveness of Decoupling Options

What can we say about the effectiveness of decoupling initiatives across regions and approaches? In comparing the effectiveness of decoupling options, we consider options for (a) determining yields in payment for-

mulas, (b) providing planting flexibility, and (c) allowing payments on land no longer farmed.

Freezing Payment Yields. Hertel, Tsigas, and Preckel (1990) projected that continuing to keep payment yields frozen under the 1990 U.S. farm legislation would reduce US variable input use (including chemical use) by 8%, while benefiting farm incomes, reducing commodity program outlays, and reducing distortions in world prices. A key challenge identified in the analysis (but not addressed in the legislation) was the need to update payment yields, because farmers want payments to increase with actual yields, which tend to increase over time (although differentially across the country). They anticipated that if the Food, Agriculture, Conservation, and Trade Act of 1990 had indexed payment yields in each state, the mounting pressure to reestablish payment yields on farms (which occurred in the 2002 Farm Bill) could be mitigated. Addressing US payment yields by freezing them and then applying an index offers one of the least disruptive decoupling options, because payments are still linked to farm-level crop yields.

When the EU introduced their version of a commodity payment system for several major commodities, they employed a *regional* yield that was not tied to yields on any individual farm, thus avoiding from the outset the above problems associated with reestablishing payment yields. (Canada previously used regional yields in its crop insurance program, although that program is now part of GRIP, which does not use regional yields.) Using regional yields in payment formulas results in a partial decoupling of payments, as government payments to farmers do not encourage them to apply more chemicals per acre to increase their future subsidy payments. (As noted above, the United States attempted something similar through its freezing of payment yields.)

The payment formulas discussed in our analysis constitute a major, but by no means the total, share of the EU, US, and Canada's potentially trade-distorting farm programs. Export subsidies and various other protectionist devices also continue to distort agricultural prices, production, and trade. However, recent moves toward a greater reliance on payments (especially in the EU), as opposed to export subsidies, enhance the opportunities offered by our three decoupling options. The need for support payments of any kind are lowered whenever countries reduce output (by decoupling and/or reducing levels of support), thereby encouraging higher global prices.

Allowing Planting Flexibility. In the US, environmental concerns that commodity programs allegedly encouraged monoculture of grain crops provided one rationale for the early emphasis on planting flexibility. Historically, soybeans were not a program crop, but were needed for their environmental benefits in a crop rotation with corn. In practice, however, granting farmers planting flexibility proved much less environmentally beneficial than hypothesized. According to Babcock et al. (1997), the US experiment with planting flexibility in the 1996 Farm Bill did lead to significant crop acreage shifts; these shifts included a 23% increase in soybean acreage, which provided additional opportunities for crop rotation with Midwestern corn, as expected. However, they found that soybeans also replaced 3 million acres of wheat in Kansas and 800,000 acres of CRP land. Thus, one can conclude that the net effect of increased planting flexibility in the 1996 Farm Bill was only a modest gain for the environment (Babcock et al., 1997).

The MacSharry reform in Europe allowed considerable planting flexibility from the beginning, so the EU's payment system had some market-oriented features since the early 1990s. Planting flexibility increases efficiency because it allows farmers to plant the most profitable crops, thereby reducing the financial burden of agricultural support programs, but environmental benefits are less clear.

Allowing Commodity Payments on Land No Longer Farmed. Permitting farmers to exit agriculture and still receive government payments offers an important policy option, particularly in North America where agriculture is much more extensive (especially in the Northern Plains). Commodity payments have shifted the extensive margin of cultivation and increased output on marginal lands. In spite of earlier efforts to change this, the United States allowed farmers in 2002 to reestablish the base acreage used in certain payment formulas.

The problem in the EU is that member countries have flexibility to design their own country-specific approaches to decoupling; this may lead to payments on land that is no longer farmed in some countries, but not all. For example, individual countries may offer coupled payments that are allowed on up to 25% of the area for arable crops (Kelch & Normile, 2004). Some countries apparently favor further development of payment systems tied to an acreage base, following the US approach.

