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The WTO's Article 22.6 Arbitration

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Abstract

This paper examines the Article 22.6 arbitration report of the WTO dispute over the United States' country of original labeling (US-COOL) regulation for meat products. At prior phases of the legal process, a WTO Panel and the Appellate Body had sided with Canada and Mexico by finding that the US regulation had negatively affected their exports of livestock – cattle and hogs – to the US market. The arbitrators authorized Canada and Mexico to retaliate by over $1 billion against US exports; this is the second largest authorized retaliation on record and only the twelfth WTO dispute to reach the stage of an arbitration report. Our legal-economic analysis focuses on a number of issues that arise in the arbitration report. First, the complainants requested the arbitrators consider a new formula for computing the permissible retaliation limit that would also include the effects of domestic price suppression. We provide a simple, economics-based model explanation for the arbitrators' rejection of such a proposal. Second, we provide market context for the $1 billion finding. While the arbitrators relied on the "trade effects" formula – which sets the retaliation limit as equivalent to the perceived loss of export revenue resulting from the WTO violation – we argue this amount to be implausibly large, given the actual conditions in the US market for cattle and hogs during this period. We then describe a number of the challenges facing arbitrators as they construct such estimates, including those likely to have arisen in this particular dispute.

1. Introduction[*]

This paper examines the Article 22.6 arbitration report of the WTO dispute over the United States' country of original labeling (*US-COOL*) regulation for meat products, and the concerns that Canada and Mexico raised that their livestock exports to the US market had been negatively impacted by the US regulation. The Article 22.6 arbitrators determined that Canada and Mexico combined should be allowed to impose tariffs on roughly $1 billion of US exports annually. Interestingly, the US repealed the COOL regulation before the Dispute Settlement Body (DSB) actually authorized the retaliation. As a result, Canada and Mexico have not applied retaliation although both countries sought and received the DSB's formal authorization to do so.

The *COOL* saga is a long one. Congress passed the original country of origin labeling legislation in 2002, though it was defunded by Congress and thus could not be implemented as a regulation until 2008, at the very end of the Bush administration. The legislation and regulation demanded that unprocessed beef and pork products sold directly to consumers have labels that include where the animal was born, raised, and slaughtered. The main argument that Canada and Mexico made was that this regulation made it costlier for US meatpackers – most all of whom slaughtered some US-raised cattle and hogs– to additionally slaughter cattle or hogs from Canada and Mexico relative to meatpackers who only relied on US animals. Thus Canada and Mexico filed a dispute in 2008, they requested a Panel in 2009, and the Panel issued its report in 2011. The Panel sided with the complainants, the United States appealed, and the Appellate Body Report was issued in 2013. The US made an attempt to comply with the reports by reforming the original COOL regulation, but the compliance Panel and later the Appellate Body also rejected the modified US regulation. At that point, Canada and Mexico sought the right to retaliate against the United States, and an Article 22.6 arbitration Panel was established.

The substantive legal issues involved in *US – COOL* – on the alleged discriminatory nature of the US consumer product labeling scheme – were similar to a number of recent WTO disputes regarding national regulations for labeling or product standards for animal, plant, or human health under the WTO Agreements on Technical Barriers to Trade (TBT) or Sanitary and Phytosanitary (SPS) measures.[1] Furthermore, there is prior work in this series that has already examined the WTO judiciary's legal treatment of the issues in the *US-COOL* dispute, including Howse and Levy (2013) for the Panel Report and Mavroidis and Saggi (2014) for the Appellate Body Report. We point the interested reader to those analyses for a more comprehensive assessment of the dispute, Panel, and Appellate Body Reports; the only additional point worth noting here is that we are in broad agreement with the Mavroidis and Saggi (2014) critique of the earlier decisions in this case.

The analysis of this paper is complementary and thus centers on issues involved in the Article 22.6 arbitration. Indeed, analysis of this particular report is important first because it is only the twelfth WTO dispute to have reached the issuance of an Article 22.6 arbitration. Table 1 lists the earlier WTO disputes to have reached issuance of such reports as well as prior research to have examined them.

Second, this arbitration is especially important to analyze given that the authorized retaliation in *US-COOL* of roughly US $1 billion collectively for Canada and Mexico was so sizeable. Indeed, as

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[1] Other legal-economic assessments of related disputes under this 15 year project include Horn and Weiler (2003) *EC-Asbestos*; Neven and Weiler (2006) *Japan – Apples*; Howse and Horn (2009) *EC — Approval and Marketing of Biotech Products*; Bown and Trachtman (2009) *Brazil – Retreaded Tyres*; Hoekman and Trachtman (2010) *EC – Hormones*, Bown and Hillman (2016) *India – Agricultural Products*; Crowley and Howse (2014) *US – Tuna II*; Broude and Levy (2014) *US – Clove Cigarettes*; and Levy and Regan (2015) and Conconi and Voon (2016) for *EC – Seal Products*.

Table 1 also indicates, this is the second largest authorized retaliation following only the *US – FSC (EC)* dispute in which the European Commission was authorized to retaliate over more than \$4 billion annually.

The main purpose of any Article 22.6 arbitration is to determine the upper limit – or the amount of bilateral trade – over which the complainant country is authorized to impose its own retaliatory import tariffs in the event that the respondent is unable to comply with the earlier WTO decisions. Our analysis centers on the fact that there are two main economic issues that are the key foundational elements to any Article 22.6 arbitration report: the choice of formula for determining the upper limit to the authorized retaliation, and the procedure to construct estimates for variables required to implement the chosen formula.

On formula determination, Bown and Ruta (2010) describe prior arbitration reports as having resulted in one of two basic approaches – the "trade effects" formula and the "subsidy" formula.[2] The complainants in *US-COOL* requested that the arbitrators consider adopting a new and alternative formula that would also include the effects of domestic price suppression that might be associated with the US regulation. The arbitrators followed the pattern established by earlier disputes in relying on the trade effects formula and thus rejected this alternative formula. We provide a simple, economics-model based explanation to motivate more formally rejection of such a proposal.

Once the arbitrators have decided on a formula, the second issue that they confront involves how they are to implement it in practice. Any formula requires that the arbitrators decide on "counterfactual" values – i.e., states of the world that were not observed – for some of its key parameters. Thus how to implement the formula is much more dependent on case-specific and market-specific considerations. Our view is that the arbitrators settled on an authorized retaliation amount that was implausibly large, given the actual conditions in the US market for cattle and hogs.

It is impossible for outsiders to disentangle exactly what it was about the arbitrators' chosen model – and which of the counterfactual parameters that they utilized – that was the primary reason behind their estimate that such a large amount of retaliation was appropriate. Nevertheless, we suggest some likely contributing explanations. Our analysis also points out how, in this particular market and in this particular period of time, the arbitrators were confronted with especially challenging economic conditions to address in their modeling approach. Because the arbitrators are so transparent in their report, we are able to raise these more systemic points about the difficulties of constructing an accurate counterfactual, and whether this should trigger a significant rethinking of how arbitrators approach this phase of the dispute. In particular, what should be done in cases when there is substantial uncertainty about the precision of counterfactual parameter estimates? The precision of these estimates matters because using different values can lead to wildly divergent amounts of permissible trading partner retaliation.

The rest of this paper proceeds as follows. Section 2 briefly reviews the economic market at stake, the US country of original labeling regulation, and the timeline of the earlier phases of the WTO dispute. Section 3 focuses on the first of the two main issues in the arbitration – the formula to be used to determine the authorized amount of retaliation. Section 4 highlights key elements of the second issue of formula implementation. Section 5 concludes.

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[2]   The subsidy formula had been implemented in disputes arising under the Agreement on Subsidies and Countervailing Measures, such as *Brazil – Aircraft (Canada), US – FSC (EC), Canada — Aircraft Credits and Guarantees (Brazil),* and *US – Upland Cotton (Brazil).* This formula was not relevant for *US-COOL* dispute as the current case did not involve the SCM Agreement.

2. Background: Regulation, Dispute, and Trade

2.1 The US COOL regulation and earlier phases of the WTO dispute

The US country of origin labeling legislation was introduced via the 2002 Farm Bill, which required that a number of agriculture goods, including beef, pork, nuts, and shellfish, be labeled with their source of origin. Inclusion of the COOL requirement in the 2002 Farm Bill was a legislative victory for the segment of the US farming groups – as well as consumer rights groups – that had advocated for labeling. The statute established a three tier "born, raised, and processed" system of identifying the source of beef and pork. Only animals that were born, exclusively raised, and slaughtered in the US were eligible for the US origin label.

However, the 2002 COOL legislative victory was undermined when opponents of the legislation were able to defund the implementation process, effectively delaying for six years the implementation of the COOL legislation. The statute itself did not specify who had to collect the country-of-origin information, how the label would be structured, what types of goods would be subject to the labeling, and how the system would be monitored and enforced. All of these issues were left to the US Department of Agriculture's (USDA) rulemaking process, and COOL opponents successfully blocked any funding for the implementation of the statute with regards to beef and pork until 2008.

