

Economic Impacts of a Significant Change in Implementation of Mandatory Country of Origin Labeling for Beef and Pork in the United States

Daniel A. Sumner, February 2013

After losing a WTO panel case and appeal before the Appellate Body, the United States faces the requirement that it change its implementation of Country of Origin Labeling (COOL). The alternative is to face withdrawal of concessions from Canada and Mexico, the countries that brought the case and that showed that they were harmed by the U.S. measure that was found to be WTO-inconsistent.

The United States has delayed any action or accommodation of the concerns of Canada or Mexico. Facing an imminent deadline, it has now proposed a regulatory change that has not yet been made publically available for comment or discussion. This note considers whether any proposed changes to the COOL regulations for beef and pork that attempt to comply with the WTO findings would likely be a significant rule in the sense that it has an economic effect of more than \$100 million per year.

The most salient facts needed to put this issue in perspective relate simply to the amount of commerce affected by any proposed regulation.

According to USDA data, the retail value of beef sold in the United States in 2011 was about \$79 billion. Domestic sales are about 18 billion pounds of beef more than half of which is muscle cuts sold in retail groceries affected by the WTO case. Thus, a conservative estimate yields more than \$40 billion in beef value affected by the new regulations. For pork domestic sales are about 14 billion pounds, with a higher proportion of pork than beef consisting of muscle cuts sold in retail groceries. Thus, a conservative estimate is that more than \$30 billion in pork value would be affected directly by any new regulation. These numbers mean that for a rule to have less than \$100 million in economic impact it would have to an effect of less than 0.15% on the market most directly affected (\$100 million/\$70 billion).

But even that 0.15% is an overestimate of the maximum impact represented by the \$100 million threshold. Any rule that directly affects beef and pork muscle cuts sold at retail would also indirectly affect food service sales and other meat cuts produced from the same animals. These less direct impacts can be quite large because market competition means price impacts affect all buyers, whether grocery outlets or food service, and when the prices or supply of muscle cuts are affected all the other products from the same animals must be likewise affected, whether it be offal or ground meat. Thus, if a proposed rule is claimed to have an economic effect of less than \$100 million, it must affect the market by less than 0.1%!

The WTO ruling against the United States required substantial change in the implementation of COOL for beef and pork in the United States. The current regulations were found to disadvantage the industries in Canada and Mexico. They were found to impose significant extra burdens on imports relative to domestic products. Any regulatory change that addresses these problems or attempts to tailor the traceability or information provided by the system would impose new costs on the domestic industry. Indeed the rule as designed to implement the 2008 farm bill faced opposition because of the burdens it placed on the meat supply chain.

As noted above, any regulatory change now being proposed must be truly miniscule if it claims to impose an effect of less than 0.1% of retail value on the industry. The bottom line is that a new rule that is significant enough to comply with the WTO ruling is certainly significant enough to exceed the threshold of \$100 million in economic impact for a significant rule.

COOL COMPLIANCE AND REGULATORY CHANGE

Compliance with the WTO COOL ruling cannot be achieved through regulatory change.

- The Appellate Body was clear that the discrimination caused by COOL stems from the fact that different labels are required for meat from cattle and hogs exclusively born, raised, and slaughtered in the United States than for meat from cattle and hogs born or raised in another country. As these labelling requirements are statutory (7 USC 1638, Section 282(2)), it is a statutory, not regulatory, change that is needed to mitigate their discriminatory effect.¹
- Exhibit A addresses the arguments made by those who advocate for regulatory, as opposed to statutory, change.

The COOL measure puts more than 9,000 US jobs at risk – the longer compliance is delayed the longer these jobs are in jeopardy.

- In a report developing calculations of lost employment opportunities using official US employment and slaughter data together with econometric estimates used by the WTO panel, Dr. Daniel Sumner estimates that the COOL measure places at risk at least 5,256 jobs directly associated with processing cattle that are no longer imported and 3,774 jobs directly associated with processing hogs that are no longer imported. These numbers include only production jobs in meat packing and processing. Jobs in allied industries and multiplier effects would increase these estimates substantially.
- Dr. Sumner's report is attached as Exhibit B.

Failure to adequately comply with the WTO ruling puts US exports at risk through potential retaliation by Mexico and Canada.

