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DETECTING COOL IMPACTS ON U.S.- CANADA BILATERAL HOG AND PORK TRADE FLOWS

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1.0 The Issue

Beef, lamb and pork (ground meat and muscle cuts) sold through retail outlets in the U.S. must be labelled according to their country of origin since March 2009. Mandatory labelling requirements have been contentious both within the US livestock and meat industry and with respect to trading partners who depend on US market access. Canada and Mexico have launched a formal dispute settlement procedure at the World Trade Organization. The North American hog/pork sector has also gone through significant economic turmoil for the last three years. A worldwide economic recession and a new strain of the flu virus lowered the global demand for pork products. Higher feed grain prices and declining hog prices tighten the profit margin of hog producers. The increase in the value of the Canadian dollar lowered the overall competitiveness of the Canadian hog/pork sector. The objective of this research project is to identify the impact of COOL legislation on bilateral hog trade flows while accounting for the other economic variables that affected the competitiveness of the Canadian hog/pork industry.

2.0 Background

The legislative history of COOL is long and convoluted. The requirements for mandatory COOL stem from the 2002 Farm Bill which directed the USDA to develop regulations to implement mandatory COOL. These regulations were to be promulgated by September 30, 2004. The law was first applied to fish and shellfish in 2004, but the application to the rest of the covered products was ultimately delayed until September 30, 2008. Another issue that has evolved over time is the labelling requirements for meat sourced from mixed country supply chains. The 2008 Farm Bill included additional provisions for labelling of meat, which have commonly been referred to as categories A, B, C, and D.

Table 1: COOL categories

Category A	Meat from animals born, raised and slaughtered in the U.S. Labelled product of the US.
Category B	Meat from animals born in Canada and raised and slaughtered in the U.S. Labelled product of US. and Canada.
Category C	Meat from hogs born and raised in Canada and slaughtered in the U.S. Labelled product of Canada and the US.
Category D	Meat imported into the US.

Note: Adapted from Meyer (2008).

The provisions of COOL add transactions costs to all levels of the supply chain. However, one particular worry has been that hog packing plants and processors will face additional logistical challenges of sorting, inventory and segregation if they choose to procure and sell products that are not entirely of US origin. The flexibility offered in applying different origin sourced hogs to a label B or label C slaughter day should help to mitigate these additional costs. The degree to which US packers choose to procure Canadian born hogs is ultimately an empirical question.

Figure 1 presents the monthly Canadian exports of live hogs to the US from January 2005 to November 2009. It appears that exports of both feeder (< 50 kg) hogs and slaughter hogs (> 50

kg) started to decline in early 2008 and that this negative trend in exports lasted through 2009. As mentioned above, COOL requirements were officially introduced in September 2008 but not implemented until March 2009.