At the very end of the Bush administration's term in 2008, the USDA published the first version of the COOL regulations. The first COOL rules permitted a mixed-origin label and disappointed COOL proponents. Even COOL opponents concurred with the interpretation that the rule was the most relaxed regulation possible given the statute.

However, the arrival of the Obama administration in 2009 resulted in regulators more receptive in their attempts to implement the spirit of the original COOL legislation. The new head of the USDA, Tom Vilsack, when implementing the rule, issued a non-binding letter stating that meatpackers should not use the mixed-origin label if the slaughterhouse processed only US born, raised, and slaughtered meat in one 24-hour period. In addition, the letter noted that the mixed-origin label was not intended to apply to the majority of products eligible for the US born, raised, and slaughtered label.[3]

Shortly before the final COOL rule was implemented, the Canadian and Mexican governments filed a request for consultations at the WTO in December 2008 and June 2009 respectively.[4] Both countries filed a request for a panel in October 2009. The subsequent panel report and Appellate Body report found that the COOL regulation breached the TBT Agreement by offering less favorable treatment to foreign goods (Howse and Levy, 2013; Mavroidis and Saggi, 2014). In July 2012, the DSB adopted the Appellate Body's report.

The WTO decisions required the US government to revisit the COOL rule. Instead of simply repealing the COOL regulation, and in an attempt to address the concerns raised by the decisions, the US issued a new and stricter COOL regulation and notified the DSB in May 2013 that it was "in compliance." The US eliminated the option of the mixed-origin label, thus providing more information to consumers. This attempted to address the Appellate Body's concern that the information gathered upstream was not being communicated to consumers and thus the costs were not justified in terms of greater consumer information. Instead, the label identified where the animal had been born, raised, and slaughtered.

Canada and Mexico disagreed that the US's new COOL regulation was consistent with WTO law and requested a compliance panel in August 2013. The compliance panel found the US policy was still WTO-inconsistent in October 2014. The US again appealed and lost in an Appellate Body decision

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[3]   See Greene (2015, p. 5)

[4]   See Greene (2015, p. 9)

issued in May 2015. Canada and Mexico announced their intention to suspend concessions with regards the US and, in June 2015, the US requested an arbitration panel to adjudicate the appropriate level of suspension.

The arbitration panel issued its decision on December 7, 2015 and the DSB adopted the report on December 21, 2015. The United States ultimately repealed the COOL regulation through an omnibus bill passed by Congress on December 18 and was signed into law by President Obama the same day. Thus, the US government successfully repealed COOL before the DSB officially authorized retaliation on December 21, 2015.

2.2 The United States' import market for livestock

The North American livestock market has become increasingly integrated since the implementation of first the Canada-US Free Trade Agreement (CUSFTA) in 1988 and subsequently the North American Free Trade Agreement (NAFTA) in 1994. As bilaterally applied tariffs on livestock – cattle and hogs – and other non-tariff barriers have fallen, there have been changes to the patterns in live animal shipments across borders in the more integrated North American beef and pork supply chains.[5] Firms and industries have reorganized regionally across North America, and trade in 'new' animal products – e.g., livestock of different ages – has emerged to take advantage of differences in comparative advantage, scale economies, and tastes and preferences. Overwhelmingly, exports of live animals have tended to move from Canada (cattle and hogs) and Mexico (only cattle) to the United States market for processing into beef and pork products for consumption.

Figure 1 provides an illustrative overview of the US import market for these products over 1989-2015 with public data provided by the US government. First note that in nominal terms, the value of US imports of live cattle and hogs increased from $800 million in 1989 to $2.5 billion by 2007. As we describe in more detail below, the US COOL regulation was implemented via an interim rule in August 2008 and with a final rule in January 2009. Canada and Mexico shortly thereafter filed WTO disputes, and the COOL regulation remained in place through 2015. In 2015, Canada requested $2.4 billion[6] (CAN $3.1 billion) in retaliatory compensation and Mexico requested $713 million in retaliatory compensation. The arbitrators ultimately granted Canada $805 million (CAN $1.054 billion) and Mexico $227.8 million, or a combined $1 billion in compensatory retaliatory. Again, for perspective, and prior to the COOL regulation, annual US imports of cattle and swine from Canada and Mexico were never larger than $2.5 billion. US imports reached $2.9 billion in 2014 after the COOL regulation had gone into effect and despite it having gone into effect.

Next consider Figure 2, which illustrates the US import *volumes* of live cattle and live hogs from each of its two major foreign sources. First, the US imports substantial volumes of cattle from both Canada and Mexico. Second, the total volume of cattle imports is relatively flat since the mid-1990s, averaging around 2.1 million head imported per year. Third, the relatively flat total import volume masks considerable fluctuations in bilateral volumes taking place on a year-to-year basis.

There are a number of apparent sources for the annual volatility in the bilateral volumes, though some are associated with major shocks that having nothing to do with the COOL regulation. For example, in 1995, Mexico's exports plummeted in response to the peso crisis. In 2003, Canada suffered an outbreak of bovine spongiform encephalopathy (BSE) that resulted in a US import ban on cattle and that was applied until 2005.[7] In 1998, the United States initiated antidumping and countervailing duty investigations against Canada and an antidumping case against Mexico, it is not

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[5] For a more complete description, see Greene (2015).

[6] Unless stated otherwise, $ refer to US dollars. Figures reported in Canadian dollars will be denoted CAN $.

[7] Later in 2003, the US experienced its own first reported case of a BSE outbreak, and this led to a massive decline in US exports of beef globally that bottomed out in 2004.

uncommon for such cases to also have a chilling effect on bilateral trade volumes.[8] In other years during this period Mexico experienced droughts and Canada shut down domestic slaughterhouses; both examples tend to exogenously increase the supply of bilateral exports of live animals to the US market. Furthermore, this figure also does not capture that the types of cattle (of different ages) being traded were likely changing endogenously over this period as the North American industry was developing into a relatively more efficient regional supply chain. Overall, the main point to keep in mind is that there were a lot of factors shifting US import demand, Canada's export supply, and Mexico's export supply for live cattle during this period.

Figure 2 also shows why the timing of the imposition of the US interim and final COOL regulations is so important. Beginning in the summer 2008, US trade flows *in general* were in a free fall – indeed, the Great Recession led to a simultaneous collapse in trade in virtually all countries of the world across most all goods. Cattle and ultimately beef were no exception. Furthermore, the value of the Canadian dollar increased substantially relative to the US dollar, thus making it less attractive for Canadian livestock producers to export their product to the US market. In the end, the coincidence of timing of the imposition of the COOL regulation alongside the Great Recession will make it difficult for any empirical exercise to separate a potential decrease in 2008-2009 trade volumes arising exclusively due to COOL from unrelated events associated with the macroeconomic shock of the Great Recession. Indeed, Figure 2 happens to illustrate that at the same time that US imports of cattle from Canada were falling over 2009-2011 from their 2008 peak levels, US imports from Mexico of live cattle were actually *increasing*.

Figure 3 illustrates the US import market for live swine, which shows a somewhat different story. The first distinction worth noting is that the virtually all US imports of live swine during the period derived from Canada, there were no imports from Mexico.[9] Second, integration of the North American market in the 1990s led to a substantial and continued US increase in import volumes from Canada until the trade collapse associated with the Great Recession in 2008.[10] US imports declined from a peak of 10 million head in 2007 to 6.3 million in 2009; again the Great Recession's timing coincided with implementation of COOL. Since then, volumes have stabilized at slightly more than half their peak levels.

3. Determination of the Article 22.6 arbitrator's formula: More than trade effects?

The dispute between, Canada, Mexico and the United States tasked WTO arbitrators with determining the upper limit to the amount that Canada and Mexico would be authorized to retaliate against the United States if the US continued to fail to bring its regulation into compliance with WTO legal rulings. The first issue that the arbitrators need to confront in every instance in which retaliation is authorized is, what formula will be used? Canada and Mexico argued that the retaliation level in this case should go beyond the "trade effects" approach that prior arbitrations had relied on so as to also include domestic price effects. This section evaluates the framework, the complainant's arguments, and the arbitrator's selected formula.

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[8] In 1998, the US initiated antidumping and countervailing duty investigations against imports of live cattle from Canada and an antidumping investigation against imports of live cattle from Mexico. The case against Mexico ended with a negative injury determination in the preliminary stage. Preliminary duties of 4.73 percent were applied in July 1999 but were then refunded after the November 1999 negative final injury determination by the USITC (Bown 2015).

[9] The US imported a tiny amount of live swine from a number of countries in Europe during this period.

[10] In 2004, the US initiated antidumping and countervailing duty investigations against imports of live swine from Canada. Preliminary duties of 14.06 percent were applied in October 2004 but were then refunded after the April 2005's negative final injury determination by the USITC (Bown 2015). Thus US import growth of live swine from Canada continued after that unabated.