Unlike the United States, Canadian programs are weaker in address-

ing environmental concerns: They contain no Sodbuster or Swampbuster provisions, for example, so they have been implicated in a major loss of prairie wetlands and in the resulting decline of ducks, shorebirds, and other migratory bird species (van Kooten, 1993). As noted above, Canada has taken steps toward decoupling, but payments to farmers under GRIP and some other programs (usually "emergency" payments when prices are considered too low) are still based on area "under cultivation," as is the case under the Wheat Board marketing system, which is similar to the approach used in the United States for decades.

Other Remedies

There are other ways to address programs' tendencies to increase the acreage cropped that are relevant to the decoupling topic. The Conservation Reserve Program idles over a tenth of US cropland and is joined by Sodbuster and Swampbuster programs, all of which address the tendency for price supports to expand production onto marginal cropland—to shift the extensive margin of agriculture and encroach upon nature. The EU recently introduced a 10% set-aside on larger farms, which is similar to the proportion of cropland idled by the CRP in the United States (but not targeted to achieve environmental benefits), and the EU introduced a reserve for tree planting to combat greenhouse gases. Canada is also set to provide payments to farmers to plant trees to earn offset credits under Kyoto, although it is discovering that this may be more expensive than originally anticipated.

These green payment mechanisms may appease trading partners as they compensate, to some degree, for the program-induced increases in area cropped. However, they do so at a cost. If programs initially were designed in a way that avoids encouraging farmers to put more land into crop uses, costs of cropland idling programs could be reduced or avoided.

So What Have We Found?

Although the United States achieved an early start in decoupling payment mechanisms, the United States stepped back from fully decoupling payments in 2002. It is our view that policy revisions are needed to allow a recommitment to decoupling and reap its benefits. Namely, we feel there is a need to (a) establish a formula for payment yields that advances with time but is not farm specific, and (b) allow farmers to receive payments even if they cease growing a crop.

Although the EU and Canada have less experience with decoupling, they pursue some relatively effective decoupling options. Canada's NISA program is a step in that direction. The EU may still fail to achieve fully its goals related to decoupling because they allow member states considerable flexibility, and some of them are already moving toward a system of base acreage, which presumably would need to be reestablished in the future, as acreage shifts over time.

We conclude that the EU and North America have reached a critical juncture, as they have the opportunity to pursue relatively painless decoupling-based remedies to costly trade distortions and environmental problems caused by domestic agricultural policies.

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Tracking and Testing Of US and Canadian Cattle Herds for BSE: A Risk Management Dilemma

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The United States has historically imported a substantial number of cattle from Canada. Given the discovery of a BSE-infected animal in Canada and another in the United States with Canadian heritage raises the question as to whether the United States should track and test imported animals. One alternative for the near term is to identify, permanently mark, and track Canadian cattle in the United States. We will use economic analysis to quantify and compare risk management and economic consequences of such an alternative in an effort to help policy analysts and decision makers decide how best to assess and manage uncertain risks of BSE in the United States from imported cattle.

Background

Canada has tested thousands of cattle per year for Bovine Spongiform Encephalopathy (BSE)—3,377 animals in 2002—but has found only one cow with BSE. In the province of Alberta where the infected animal was found, "the brains of 2,769 targeted cattle were tested from October 1996 to March 31, 2004. One cow, condemned at slaughter (did not enter the human food chain), was confirmed positive for BSE in May 2003.... Brain tissue samples from the remaining 2768 cattle had no evidence of BSE" (Government of Alberta, 2004). The Canadian cattle tested included animals that exhibited neurological signs and/or emaciation as well as postmortem samples submitted to provincial diagnostic laboratories. If, based on European experience, targeted animals are about 60 times more likely to have BSE than nontargeted animals (Doherr et al., 2001), then the prevalence rate of BSE among nontargeted cattle would be about six per million cattle ((1/2,768) • (1/60)).

In December 2003, a second dairy cow from Alberta, imported into the United States to the state of Washington, was also diagnosed with BSE. The United States Department of Agriculture's APHIS Veterinary Services (VS) issued an "Explanatory Note" in February 2004, following an investigation by the USDA and the Canadian Food Inspection Agency (CFIA). The note concluded that the previous risk analysis of Canadian cattle and beef products imported into the United States remained unchanged by the new case and that the risks remained low. They noted that both of the BSE cases of Canadian origin occurred in cattle born before the implementation of the feed ban on the use of animal neurological matter in livestock feed, which is alleged to be the main way the disease spreads (USDA, 2004).