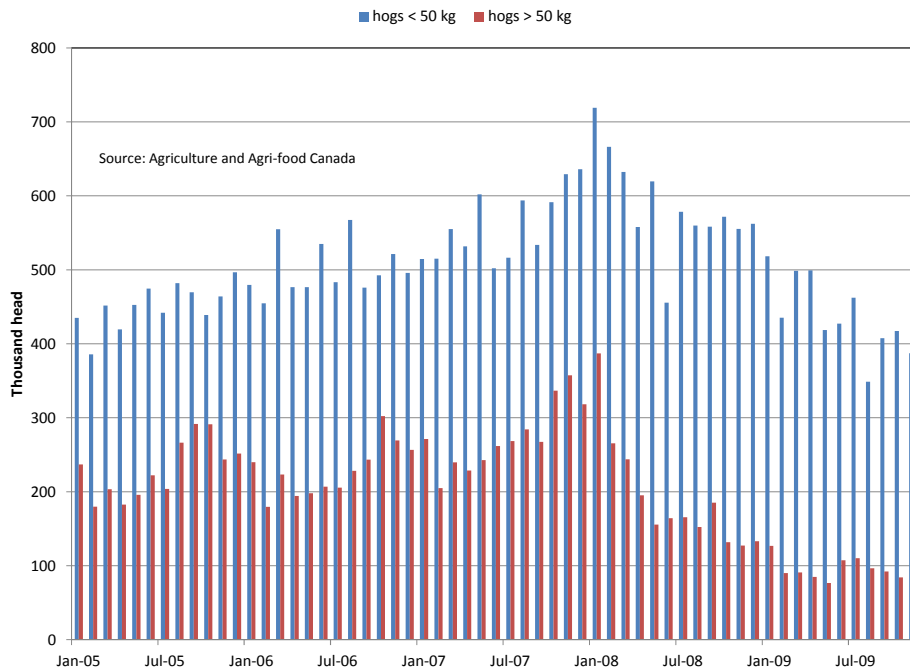


Figure 1. Monthly Canadian live hog exports from January 2005 to November 2009

One method of determining the impact of COOL is to examine the basis between Canadian and US hog prices. In Canada, slaughter hog prices are mostly formula-based and are priced off the US market, so comparing the basis for these prices is not very informative. Contractual relationships between packers and producers make it difficult for prices to adjust in the short-run as contracts and formulas are revised only a few times per year. Price comparisons for feeder hogs may be more informative because more transactions are completed on the spot market and are not set by formulas. Yet, there are significant differences across marketing mechanisms in Canada and detecting changes in price arbitrage relationships between the US market and Canadian regions is difficult. A price comparison for iso-wean piglets (5 kg. and less) shows increased basis between U.S. and Manitoba prices which coincides with the final legislative process to introduce COOL for red meats.

3.0 Findings

COOL potential impacts on the Canadian hog industry are investigated by looking at trade flows. The strategy involves modeling the US import demand for feeder and slaughter hogs to determine if the introduction of COOL has had any statistically significant impact on the US demand for Canadian hogs. The empirical challenge is to implement a robust procedure to detect structural change in an equation when the number of observations in the period of potential change is small. We use a structural change test developed by Andrews (2003). Three log-linear equations serve to explain Canadian exports of live hogs (feeder and slaughter hogs) and pork

meat to the US as a function of different supply and demand shifters which include the exchange rate between the Canadian and US currencies, labour costs in the U.S. and Canada, barley and corn prices and real personal income in Canada and the US. Monthly data from January 2000 to November 2009 were used. The only drawback of the Andrews' procedure is that the beginning period of a potentially new regime must be specified *a priori*. While COOL was implemented in September 2008, it is likely that firms anticipated the impacts of the new regulations and adjusted their behaviour accordingly before that date. In order to obtain a better idea of the potential break point dates, we first implemented the structural change procedure of Bai and Perron (2003, hereafter BP).

The BP tests clearly suggest that COOL may have an impact on trade flows of slaughter and feeder hogs but do not identify a significant impact for pork meat exports. The next step involves implementing Andrews' test for structural change. Given the uncertainty related to when COOL adjustments began, we decided to compute the test for structural change beginning in September 2007 (what would be an early adjustment to COOL) to October 2008 (a late adjustment to COOL). The only instances in which the *p*-value of the test falls below 0.10 is for the slaughter hog export equation and structural change beginning in March or April 2008. The null hypothesis of no structural change (or equivalently of COOL having no impacts on the North American hog/pork sector) could not be rejected for feeder hog exports and pork meat exports.

The tests of structural change do not provide unequivocal evidence that COOL was solely responsible for a dramatic decline trade flows, especially for feeder hogs. Figure 1 clearly shows that the absolute volume of live hog exports did decline significantly in early 2008, so an alternative explanation of this decline should be considered. The empirical model does provide information about how exogenous factors - the recession, appreciation of the Canadian dollar and feed prices - affect the exports of live hogs. A simulation approach is used to ask what would have happened to trade flows associated with an earlier trade regime - pre-2008 - if the exogenous factors for the 2008-2009 period had prevailed during this earlier regime. The simulated trade flows are compared with actual trade flows for the 2008-2009 period.

In terms of the feeder pig market, the simulations show that the exogenous factors do a very good job of explaining trade flows for the 2008-2009 period. So it is no surprise that we were unable to find unequivocal evidence of structural change in trade flows that is solely attributable to COOL. In terms of slaughter hog markets, the predictive power of the other exogenous factors is much weaker and these factors do not explain the decline in slaughter hog exports observed in the post-2008 period. So the difficult economic environment in the North American hog/pork sector cannot in itself explain the decline of Canadian slaughter hog exports. COOL appears responsible for the trade impact in slaughter hogs while broad economic conditions are mostly responsible for the decline in feeder hog exports.

4.0 Implications

The challenges of detecting COOL-induced impacts are significant. Researchers only have limited data to test the implications of COOL and there are many factors that influence price and trade flows in the North American hog/pork industry. Simulations reveal that much of the decline in feeder hog exports can be explained by other exogenous factors that affect the

competitiveness of Canadian exports. Conversely, the negative trend in slaughter hog exports to the U.S. is mostly function of the structural changes induced by COOL. The ability to parse out these affects and truly measure the impact of COOL will require more time and more data.

References

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