3.1 A model-based formulation of reciprocity to limit retaliation

In order to evaluate the arbitration approaches proposed by Canada and Mexico, as well as that actually adopted by the arbitrators, we introduce the very simple model of Bown and Ruta (2010). This model illustrates the retaliation limit implied by the Bagwell and Staiger (2001) mathematical formulation of reciprocity.[11] Bown and Ruta have previously used the model to evaluate how close earlier Article 22.6 arbitrators were in relying on it for each of the first ten disputes that reached that phase of the DSU process.[12]

Begin with Figure 4, and for ease of exposition we limit the discussion to two countries – the United States (respondent) and Canada (complainant).[13] The figure illustrates the Canadian domestic market for livestock (left panel) and the international market for livestock trade between Canada and the US (right panel). The international market illustrates Canada's export supply of livestock, given its domestic market conditions (shown in the left panel), and the United States' import demand for livestock, given its domestic market conditions (not shown). Suppose that a WTO-consistent regime would have the US with an import demand curve of MD_1^{US} – then the market clearing price would be P_1 and the equilibrium volume of trade – Canadian exports of livestock to the US – would be given by Q_1. In the Canadian domestic market (left panel), Q_1 is equivalent to the difference between domestic quantity supplied (q_1) and domestic quantity demanded (d_1) at price P_1.

Now suppose the United States implements a non-tariff barrier, such as the country of origin labeling regulation. This shifts in the US import demand curve for livestock from MD_1^{US} to MD_2^{US}. This causes the volume of US imports from Canada to fall from Q_1 to Q_2 (right panel) and total livestock production in Canada to fall from q_1 to q_2 (left panel).

Under the Bagwell and Staiger (2001) mathematical definition of reciprocity serving as a limit to the tariff retaliation, Bown and Ruta (2010) show that this would be given by the shaded area in the right panel, or equivalently by the combination of the two shaded areas of the left panel. These rectangular areas are determined by the initial world price (P_1) multiplied by the difference between the WTO-consistent level of exports (Q_1) and the level of exports under the WTO-inconsistent COOL measure (Q_2) – i.e., $P_1[Q_1 - Q_2]$, in the right panel, which is equivalent to $P_1[q_1 - q_2] + P_1[d_2 - d_1]$, in the left panel.

Before moving on, it is worth considering how easy it would it be for the arbitrators to implement this particular theoretical formula in the real world. We argue that, provided that post-violation import volumes (i.e., quantities, so Q_2) can be disentangled from post-violation import values (i.e., P_2Q_2), then this reciprocity formula is no more difficult to implement than the trade effects formula that the arbitrators have frequently chosen to implement in practice, including in *US-COOL* as we describe next.[14]

Under both this case and in the arbitrator's actual choices, Q_1 and P_1 are unobserved or "counterfactual" (WTO-consistent) levels of trade volumes and prices. The arbitrators will need to derive these counterfactual levels for Q_1 and P_1 through reliance on economic modeling techniques, as we further describe in Section 4 below. For now, it is sufficient to note that the arbitrators do come up

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[11] Bagwell and Staiger (2001) is the partial equilibrium of the model first developed in general equilibrium in Bagwell and Staiger (1999). For a book-length treatment that incorporates many additional extensions to these models, see Bagwell and Staiger (2002).

[12] See also Grossman and Sykes (2011), Howse and Staiger (2005), and Bown (2002). In particular, our qualitative analysis here abstracts from the issues raised by Grossman and Sykes that the results can change once we take into consideration cases where there are differences in the import demand and export supply elasticities.

[13] On the issue of what formula to select, Mexico's arguments essentially mimic the Canadian arguments described here.

[14] In practice, there are some instances in which trade volume data are not reported or available, and all that is available is the value of the transactions. In such instances this formula would not be able to be implemented.

with estimates for Q_1 and P_1 and this therefore implies that they could have implemented the theoretically-motivated Bagwell-Staiger formula of Figure 4 if they had wanted to do so.

3.2 The arbitrator's decision on the formula in US-COOL

While the arbitrators in *US-COOL* could have implemented a level of retaliation consistent with this definition of reciprocity, they did not. Instead, they followed earlier panels, such as *EC – Bananas III* and *EC – Hormones,* and use a trade effects formula under a slightly different definition of a change in export revenues. The alternative formula is illustrated in Figure 5.

In *US-COOL*, the arbitrators authorized the complainants to retaliate by an amount equal to $[P_1 Q_1 - P_2 Q_2]$, which is illustrated in the right panel of Figure 5. This is equivalent to $[P_1(q_1 - d_1) - P_2(q_2 - d_2)]$, which is illustrated in the left panel. The change in export revenue under this trade effects approach allows not only for volumes to change ($Q_1 \rightarrow Q_2$), as as is also the case under the reciprocity formula, but also for prices to change ($P_1 \rightarrow P_2$). The latter is different from the reciprocity formula, which evaluates the change in exports volumes at the fixed price of P_1.

This level of retaliation under the trade effects approach illustrated in Figure 5 will be at least as large as the amount of retaliation authorized under the reciprocity approach illustrated in Figure 4.

It is, however, instructive to consider the scenarios in which the trade effects approach (Figure 5) and the reciprocity approach (Figure 4) are equivalent. The first occurs when $Q_2 = 0$, i.e., the WTO-inconsistent US non-tariff barrier is *prohibitive* and cuts off all imports from the complainant of the disputed product. The second occurs when $P_2 \rightarrow P_1$, i.e., the WTO-inconsistent US non-tariff barrier resulted in very little change in the exporter-received price, which could arise if the export supply curve is very elastic. Otherwise, the trade effects approach permits a larger amount of retaliation by the complainant than the strict definition of reciprocity implied by the Bagwell-Staiger formulation.

3.3 Evaluating the complainant's request for a different formula

Next consider what the Canadian complainants requested in the arbitration for additional compensation – *beyond* the trade effects illustrated in Figure 5 – for the negative impacts on domestic sales (in the Canadian market) due to the US's WTO-inconsistent COOL measure. In Figure 6 we use our simple economic model to describe potential ways of interpreting this request in order to evaluate the arbitrators' decision not to include it in the formula for determining Canada's retaliation limit.

One potential way to interpret the request is that Canada is seeking to be compensated for lost domestic revenue for Canadian livestock producers for their livestock sold in Canada. Recall that in the model, the Canadian price of livestock falls from P_1 to P_2 when the US implements COOL. However, as Figure 6 illustrates, because of the standard assumption that the Canadian demand curve for livestock is downward sloping, quantity demanded – i.e., the volume of domestic sales – actually increases from d_1 to d_2 with the decline in price. Thus it is not necessarily the case that domestic revenues fall when the US implements the WTO-inconsistent US COOL measure. The change in revenue associated only with the change in domestic (Canadian) sales is given by $[P_2 d_2 - P_1 d_1]$, or the area given by $[b - a]$ in Figure 6. If $b > a$, the change in domestic revenues associated with the decrease in price is actually positive as a result of WTO-inconsistent COOL measure. Specifically, revenues associated with domestic sales will actually increase with a decline in the domestic price when the initial equilibrium is situated at a relatively elastic part of the demand curve, so that percentage increase in quantity is larger than the percentage decrease in price.

An alternative way of interpreting the request is that perhaps Canada is also seeking to recoup the lost revenues associated with the drop in the price that would be limited to the level of domestic sales volume that would have existed under a WTO consistent policy. I.e., ignore the (positive) change in

revenues associated with the increase in Canadian quantity demanded due to the fall in price [area b in Figure 6] and only consider the losses due to the original level of sales [area a in Figure 6].

The concern with such an approach is that it ignores the fact that that when the Canadian price of livestock falls from P_1 to P_2, Canadian purchasers of livestock – in this case, Canadian meatpackers and final consumers – actually benefit. In Figure 6, their economic wellbeing is measured by the economic concept of "consumer surplus"; with the decline in price, Canada's consumer surplus in the livestock market actually increases by the area given by $[a + c]$. These gains to Canadian consumers of the lower price more than offset the losses in producer surplus associated with the change in domestic sales $[a]$.[15]

More generally, the problem with the complainants' proposed approach in this case is that it was ad hoc and it moves further away from reliance on an economic modeling framework. Such a framework is beneficial in that it imposes discipline on the arbitrators through both a consistency of analysis and through the requirement that all changes are accounted for and thus "add up."[16]

In this case, the complainant's proposal seeks to focus only on the ways in which the WTO-inconsistent measure imposed losses on Canadian economic well-being, and it ignores all of the benefits arising elsewhere in the Canadian economy. The problem of such a non-model based approach is that it leads to both double counting and a question of where to draw the line.

First, if one were to adopt the complainant's approach, the next logical question to arise would be, why stop at only trade losses (the shaded areas of Figure 6) and losses in domestic sales (area [a] in Figure 6)? For example, in a different modeling framework, one could potentially show that there were also losses to domestic factors of production that are specific to the livestock industry. From that perspective, why not also add into the calculation the workers whose wages are lower or the investors in livestock production (capital owners) whose rents are lower, each of which also loses in the short run due to falling prices of Canadian livestock? Our response for leaving them out of the analysis here is because they are not included in this particular economic model, and the use of an economic model is what is relied upon to determine what data are and are not needed to compute the retaliation. Put differently, reliance on an economic model clarifies not only where to begin the analysis, but it also clarifies where to draw the line and end the analysis.