The detection of two BSE cases from Alberta in less than eight months raises the question: What is the current prevalence of BSE in Canadian cattle? From a risk management perspective, the key question is what actions, if any, should be taken given the uncertainty about the true prevalence of BSE in Canadian cattle. This decision problem is made more challenging by high economic stakes and by scientific uncertainties regarding BSE sources, reservoirs, and dynamics. Additionally, false positives might be economically damaging—the USDA's reports of unconfirmed BSE cases that turned out to be false had market impacts.

Scientific unknowns make predictive modeling highly uncertain, creating a dilemma for both health and economic risk management. Experience since 2003 has shown that the presence of confirmed BSE cases dramatically reduces US beef exports, even when the infected animals originated outside the United States. If the true prevalence of BSE in Canadian cattle shipped to the United States

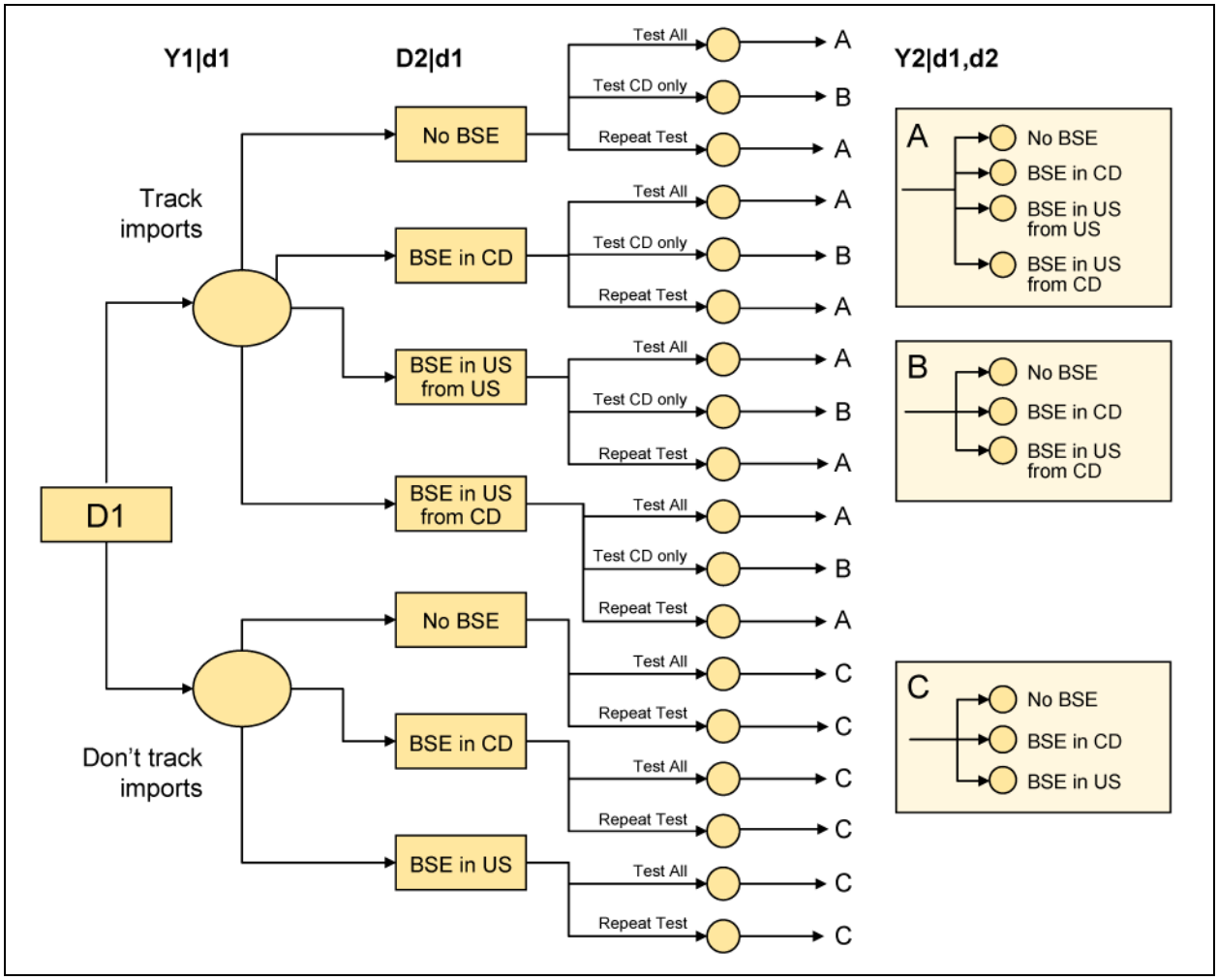

Figure 1. Decision tree for BSE testing policy.

were known to be as high as six per million head, then continued prevention of cattle imports from Canada might be expected. On the other hand, if the prevalence of BSE in Canadian cattle were known to be much smaller or zero, then the advantages of trade could be gained by allowing unrestricted imports. Given the high economic stakes and uncertainties, it has been difficult to decide or objectively evaluate what policies would best promote US and international interests. Options range from the status quo (preserving current import restrictions and testing programs) to tightening or loosening import policies. Another alternative involves gathering more information before deciding. This might be done by tracking and testing Canadian cattle as they enter and live in the United States and then using this information in support of decisions on import restrictions. Discovery of which of these (or other) options is most desirable requires comparing their associated chances of gains and losses.

Formulating the Risk Management Decision Problem

Figure 1 outlines the decision alternatives to be compared in a sequential manner. An initial (Stage 1) decision whether to track Canadian cattle in the US ("Track CD imports") or not to track them ("Do not track CD imports") is followed by arrival of additional information from ongoing sampling and BSE testing programs in the US and Canada. If the Stage 1 decision was "Track CD imports," then in the next year, any of the following informative events may be observed:

- no new BSE cases are detected;
- BSE case(s) of Canadian origin are detected in the United States;
- BSE case(s) of US origin are detected in the United States; or
- BSE case(s) of Canadian origin are detected in Canada.

If the Stage 1 decision is "Don't track CD imports," then the four possible observations for the next period are

aggregated to only the following three:

- no new BSE cases are detected;
- new BSE case(s) are detected in Canada; or
- new BSE case(s) are detected in the United States.

A Stage 1 decision to track imports increases the chances that the origin of a new case can be determined.

After the Stage 1 decision, and given updated information about any new BSE cases, a subsequent (Stage 2) decision will be made about whether to sell and process healthy-appearing cattle without first requiring them to be tested for BSE ("No required test"), versus requiring all US cattle to be tested for BSE before being sold or processed ("Test all"), versus requiring only all Canadian cattle in the United States to be tested for BSE before being sold or processed ("Require testing for CD cattle only"). The latter option is available only if the Stage 1 decision was to track Canadian cattle imports. Stage 2 decisions will be made conditional on the information available then. For example, if a new BSE case of unknown origin is detected in the United States, then the best Stage 2 decision might be to test all US cattle at slaughter to reduce export and domestic losses; if the origin of the case is known to be Canadian and the Stage 1 decision was to track Canadian imports, then the best Stage 2 decision might be to require testing for Canadian cattle only.

Estimated Economic Consequences of Detecting Additional BSE Cases

Given this decision problem, one may estimate the economic costs associated with each terminal node (i.e., "leaf" node) at the tips of Figure 1. Three types of costs will be considered: tracking costs, testing costs, and market costs. Tracking costs are estimated to be $30.7 million and represent the cost of permanently marking each live animal coming into the United States, including labor and materials. Testing costs represent the costs of the BSE tests, including kits, labor, shipping, holding, laboratory facilities, and expenses. Testing all cattle in the United States is estimated to total $1.09 billion. Testing Canadian cattle only would cost $47.3 million, and testing only those animals that fail an initial screening test would cost $2.4 million.