- Losses to Canadian and Mexican cattle producers and Canadian hog producers as the result of suppressed production and exports to the US and lowered livestock prices in Canada and Mexico caused by COOL can be measured using the econometric parameters that were accepted by the WTO panel. Using those parameters Dr. Sumner estimates that total Canadian cattle losses are \$639 million per year. This figure does not include Canadian hog losses or Mexican cattle losses so the impact is likely well over \$1 billion per year.
- Dr. Sumner's analysis is attached as Exhibit C

¹ While a statutory fix is needed it could be very narrow. For example, COOL labels could remain mandatory and the statute unchanged except that meat from imported livestock that is processed in an FSIS inspected facility would be permitted to be labelled the same as meat from US livestock processed in that facility. Additional information on livestock origin could be added on a voluntary basis.

US-COOL

Q&As on Requiring Statutory Versus Regulatory Change to Bring COOL into Compliance with WTO Ruling

Question: Some (National Farmers Union, US Cattlemen's Association) suggest that the Appellate Body's decision in COOL can be implemented by regulatory (as opposed to legislative) change. Is that correct?

Answer: No. The Appellate Body was clear that the discrimination caused by COOL stems from the fact that different labels are required for meat from cattle and hogs exclusively born, raised, and slaughtered in the United States than for meat from cattle and hogs born or raised in another country. As these labelling requirements are statutory (7 USC 1638, Section 282(2)), it is a statutory, not regulatory, change that is needed to mitigate their discriminatory effect.

Question: What about the point made by USTR that the "core" issue is that the upstream record keeping burden on producers and processors is disproportionate to the amount of information supplied to consumers and that this could mean that providing more information to consumers or requiring less of producers and processors could bring the US into compliance? Would these sorts of tweaks work?

Answer: No. The Appellate Body did not say that if the US fixes the one problem identified, it would then be in compliance. Rather, it said that, given the underlying discrimination against imports, this one problem is sufficient for finding the US to be in violation of its national treatment obligations under Article 2.1 of the Agreement on Technical Barriers to Trade (TBT).

That being said, if one looks at the feasibility of "balancing" producer burden with consumer information, it is nearly impossible to see how it could be achieved in the current statutory framework. For example, the statutory exclusion of food service and small retailers from COOL means that about half of all consumers receive no COOL information, yet all producers and processors carry the COOL burden - an imbalance that cannot be redressed through regulatory change.

Even assuming that the United States could change COOL to craft a measure that "stems exclusively from a legitimate regulatory distinction", the impact of the COOL measure found by the Panel and confirmed by the Appellate Body will still exist. This detrimental impact is the test for a GATT Article III:4 national treatment discrimination claim, a claim raised by Canada but not decided for reasons of judicial economy. Thus, Canada would have a *prima facie* case under GATT Article III:4, subject only to the exceptions of GATT Article XX, which have not been asserted by the US. Consequently, while the Appellate Body did not find it necessary to consider GATT Article III:4 claims, Canada would likely be successful in asserting those claims in WTO compliance proceedings.

Moreover, further analysis undertaken under TBT Article 2.1 would reveal additional elements in the "design, structure, and architecture" of the COOL measure that, like the disparity between producer record keeping and consumer information, display a lack of evenhandedness in the application of COOL. For example, the decision to cover only products where there is competition with imports shows the protectionist intent of COOL.

EXHIBIT A

Question: Did the Appellate Body agree that the COOL measure fulfils a legitimate objective in a least trade restrictive way, consistent with Article 2.2 of the Agreement on Technical Barriers to Trade?

Answer: No. The Appellate Body found that the Panel did not make sufficient findings for the Appellate Body to decide the matter. However, in making that finding the Appellate Body set out in some detail the specific standard to be applied under Article 2.2 - a weighing of the degree of contribution the measure makes to its objective, its trade restrictiveness, and the severity of the consequences of non-fulfillment - and noted where the COOL measure would be vulnerable to analysis under the articulated framework.

If the US does not change the COOL measure to remove the discrimination that violates TBT Article 2.1, these issues (and others) could be raised in future proceedings to support a finding of a violation of TBT Article 2.2.

Question: Did the Appellate Body reject Canada's proposed less trade restrictive alternatives to COOL?

Answer: No. The Appellate Body did not reject Canada's proposed alternatives to COOL, namely voluntary labelling and labelling based on substantial transformation. Rather, with respect to voluntary labelling it found that the Panel findings "do not enable us to determine to what extent a voluntary labelling scheme would contribute to the objective of providing consumers with information [...] or how such a contribution would compare to the degree of contribution made by the COOL measure itself."