Second, the complainant's non-model based approach serves to ignore that any change in trade policy has distributional impacts for a country that must be taken into account when conducting an economic welfare calculation. Specifically, there are segments of the Canadian economy in which the change in economic wellbeing due to the US-imposed COOL measure is positive, as observed in Figure 6. Most directly, Canadian meatpackers and consumers of beef actually gain from COOL because more domestic production is retained locally and prices are lower. However, just as use of an economic model provided us with a framework to show where to draw the line in counting up losses, the same can be said that the model imposes discipline that appropriately limits the scope of those who benefit from the COOL measure as well. In a different economic model, other groups in Canada could be shown to benefit from the lower Canadian consumer prices for beef arising from the COOL measure. For example, ketchup and mustard producers in Canada – goods that are complements in

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[15] Of course they do not offset the total loss in producer surplus that would also include the loss in producer surplus associated with lost export volumes, but we have already addressed those through the analysis of trade effects.

[16] One way to allow the complainant to include domestic price suppression losses into their calculation would be if, when computing the products over which to retaliate, the modeling approach took into account not only the lost exports that would arise due the retaliatory tariff, but also the domestic price suppression losses in the respondent's market that it would suffer as a result of the retaliation. Our conjecture is that if markets were symmetric, the theoretical result would be that the domestic price suppression effects would cancel out and we would end up with what is given in Figure 5 under the trade effects approach. Thus it is unnecessary to expand the scope of the analysis to consider the effects of domestic price suppression because the retaliation would lead to equivalent domestic price suppression for the goods being retaliated against in the respondent's market.

consumption with beef – are also better off as the price and quantity consumed of such goods increase alongside the increased consumption of beef.

The main point is that a well-articulated economic model is needed to define the scope of the retaliation limit in WTO disputes. The model is then used to prevent both double counting and under-counting, and to show where to draw the line for what effects need to be included and which do not.

This argument therefore pushes back against the complainant's proposal in the *US-COOL* arbitration, in which they cherry-picked a potentially longer list of those in Canada that also suffered negative distributional effects from the measure, without considering the equally long list of those who enjoyed positive distributional effects.

However, this also serves to reinforce the argument against the approach that the arbitrators have undertaken in *US-COOL* and in other disputes (e.g., *EC-Hormones*) before it. While the Bagwell and Staiger (2001) modeling framework provides a logic and model-based consistency for defining a level of retaliation limited to the WTO-consistent policy's world price multiplied by the change in export volumes (e.g., $P_1[Q_1 - Q_2]$, see again Figure 4), it does not follow for the change in export revenue rule that the arbitrators have seemingly followed to date (e.g., $[P_1Q_1 - P_2Q_2]$), see again Figure 5), since the early WTO decisions (Bown and Ruta, 2010).

Thus while the arbitrators made the right decision to reject the complainant's proposal to include domestic price suppression effects, it is still somewhat unclear why the arbitrators have continued to apply the exact trade effects formula that they do apply.

4. Implementing the formula

Once the arbitrators have decided upon a formula, as described in Section 3, the next step is for them to establish the key counterfactual values needed to implement the formula. This section describes what the complaining countries requested, what the arbitrators granted, and some of the difficult issues that arise when arbitrators are required to implement the formula in practice.

4.1 The scale of the trade effects in US-COOL

Before getting into details of the determination of which elements would feed into the formula, we step back and once again consider the scale of retaliation that Canada and Mexico requested, as well as what was authorized, in order to put these into perspective.

In the 2015 arbitration, Canada requested roughly $2.4 billion (CAN $3.1 billion) in retaliatory compensation and Mexico requested $713 million in retaliatory compensation. Even when focusing on the requests limited to perceived export revenue losses (under the trade effects formula), Canada requested $1.6 billion (CAN $2.0 billion) and Mexico requested $515 million. The United States claimed much smaller trade effects due to the COOL measure. The US estimated that the lost export revenue for Canada was $43 million and for Mexico was $48 million – i.e., combined the annual lost export revenue was less than $100 million.

The Article 22.6 arbitrators in the dispute ultimately granted Canada $805 million (CAN $1.054 billion) and Mexico $227.8 million. Again recall that the retaliation being granted is based on a formula that gives the value of export revenue that was *lost* annually because of the COOL regulation. These figures thus represent approximations for the additional annual bilateral exports to the US market during the 2009-2015 period that would have arisen had the COOL regulation not been in place.

Figure 7 puts these amounts into perspective by plotting them with the information on US actual imports of cattle and swine over the 1989-2015 period. In particular, the solid lines represented the realized US bilateral imports from Mexico (grey) and from Canada (black). The dashed lines represent

what the arbitrators granted plus the actual level of imports, and the lines with boxes represent the "trade effects" portion of the Canadian and Mexican requests plus the actual level of imports.[17]

Consider Canada and begin in 2009, i.e., the year of the implementation of the COOL regulation. The arbitrator's authorized level of retaliation puts their approximation for what Canada's exports to the US but for the US-COOL regulation at $2 billion, which is roughly equivalent to its peak level of exports achieved in 2007. This is relevant because the arbitrators are essentially indicating that Canada's cattle exports would have not declined at all between 2007 and 2009, even though there had been a global trade collapse in 2008-2009 – in virtually all products and in all countries – due to the Great Recession.

The story for Mexico is even more dramatic. The arbitrator's decision implies that it felt that Mexico's exports of live cattle to the US would have actually increased by roughly 30 percent between 2007 and 2008 but for the COOL regulation.

Before imposition of the COOL regulation, total US livestock imports from Canada and Mexico peaked at $2.5 billion in 2007. And given that realized exports in 2014 – with the COOL regulation still in place – were $2.9 billion, this implies that total combined exports without COOL in 2014 would have been $3.9 billion, or that exports but for COOL would have increased by 87 percent over seven years.

These numbers are clearly difficult to rationalize against the US market reality. It thus raises important questions concerning how arbitrators actually arrive at such figures.

Nevertheless, it is worth pointing out that at least the arbitrators did not grant the even higher levels that Canada and Mexico had requested, which are also plotted in Figure 7.

4.2 The general difficulties facing the arbitrators in attempting to implement the formula

As we have already indicated in Section 3, once the arbitrators have decided upon a formula, they will need information on key values of parameters utilized to compute the formula. In particular, post-violation import volumes (i.e., quantities, so Q_2) are known – e.g., see the data for the US cattle market (Figure 2) or the US swine market (Figure 3). Thus the arbitrators only need to determine counterfactual levels of Q_1 and P_1 , or what levels of trade volumes and prices that would have arisen in a world in which the US had implemented a WTO-consistent COOL regulation.

The intellectual exercise is thus to predict the time path of Canadian exports of cattle and hogs, and Mexico's exports of cattle, to the US market in 2009 and beyond, in order to then compare those predicted values with the actual volumes of exports. Perhaps the easiest way to imagine this exercise is to consider simply what 2009-2015 would had looked like if the US had never imposed the COOL measure. In such an exercise, economists typically use data from the past to predict the future.

Here we rely on Figures 8 and 9 to illustrate just how divergent the answers to this basic prediction can be when we only change one element – the "past" years being used to base the prediction of the future. Importantly, to show these results, we rely only on publicly available data. The implication though is these exact figures will not match exactly what was described by Canada, Mexico, US or the arbitrators in the actual report; those are data to which we do not have access. Furthermore, our discussion is phrased as decisions made by "the arbitrators" in implementing these economic models. We recognize that the arbitrators themselves are frequently constrained by the quality of the analysis and models that the parties put before them. While we recognize that this is an important issue, so as to focus on other challenges that arbitrators face, we choose to abstract from it here.

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[17] That is, for the Canada and Mexico retaliation requests, we do not plot the additional amount the additional amount that each requested due to the "domestic price suppression" effects that the arbitrators denied.

Consider first Figure 8, and suppose that post-2009 total import volumes of cattle had followed the trend of total US imports of cattle over the prior twenty-year period of 1989-2008. Interestingly, as we have already noted, while there are substantial fluctuations in bilateral trade on an annual basis over this time period – e.g., as US imports from Mexico decline one year in response to a shock at home, imports from Canada increase that year to fill the gap – total US cattle import volumes from the two are actually fairly flat. Using the past data from the whole period to predict the counterfactual would suggest that US imports in 2015 were not much different from what they would have been as predicted by this 20-year pre-COOL trend – i.e., about 2.2 million head.

On the other hand, suppose instead that we modify the approach that generates the counterfactual prediction very slightly along two dimensions. First, we do not rely on data from the 20-year period; we only rely on data from a much more recent period – say, 2004-2008. Second, suppose we also construct the prediction for each US trading partner individually.

The result is illustrated in Figure 9, which shows the other extreme. Consider first imports from Canada. This model predicts a level of Canadian exports of 4.5 million head by 2015 – twice as much as Canada had ever exported to the US in any given year before COOL. This is even twice as much as the total level predicted to be exported by Canada and Mexico combined in Figure 8 under the alternative approach.