Market costs represent market losses (or gains) associated with each second-stage outcome as a function of all that occurred up to that point. These costs are dependent on the source of the BSE animal and the type of tracking and testing programs in place when the discovery occurs. These impacts range from a loss of $12.2 billion when there is a case of BSE in the United States from a US animal to a gain of $1.3 billion when there is a case of BSE in Canada and tracking of Canadian cattle in the United States. The full set of possible outcomes can be found in Cox et al. (2004).

BSE Decision Consequences

The economic consequences of tracking Canadian cattle imports depend on the chances as to whether and where BSE is detected. The probabilities of the different economic consequences, given the choices of Stage 1 and Stage 2 decisions, are estimates of the probabilities of finding one or more BSE-positive cattle among each batch of 1,000 tested. The probabilities of the different outcomes were estimated from data collected following the discovery of the first BSE animal in Canada. The full set of probabilities can be found in Cox et al. (2004).

Consequences of Decisions in the Base Case

Under the baseline assumptions, the expected net cost to track imports is $10.3 million per year, while the expected cost to do not track imports is $90.0 million per year. Thus, the expected net economic value of the information provided by tracking is $79.7 million per year, reflecting a much higher probability of large market losses when imports are not tracked. Such large results occur because without tracking, BSE cases of Canadian origin in the United States cannot be distinguished from (and therefore have the same economic impact as) BSE cases of US origin. The least-cost rule then is to track Canadian cattle imports, then continue limited sampling in Stage 2 no matter what occurs. In other words, the benefit from tracking in this case does not come from avoiding the cost of 100% testing of US cattle, because this is costly. Rather, it comes from the assumed reduced loss of US beef sales if the country of origin of a BSE case detected in the United States is Canada and this can be ascertained and announced.

A sensitivity analysis, where we varied the probabilities and costs, indicates that the dominance of this decision is robust to many variations in the input data, suggesting that the model's recommendation to begin tracking may be well justified despite remaining uncertainties. The economic value of tracking information comes primarily from limited export losses and from avoiding the need to test all US cattle to win back customers. Although the best second-stage decisions vary across sensitivity analysis cases, most results agree that

tracking is the optimal current decision, even while differing in their precise (Stage 2 planning) reasons.

Impacts of Possible Win-Back of Export Markets

The above analysis pessimistically assumes that the losses of US cattle and beef export markets following the discovery of a Canadian-origin BSE case in December 2003 are persistent and irreversible. If policies in the United States result in recovery of some of the lost export markets, then the economic impacts from tracking and testing could dwarf those calculated for the base case. For example, under an assumption that aggressive testing would allow the United States to regain its lost exports (as long as no confirmed BSE case of US origin is discovered), the optimal strategy becomes to immediately start tracking all Canadian cattle and, if a confirmed BSE case of Canadian origin is found, to test all Canadian-origin cattle in the United States prior to export. In this case, the expected net economic value of the information provided by tracking increases to $771.6 million per year.

Concluding Comments

This analysis suggests that the economic value of information provided by tracking of imports and implementation of testing programs in the United States greatly exceeds its costs for cattle that may be imported in the future. For "legacy" Canadian cattle that have already entered the United States, moving quickly to locate and start tracking them before any additional BSE cases are detected appears to be well justified for almost any plausible set of input assumptions, provided that the cost per head is kept within bounds (up to $35/head, based on the sensitivity analyses for the base case). If the costs per head are too great to justify locating all legacy animals, then location and tracking efforts should focus on the oldest animals—those with the greatest risk of becoming new BSE cases.

The analysis provided here focuses on potential economic consequences and risk management options for possibly mitigating losses if another BSE case is discovered in the United States. The possibility that some BSE cases might pose (currently unquantified) health risks of variant Creutzfeldt Jakob Disease (vCJD) to humans reinforces the conclusions by increasing the importance of being able to identify the origin of any new BSE cases quickly.

That tracking and testing may be imperfect has sometimes been advanced as a qualitative argument for restricting or rejecting them. The quantitative comparisons in the sensitivity analyses suggest that this reasoning is usually not justified: Measures that help to identify the origins and prevalence of BSE cases have high information value for improving future risk management decisions and creating additional risk management options, even if they are less than perfect.

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