Similarly, regarding the proposed alternative of substantial transformation (*i.e.*, labelling based on place of slaughter), the Appellate Body found that the Panel findings support a conclusion that substantial transformation would partially contribute to providing information to consumers. However, because the Panel did not assess the degree of contribution of the COOL measure, the Appellate Body was "unable to compare the degree of the COOL measure's contribution" with the alternative of substantial transformation.

Question: Did the Appellate Body find that the COOL measure was not trade restrictive?

Answer: No. The Appellate Body found that the US argument that the COOL measure is not trade restrictive fails. However, as this is only the first of three findings necessary for a determination under Article 2.2 of the TBT, the Appellate Body found that the Panel did not make sufficient findings for the Appellate Body to decide the matter. As a result the Appellate Body overturned the Panel's finding of a violation of TBT Article 2.2 but was unable to make a finding of its own.

Question: Did the Appellate Body confirm that country of origin labelling generally is acceptable under WTO rules?

Answer: Yes, depending on how the labelling system is implemented and administered. As a technical matter it simply did not overturn the Panel on this point.

EXHIBIT B

**U.S. Country of Origin Labeling Measures Reduce Imported Live Cattle and Hogs and
thereby put at Risk U.S. Jobs in Meat Processing**

Daniel A. Sumner, November 25, 2011

The WTO Panel report concerning Dispute DS384: *United States — Certain Country of Origin Labeling (COOL) Requirements*, circulated on November 18, 2011, concluded that U.S. COOL regulations altered the conditions of competition between imported Canadian cattle and hogs and their U.S. domestic counterparts in violation of US obligations under WTO Agreement provisions. The consequent reduction in the importation of cattle and hogs from Canada has reduced livestock slaughter and meat processing in the United States. Quantitative estimates of the degree to which the COOL measure reduced livestock imports can be used to calculate the amount of employment in meat packing and processing that the COOL measure has put at risk.

This report develops those calculations of lost employment opportunities using official U.S. employment and slaughter data together with econometric estimates used by the WTO panel.

Estimates of the Effect of COOL on Imports of Cattle and Hogs

First, let us briefly review data and econometric estimates of the effects of the COOL measure on imports of Canadian livestock.¹ Naturally, one might use several potential econometric specifications of the relationship between the COOL measure and U.S. imports of

¹ The COOL regulations also affected the market for imports of Mexican feeder cattle into the U.S. market. We do not include those impacts in the calculations reported here.

cattle and hogs. Estimates of import impacts are similar across specifications. To consider employment impacts we use coefficient estimates from base case estimates using weekly data through November 2010, which were available at the time of the final submissions to the WTO panel. The impact of COOL on imports differed for fed cattle, feeder cattle, and fed hogs and feeder pigs relative to estimates of the relevant slaughter or placements on feed. Therefore each of these separate estimates is used to develop employment impacts.

The relevant coefficients come from econometric specifications in the following form: (1) $[\text{Imports}/(\text{Total use})]_t = \alpha + X_t\beta + \gamma\text{COOL} + \varepsilon_t$, where the subscript t refers to months, the α , β and γ are parameters reflecting the intercept and effects of the explanatory variables, and ε is a random term that accounts for factors affecting the ratio that are not included in the measurable variables in the model. The measured variables are defined in the following list.

- $[\text{Imports}/(\text{Total use})]_t$ is the ratio of imports of each type of animal—fed cattle, feeder cattle, fed hogs and feeder pigs—to the use of the that animal type in the U.S. market, where use refers to either placements or slaughter of the relevant species.
- X_t is a list of factors other than the COOL measure that may have affected the ratio of imports to use. Examples include season of the year, BSE events, shipping costs and other special events that occurred over the period.
- COOL reflects the mandatory COOL measure and is indicated by the value of zero for weeks before September 29, 2008 and the value of one for weeks after September 29, 2008.

The COOL parameter, γ , quantifies the effect of the COOL measure on the ratio of imports to use. If we set slaughter of U.S.-origin livestock constant², then the γ parameter shows by how much use (placements or slaughter) declines, in proportional to total use, due to the

² The mainstream U.S. domestic slaughter livestock industry opposed COOL because they noted that it would raise costs and contract their industry, so assuming slaughter of U.S. livestock to be constant in response to COOL is likely conservative. Given the size of U.S. cattle and hog inventories even a small percentage effect would have a significant impact. Note also that U.S. slaughter of U.S.-origin animals is affected by many non-COOL economic factors, such as incomes, weather and feed costs, to name a few.