Why is this prediction for Canada so different? Recall earlier that Canada had a BSE crisis that left Canadian cattle exports at zero in 2004. Once the US BSE import ban was lifted, because Canada had already a highly developed production capacity, it experienced a substantial increase in export growth to the US over 2005-2008. However, this growth was not driven by some underlying economic fundamental, like an increase in productivity growth that might arise after adoption of a newly invented technology. The sharp increase in export growth over 2005-2008 was simply due to Canada resuming cattle exports – from the very low base level of zero exports in 2004 – and increasing its exports back to the pre-2003 (pre-BSE) levels. Put differently, it is extraordinarily unlikely that Canada would have been able to keep up the same level of export *growth* that it experienced over 2005-2008 after 2008 – i.e., once it had re-achieved its pre-BSE *levels* of exports to the US and was once again producing and exporting at capacity.

The years chosen to illustrate this argument were selected deliberately, of course. The main point is that even the basic selection of which years to use in the historical sample to generate the prediction can make a sizeable difference in the results.

To see this even more clearly, suppose 2004-2008 were also chosen as the years to predict future Mexican export volumes to the US. As Figure 9 illustrates, Mexico's cattle exports to the US were declining slightly during those years. Some of this decline was simply a normal market response – US imports from Mexico were declining slightly as US imports from Canada were resuming after the US lifted the BSE import ban on Canada.

This also raises at least two additional complications for arbitrations such as *US – COOL* – that involve *multiple* complainant countries – to have to address.

First, to what extent should it be necessary for the arbitrators to demand consistency in approach across the two complainant countries? For example, the demand for consistency in generating the predictions that we have just described would require using the same years for Mexico as we did for Canada to generate the prediction. That would seem like a reasonable rule of thumb, if not a requirement. But in this instance, when that approach is taken, the trend would predict that Mexico exports to the US (even without COOL being implemented) would have declined to zero by 2014 (see again Figure 9). Would this then tend to invalidate that the approach be permitted for use on the Canadian data?

Second, and regardless of whether such internal consistency of approach is required, should there also be an "adding up" constraint required so as to impose discipline on the arbitrators? For example,

in a dispute like this one, should the arbitrators be required to ensure that each country's individual model does not combine to result in a counterfactual volume of total US cattle imports (i.e., combined from both sources) that is infeasible, given the underlying market conditions?

Consider again Figures 8 and 9, and suppose that the arbitrators had tentatively adopted the approach in Figure 8 to determine Mexico's counterfactual exports only and the approach in Figure 9 to determine Canada's counterfactual exports only. Demanding an adding up constraint would reveal that the *combination* of each separate model's prediction provides an implausibly large increase in total exports of cattle to the US market.

While the two cases illustrated in Figures 8 and 9 are the extremes, these simple exercises illustrate quite starkly a number of important issues likely to face any arbitrators in these types of disputes. Even though we have only relied on an extraordinarily simplistic economic (time trend) model to predict the counterfactual volumes, we are able to show that even slight (and arguably quite reasonable) differences in the methods of applying that model can yield wildly divergent results.

Furthermore, in the actual application that the arbitrators adopted in the *US-COOL* dispute, there were many other complicating factors beyond the COOL regulation that impacted Canadian and Mexican exports of cattle (and swine, not shown) to the US in the post-2008 period, including the Great Recession. We have documented a number of them as well in Section 2. Constructing a level of counterfactual exports depends heavily on which of these factors that the arbitrators take into consideration.

In this particular application, as outsiders we are unable to discern exactly which of the arbitrator's choices led to the authorized retaliation levels that we argued in the previous section were implausibly large.[18] Identifying the precise factors would require we had access to the underlying data and models.

4.3 Additional issues that arose in implementing the formula

There were a number of other important issues that arose in the process of carrying out the arbitration. We do not have sufficient space to assess them all here, though we flag two that raise additional concerns for the process.

The first important issue that arose involved Canada providing its counterfactual estimates based on weekly data and the US providing its counterfactual estimates based on monthly data; this mattered because the data themselves led to quite different results.[19] Canada argued that the weekly data were preferred, because the higher frequency provided more variation that was able to allow for more precise estimation. The US argued that there was likely to be more measurement error in the weekly data. The weekly series was collected by a different government agency (USDA/APHIS) than the one tasked with collecting data on official US trade statistics. Thus unlike the official trade statistics – that the US used in its estimates and which were only available at the monthly frequency – the APHIS series was not checked for errors, corrected, or revised.

There are two concerns here. The first issue facing the arbitrators in this instance is that each side has a legitimate argument on theoretical (statistical) grounds. The follow up question is then, which effect is larger and more likely to significantly bias the results? Unfortunately, that is a more difficult issue and may only be discerned empirically, and through careful examination of the data, if at all.

However, the second and separate concern that arises involves the potential long-run impact associated with the US government not being allowed to stop certain data from being used in the

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[18] It is worth noting that Canada chose September 2005 as its starting point for empirical estimates (p. 59), which is consistent with the concern that this particular export response after BSE could significantly influence the size of the results.

[19] See, in particular, the discussion on pp. 54-60.

arbitration. Would this encourage the United States to become less transparent and result in other intended consequences?

Indeed, this case involved a different US government agency collecting unofficial data on cattle border crossings for its own purposes of tracking animal health. But in so doing, the fact arose that such data inadvertently ended up harming the United States. Could this subsequently result in one US government agency (e.g., Census) being forced to instruct another US government agency (e.g., USDA) to not collect its own data on trade flows if it does not have the resources to revise it and reconcile it with other official US data series? Given that APHIS was collecting the data with good intentions, a byproduct of such a policy could be that such a prohibition inadvertently harms public (animal) health.

The second important issue arose because Canada and the United States used very different empirical approaches to establish their estimates.[20] Canada relied on econometric regression techniques, whereas the US chose to use a partial equilibrium, simulation model referred to as an equilibrium displacement model (EDM). The arbitrators did not rule out the US approach a priori, but they did not consider it seriously under the argument that they found the US implementation of the model flawed because the US assumed that the compliance costs of the COOL measure were nondiscriminatory, and that they also applied to the US industry.

An open question is whether the arbitrators would have been satisfied with a US model in which the US assumed that a US meatpacker using (some) imported Canadian livestock as an input faced a higher cost of compliance than a US meatpacker using only domestic US livestock.[21] While the US tried this in response to questions from the arbitrator, it only did so for the original COOL measure and not the amended COOL measure and so the arbitrators found that to be enough to dismiss it.

In our view, it is unfortunate that more attention was not payed to such an alternative approach. This is mainly because the parties and arbitrators constructed such widely divergent estimates for the size of these trade effects. A better understanding of the US model might have provided more insight as to what was really the source of these large differences. Knowing the source of the differences may have allowed the arbitrators to end up with an approach that was better motivated and that provided overall trade effect estimates that were more in line with the market reality. Again, as we already described in Section 3, the figures that they settled on seemed far too large.

5. Conclusions

This arbitration involved Canada and Mexico requesting and being granted the right to retaliate against the US for the lost export revenue associated with the US country of origin labeling regulation that was first put into effect in late 2008, at the same time as the global trade collapse and Great Recession. The arbitrators assessed the combined losses in Canadian and Mexican export revenue at over $1 billion. This is not only the second largest retaliation authorized by an arbitration, we have also argued that is likely to have been implausibly large, given that the peak value of their combined exports to the US market before the COOL regulation was roughly $2.5 billion in 2007.

Putting to the side our specific critiques, it is worth stating that the arbitrators in *US-COOL* should be praised for their transparency and in the level of detail they provided in their report. Especially relative to earlier Article 22.6 reports, this report made it much easier for outside analysts to identify potential sources of concern with the process and applied techniques. Hopefully this sort of feedback can help the process improve over the long term. However, such improvements are only possible

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[20] See, in particular, the discussion on pp. 62-67.

[21] The key here is "some" Canadian livestock. If the US firm used only Canadian livestock as an input for its beef production it would also not have to segregate.

because the arbitrators have been so transparent and provided such useful and rich detail in the first place.

To conclude, it is worth stepping back and considering the broader question of whether too much is being asked of the arbitrators in these cases. To help frame the discussion, suppose we compare what is being asked of the typical arbitrator with what is asked of an editor at a scholarly economics journal.

The editor has been given two extraordinarily complicated empirical economics papers. The author of each paper has been asked the same question. Each seeks to convince the editor that his answer is the correct one. The editor is not an expert in the area, and so she relies on referees (WTO Secretariat staff) for guidance. However, that is where the similarities end, as the arbitrator faces a number of additional constraints. First, there is no prior academic literature providing even an attempt to answer any question close to what these two papers are addressing. Second, unlike academic research, both papers reveal very little about their underlying assumptions, and they certainly provide no information as to the robustness of their estimates, where they break down, or where they are otherwise imprecise. Third, unlike a journal editor, she has very little leeway in the requests that she can make of each author to provide additional information (new specifications, robustness checks, etc.). Fourth, she has a very limited period of time in which to make her decision. Finally, unlike the journal, the arbitrator can only choose to "publish" and accept the results of one of the papers. In WTO dispute settlement, they can't both be right.

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Table 1. WTO Disputes Resulting in Retaliation Decisions by Article 22.6 Arbitrators

| Year of report	Dispute		Key Provisions	Award by the arbitrators	Retaliation Research
1999	DS27	*EC – Bananas III (US)*	GATT Article XIII	$191.4 mil	Bown (2002) Bown and Ruta (2010)
1999	DS26	*EC – Hormones (US)*	SPS Agreement	$116.8 mil	Bown (2002) Bown and Ruta (2010) Bernstein and Skully (2003)
1999	DS48	*EC – Hormones (Canada)*	SPS Agreement	CAN $11.3 mil	Bown (2002) Bown and Ruta (2010) Bernstein and Skully (2003)
2000	DS27	*EC – Bananas III (Ecuador)*	GATT Article XIII	$201.6 mil	Bown (2002) Bown and Ruta (2010)
2000	DS46	*Brazil – Aircraft* (Canada)	SCM Agreement GATT Article XVI	$344.2 mil	Bown and Ruta (2010)
2002	DS108	*US – FSC (EC)*	SCM Agreement	$4.043 bil	Howse and Neven (2005) Bown and Ruta (2010)
2003	DS222	*Canada — Aircraft Credits and Guarantees (Brazil)*	SCM Agreement	CAN $247.797 mil	Bown and Ruta (2010)
2004	DS136	*US – 1916 Act (EC)*	GATT Article VI, Antidumping Agreement	No specific amount, but related to size of any potential damage payments EC firms have to pay arising under 1916 Antidumping Act	Howse and Staiger (2006) Bown and Ruta (2010)
2004	DS217	*US –Offset Act (Byrd Amendment) (Brazil, Canada, Chile, EC, India, Japan, Korea, Mexico)*	GATT Article VI, Antidumping Agreement, SCM Agreement	0.72 * value of payments made the prior year under the Continued Dumping and Subsidy Offset Act of 2000	Bown and Ruta (2010)
2007	DS285	*US – Gambling* (Antigua and Barbuda)	GATS Article XVI	$21 mil	Bown and Ruta (2010)
2009	DS267	*US – Upland Cotton* (Brazil)	SCM Agreement Agreement on Agriculture GATT Article XVI	Annual formula computed and applied based on size of continued US subsidy	Grossman and Sykes (2011)
2015	DS384	*US – COOL (Canada)*	TBT Agreement	CAN $1.054 bil*	
2015	DS386	*US – COOL (Mexico)*	TBT Agreement	$227.758 mil	

Source: compiled by the authors. *Roughly $805 million. Unless stated otherwise, $ refers to current US dollars.

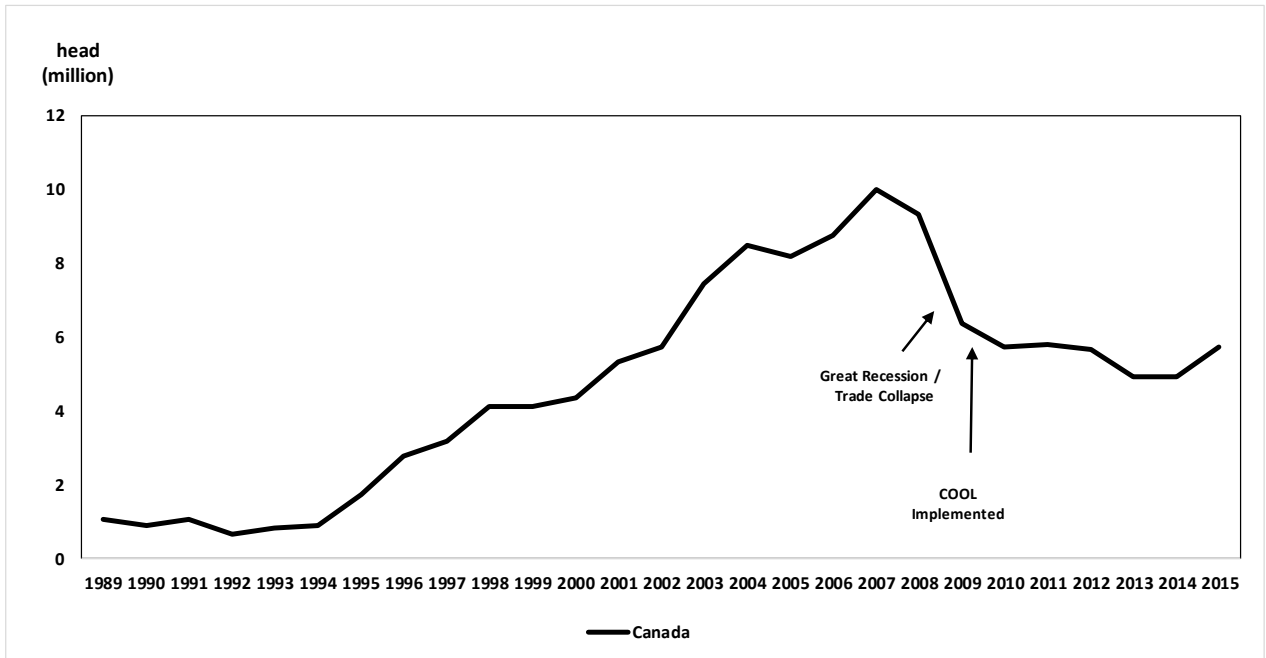**Figure 1. US Import Values of Products Subject to the *US – COOL* Dispute, 1989-2015**
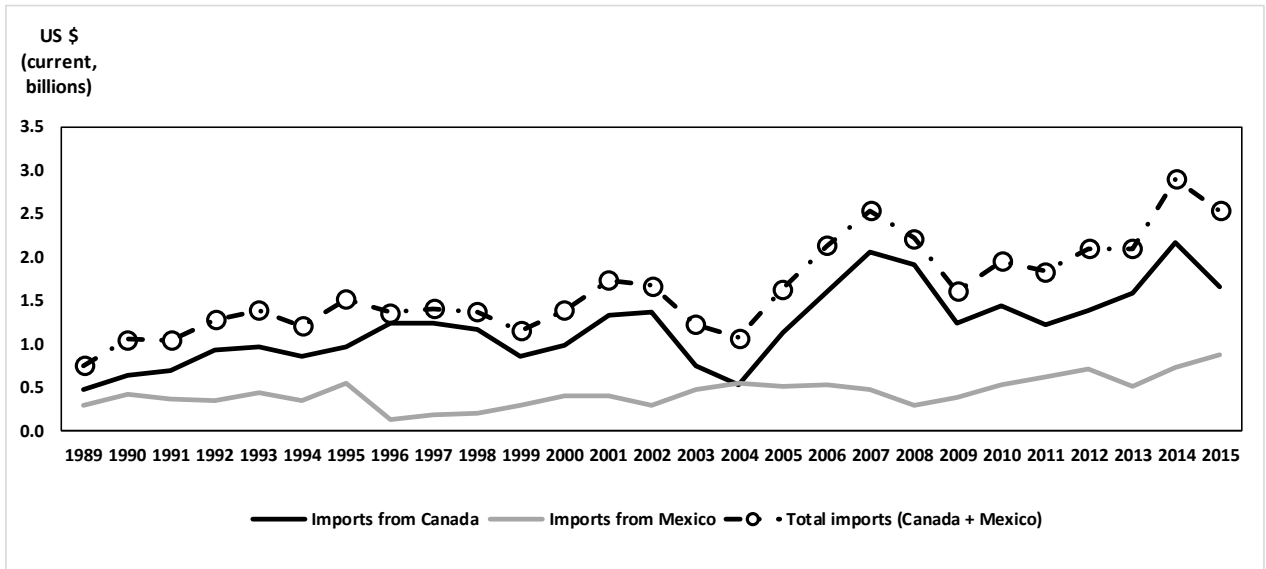
Source: constructed by the authors with data from the USITC's Dataweb.