COOL measure.³ Recall we have estimates of this parameter separately for fed cattle, feeder cattle, fed hogs and feeder pigs. Imports of fed cattle and fed hogs contribute directly to slaughter in the near term and move through the system soon after importation. Feeder cattle and feeder pigs also enter for slaughter in the United States—with a time lag during which they are fed to slaughter weight. Given the individual estimates for each animal category, the overall slaughter impact of COOL is the summation of the impact of all four categories.

Estimates for all four animal categories are used in the calculations of the impact on employment. These estimates are presented in Table 1. In each case, we give a range of estimates, those with and without including an indicator of transportation costs as an explanatory variable. The midpoint of the sum for cattle is -0.03625, which means that COOL reduced imported cattle available for slaughter by an amount equivalent to about 3.6 percent of the overall slaughter of cattle in the United States. The midpoint of the sum of coefficients for hogs is -0.03145, which means that COOL reduced imported hogs available for slaughter by an amount equivalent to about 3.1 percent of overall slaughter of hogs in the United States.

U.S. Employment in Meat Processing and Closely Related Occupations

The U.S. Bureau of Labor Statistics provides detailed survey-based data on employment by industry and occupation. These data may be used to assess which jobs are most likely to be at risk in the reduction of slaughter of cattle and hogs in U.S. facilities. The estimates based on the official U.S. government statistics that I present below are conservative for three main reasons. First, I do not attempt to include jobs in the operations that raise imported feeder cattle and pigs to slaughter weight. Second, I do not attempt to include employment outside meat packing plants but along the meat marketing chain in occupations other than butchering and

³ For those who want to check the mathematics, the parameter γ is the change in $I/(I+D)$ caused by COOL, where I is import quantity and D is domestic quantity. Let dI/dC and dD/dC reflect the first derivatives or changes with respect to COOL. This can be written as $\gamma = (dI/dC)/(I+D) - [dD/dC + dD/dC]/(I+D)^2$. The final term divided by $(I+D)^2$ is very close to zero because $(I+D)^2$ is a large number.

meat cutting. Third, I do not attempt to account for indirect employment impacts from upstream or downstream employment in industries and occupations that are not directly tied to processing animals in the United States.

The employment data come from May 2010 surveys. I calculate jobs at risk by including only production workers in the “Animal Slaughtering and Processing” industry plus additional jobs in meat processing occupations, 51-3021, 51-3022 and 51-3023, that are also found in other industries. The sum of the production workers in the industry and those in meat processing in wholesale, retail and other such industries is a conservative estimate of jobs directly put at risk by reduced numbers of animals for slaughter. This total is about 500,000 workers in the U.S. economy (Table 2).

U.S. Bureau of Labor Statistics data do not allow separation of meat processing employment by species processed. Therefore we use USDA data on meat production by species to estimate shares of employment. Using current USDA estimates for 2010, beef accounted for about 29 percent of meat production and pork accounted for about 24 percent of meat production, with poultry accounting for almost all the rest. As a reasonable approximation, we assume the workers per pound of meat production is the same across species. In that case, beef production accounts for 145,000 of the jobs included above and pork accounts for 120,000 of those jobs, with most of the rest associated with poultry slaughter and related activities. These estimates for beef and pork are underestimates if poultry processing uses fewer workers per pound of meat than does beef and pork processing.

U.S. Employment at Risk from the COOL Measures

We can now apply the estimates from Table 1 to the employment estimates in Table 2. Our estimate is that the COOL measure implied reductions in U.S. cattle slaughter of about 3.625 percent. Using the employment estimate of 145,000 jobs for cattle processing, the COOL

measure places at risk at least 5,256 U.S. jobs that were directly associated with processing those cattle that are no longer imported.

Our estimate is that the COOL measure implied reductions in U.S. hog slaughter of about 3.145 percent. Using the employment estimate of 120,000 jobs for hog processing, the COOL measure places at risk at least 3,774 U.S. jobs that were directly associated with processing those hogs that are no longer imported.

Overall, the COOL measure places at risk at least 9,030 jobs that were directly associated with processing imported cattle and hogs. This employment estimate includes only production jobs in meat packing and processing in the animal processing industry, wholesale or retail and other directly connected to meat processing. Jobs in allied industries and broader multiplier effects would increase these estimates substantially.