Figure 2. US Import Volumes of Live Cattle by Source, 1989-2015
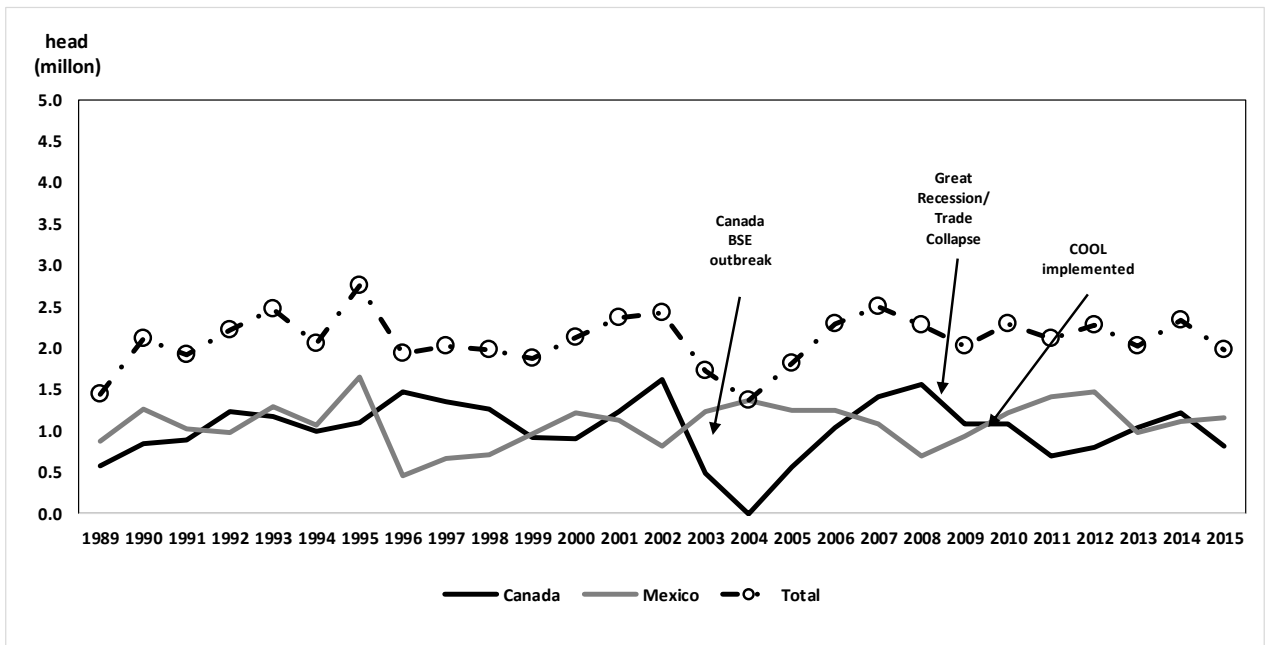
Source: constructed by the authors with data from the USITC's Dataweb

Figure 3. US Import Volumes of Live Swine by Source, 1989-2015

Source: constructed by the authors with data from the USITC's Dataweb. US did not import swine from Mexico during this period. US also had sporadic imports of swine – at very small volumes – from other countries, mostly in Europe, during this period.

Figure 4. The retaliation limit under the mathematical formulation of reciprocity
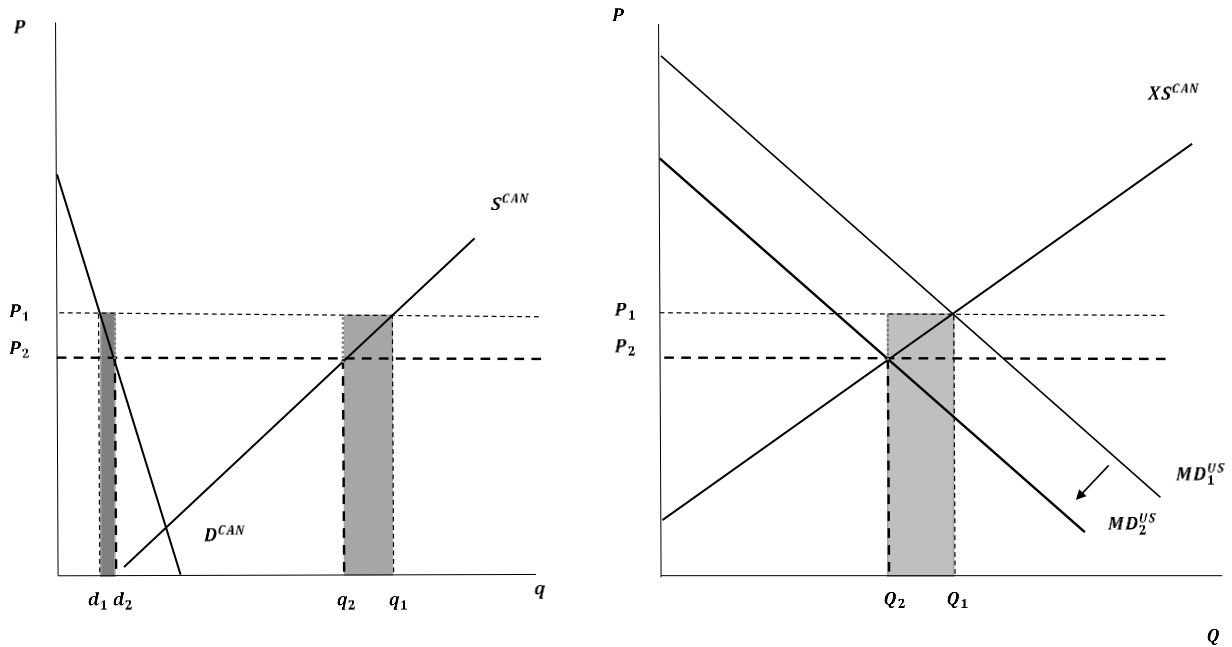
Figure 5. The retaliation limit under "trade effects"
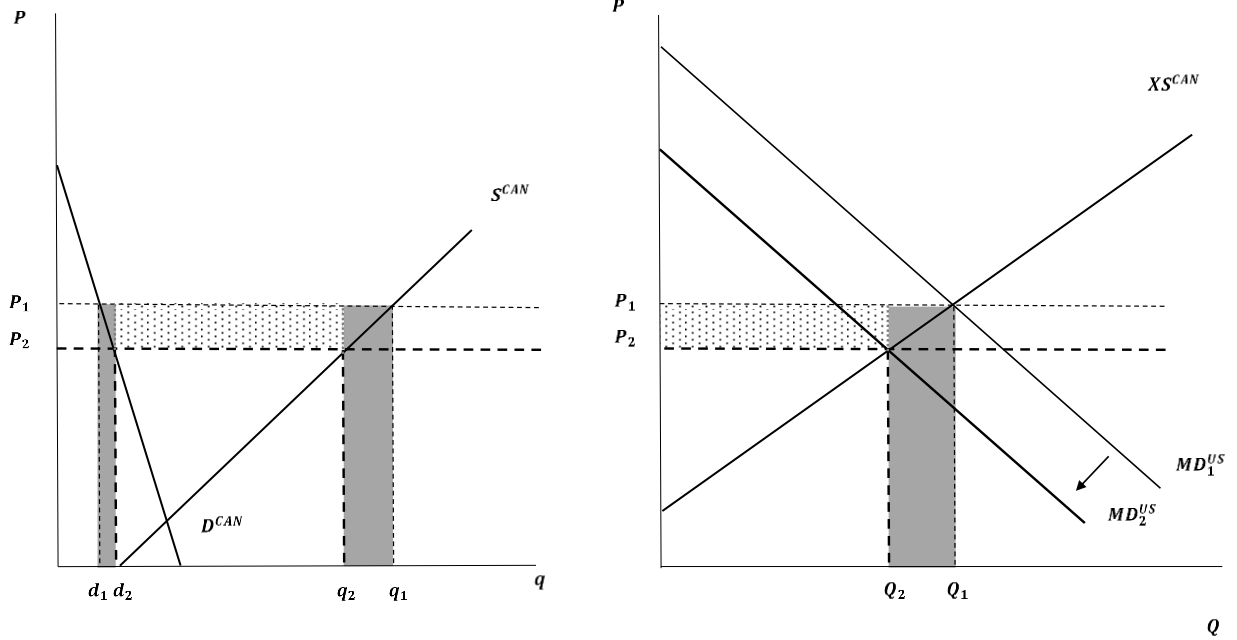
Figure 6. The retaliation limit under "trade effects" plus "domestic price suppression"
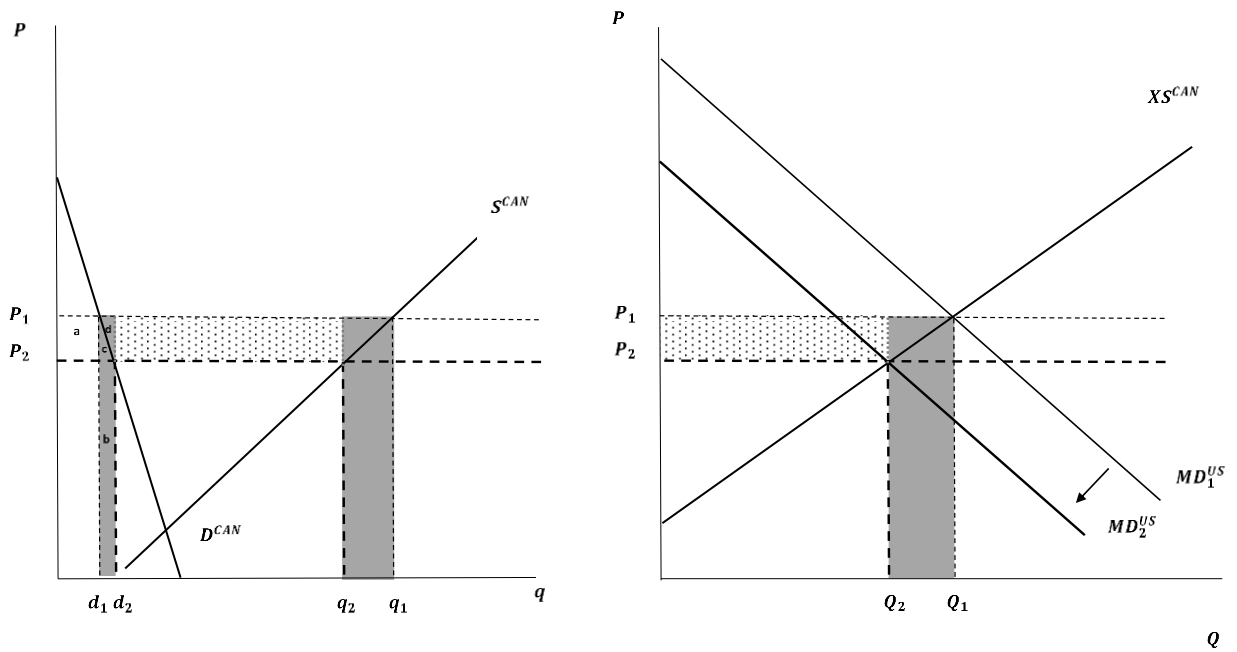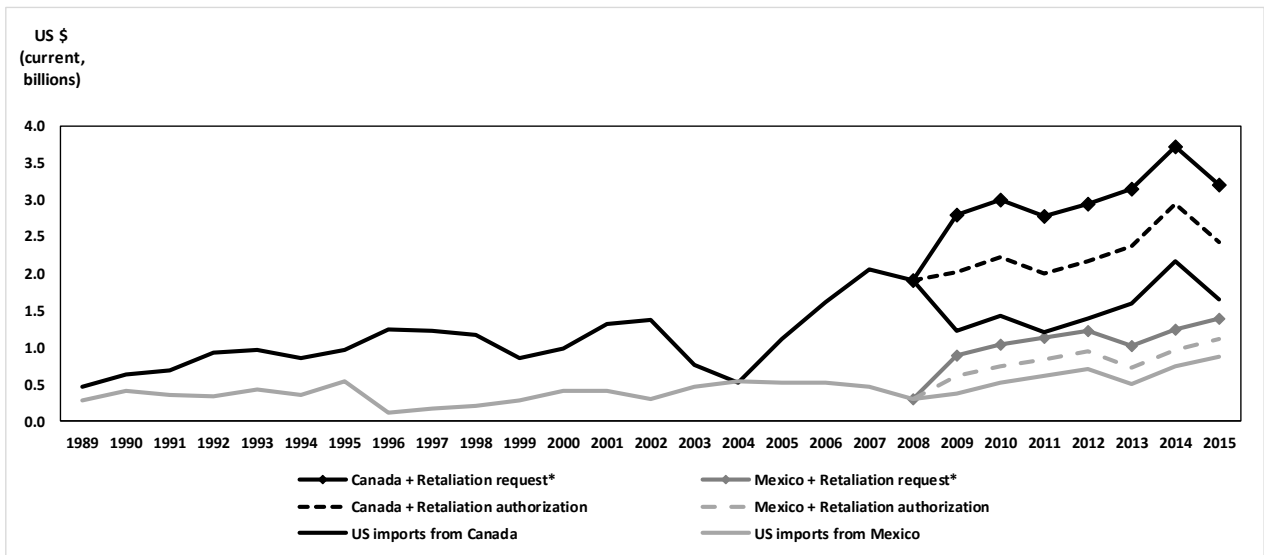
Figure 7. US Imports of Livestock and Implications of proposed WTO retaliation levels
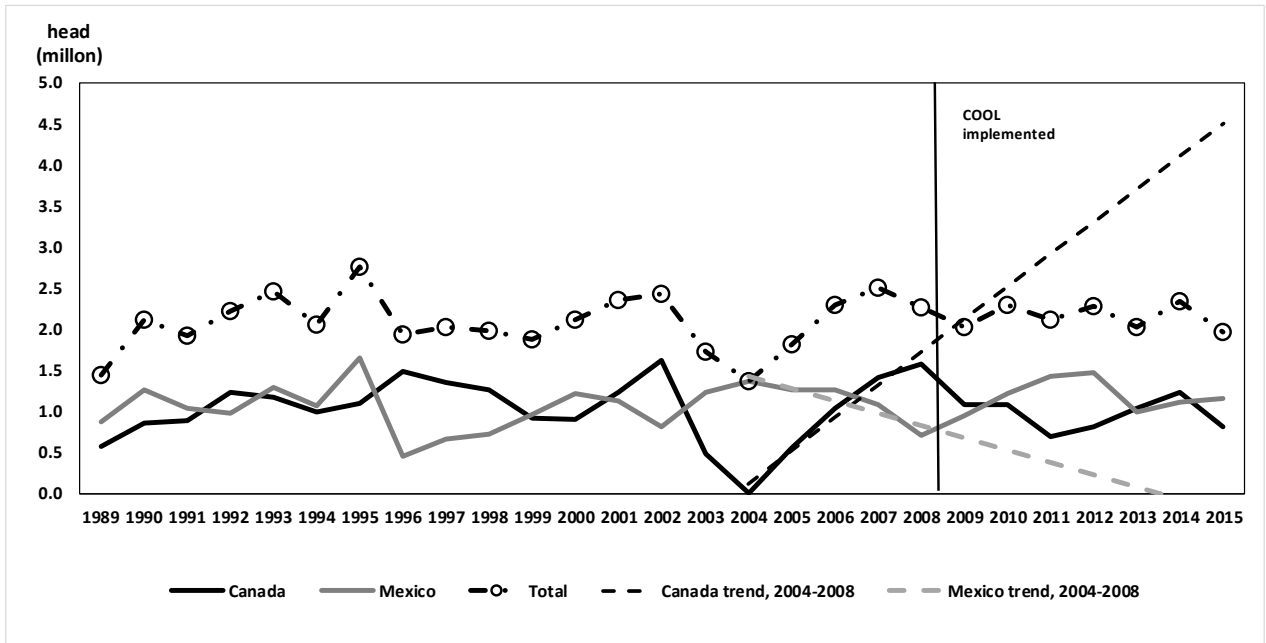

Source: constructed by the authors with data from the USITC's Dataweb and WTO reports. *indicates the retaliation requests limited to only the "trade effects" component and thus does not include the additional request for the "domestic price suppression" component (that the arbitrators denied formulaically).

Figure 8. Using 1989-2008 Total Trends to Construct Counterfactual Cattle Export Volumes
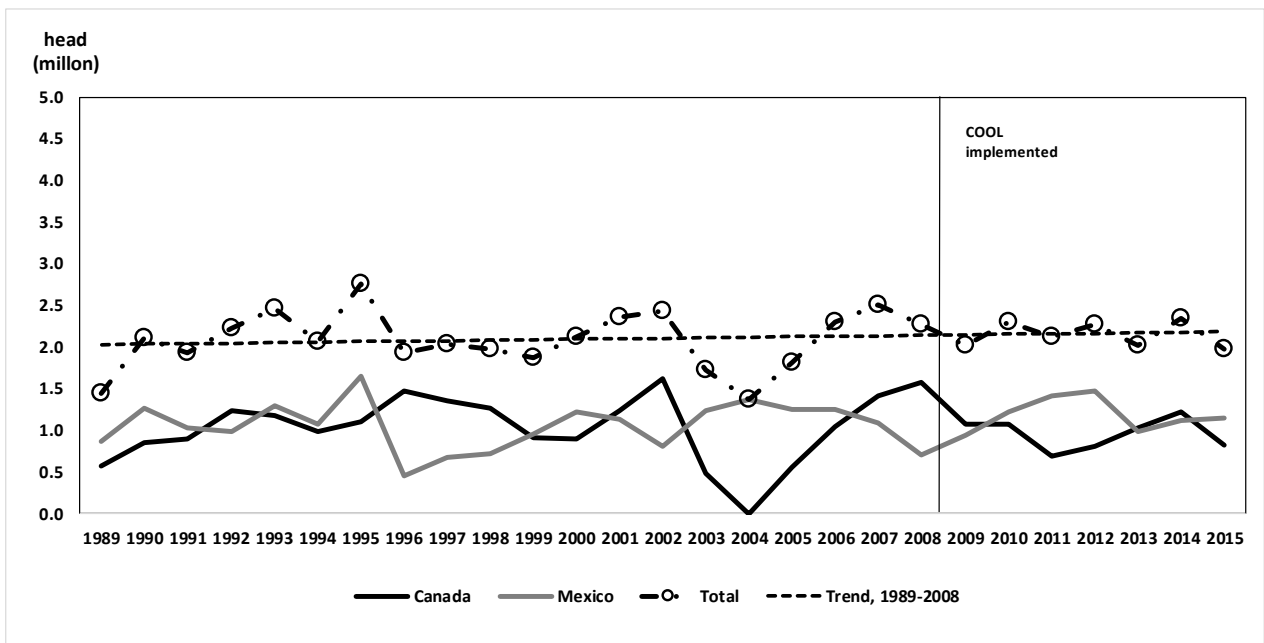
Source: constructed by the authors with data from the USITC's Dataweb.

Figure 9. Using 2004-2008 Bilateral Trends to Construct Counterfactual Cattle Export Volumes

Source: constructed by the authors with data from the USITC's Dataweb.

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