Table 1. Estimates of the effects of the U.S. COOL measure on quantity of imported animals as a percent of current or future slaughter*

Animal Category	Estimate w/o transport cost	Estimate including transport cost
Fed Cattle	-0.0046	-0.0040
Feeder Cattle	-0.0306	-0.0333
<i>Sum for Cattle</i>	<i>-0.0352</i>	<i>-0.0373</i>
Fed Hogs	-0.0116	-0.0200
Feeder Hogs	-0.0190	-0.0123
<i>Sum for Hogs</i>	<i>-0.0306</i>	<i>-0.0323</i>

*All coefficients are highly significant statistically

Table 2. Employment at risk, based on industry and occupation data

NAICS 311600 - Animal Slaughtering and Processing, May 2010 estimates

All Occupations Employment Estimates Employment 492,700

Production Occupations

51-0000	Production Occupations	328,000
51-1011	First-Line Supervisors of Production and Operating Workers	14,300
51-2092	Team Assemblers	6,000
51-2099	Assemblers and Fabricators, All Other	2,740
51-3021	Butchers and Meat Cutters	11,010
51-3022	Meat, Poultry, and Fish Cutters and Trimmers	112,450
51-3023	Slaughterers and Meat Packers	83,390
51-9032	Cutting and Slicing Machine Setters, Operators, and Tenders	6,260
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	10,730
51-9111	Packaging and Filling Machine Operators and Tenders	16,510
51-9399	Production Workers, All Other	18,350

Occupational Employment Statistics: May 2010

National Occupational Employment and Wage Estimates. Production Occupations

51-3021	Butchers and Meat Cutters	125,910
51-3022	Meat, Poultry, and Fish Cutters and Trimmers	163,080
51-3023	Slaughterers and Meat Packers	88,500

Additional employment in these three occupations outside Animal Slaughtering and Processing.

$$(125,910-11,010)+(163,080-112,450)+(88,500-83,390) = 115,900+50,630+5,110 = 171,640$$

Total industry production occupations in Animal Slaughtering and Processing, plus additional jobs in Occupations 51-3021, 51-3022 and 51-3023 in other industries equals a conservative estimate of jobs at risk: $328,000 + 171,640 = 499,640$ or about 500,000 workers in the U.S. economy.

References

Sumner, Daniel A. "COOL Econometrics." 2010

U.S. Bureau of Labor Statistics. 2011. *Occupational Employment Statistics: May 2010 National Industry-Specific Occupational Employment and Wage Estimates, NAICS 311600 - Animal Slaughtering and Processing*. http://www.bls.gov/oes/current/naics4_311600.htm

U.S. Bureau of Labor Statistics. 2011. *Occupational Employment Statistics: May 2010 National Occupational Employment and Wage Estimates. Production Occupations* http://www.bls.gov/oes/current/oes_nat.htm#51-0000

U.S. Bureau of Labor Statistics. 2011. *Occupational Outlook Handbook, 2010/11 Edition* <http://www.bls.gov/oco/oco2001.htm#employ>

USDA, Economic Research Service. 2011. *Livestock, Dairy, and Poultry Outlook: Meat Statistics Historical Tables*. <http://www.ers.usda.gov/publications/ldp/ldptables.htm>

WTO. (2011) DISPUTE SETTLEMENT: DISPUTE DS384, United States — Certain Country of Origin Labelling (COOL) Requirements. http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds384_e.htm

Canadian Losses from U.S. COOL Implementation

Dan Sumner, September 27, 2012

The Canadian livestock industry has suffered losses due to the adoption by the United States of the labeling requirements for red meat set out in the Country of Origin Labeling statute and implementing regulations (“COOL”). These losses are the result of suppressed Canadian production and exports to the United States and lowered livestock prices in Canada caused by COOL.

We can measure these effects of COOL using the econometric parameters that were accepted by the WTO panel as contributing to their understanding of how COOL affected markets in ways that discriminated against imported livestock.

Methodology for Calculating Losses to Canada Cattle due to COOL

The WTO assesses losses in terms of revenue lost due to a trade action that suppresses prices or results in lost trade opportunities. The lost revenue can be calculated as:

$$\text{Lost Canadian Livestock Revenue} = P^C (\Delta Q_{\text{cool}}) + Q^C (\Delta P_{\text{cool}}),$$

where P^C is the without COOL price in Canada and Q^C is the without COOL quantity in Canada, $(\Delta Q_{\text{cool}}) < 0$ is the lost trade quantity due to COOL. (The assumption is that these lost sales reduce production. As US market access was cut producers cut back supply.) Finally, $(\Delta P_{\text{cool}}) < 0$ is the price decline due to COOL. This is the impact from lower market prices due to COOL. This equation can be applied to each of the animal types considered in the WTO case.

The components of this calculation are available from the econometric analysis and industry data that Canada presented to the WTO panel. In the econometric presentation Canada estimated the difference between the price of U.S. and Canadian livestock in the U.S. and the ratio of import quantities of two classes of Canadian cattle to U.S. production or domestic use of those classes. These parameter estimates must be multiplied by the actual price and quantity levels of the each of the classes to determine actual dollar losses for each of the classes.

Thus, we need to use the equation for two separate estimates: fed cattle and feeder cattle. In each case we pay careful attention to the units and time scale of the estimates.

Fed cattle estimates

The term (ΔP_{cool}) is the effect of COOL on the price of Canadian fed cattle, the animal class for which the Canadian analysis showed effects of COOL on the price basis. Coefficients for steers and heifers were estimated separately for the price basis equations, but the estimates were very similar and an average estimate is used in the calculation below to be consistent with the quantity calculations. The estimated parameter in the price basis equation measures $\Delta(P^C - P^U)$. In the

EXHIBIT C

updated base specification the average of the steer and heifer coefficient is -0.0325, where the units are U.S. dollars per pound. This estimate is from an econometric specification that measures the change in price before and after the implementation of COOL holding other potential causal factors constant. It is the quantitative measure of the how much COOL drove down the price for Canadian fed cattle compared to the price for U.S. fed cattle. Assuming that COOL has negligible effects on U.S. fed cattle price, the calculation is as follows for the price effect:

$\Delta(P^C - P^U) = \Delta P^C / \Delta(\text{COOL}) = \$-0.0325/\text{pound of Canadian fed cattle production (live weight) per year. Canadian production is about 3.3 million head at approximately 1200 pounds per head live weight at final sale. This yields:$

Loss from fed cattle price decline = (3.3)(1200)(-0.0325) = \$129 million per year.

The term (ΔQ_{cool}) is the effect of COOL on the quantity of Canadian livestock of each type. Our econometric estimate for the fed cattle quantity ratio is -0.0046. That is:

$$\Delta(Q^C/Q^U)_{\text{fed cattle}} = -0.0046.$$

We assume that U.S. fed cattle slaughter is approximately unchanged. Therefore, $\Delta(Q^C) = Q^U(\Delta Q^C) = -0.0046(600,000)(52) = -143.5$ thousand head per year. Where $Q^U = 600$ thousand is the number of fed cattle slaughtered in the U.S. per week, including both steers and heifers. Using a representative price of \$0.90 per pound and a weight of 1200 pounds per head we have value per head of \$1080. These figures yield:

Loss from declines in fed cattle quantity = -143,500(\$1080/head) = \$155 million per year.

Total loss to fed cattle \$284 million per year.

Feeder cattle

Our econometric estimate of the term (ΔQ_{cool}) for the feeder cattle quantity ratio is -0.03. That is:

$$\Delta(Q^C/Q^U)_{\text{feeder cattle}} = -0.030.$$

We assume that U.S. feeder cattle placements are approximately unchanged. Therefore, $\Delta(Q^C) = Q^U(\Delta Q^C) = -0.030(325,500)(52) = -507$ thousand head per year. Where $Q^U = 325,500$ is the number of feeder cattle placements in the U.S. per week. Using a representative price of \$1.00 per pound and a weight of 700 pounds per head we have value per head of \$800. These figures yield:

Loss from declines in feeder cattle quantity = -507,000(\$700/head) = \$355 million per year.

Total Canadian cattle losses - \$284 + \$355 = \$639 million per year.

EXHIBIT C

Source for econometric estimates: "Detailed results from regressions quantifying the effects of the COOL measure on Canadian cattle and hogs prepared to accompany the response to Panel question 106." Here I use regression set C.1 which uses the base specification on the updated data set. Numbers would differ somewhat if other specifications were used for the calculations. January 2011.

Sources for prices and quantities are the January 2011 data base submitted by Canada to the WTO panel and supplementary data on average prices and quantities in Canada from CanFax, USDA and Canadian government sources.