Applied Economic Perspectives and Policy (2016) volume 38, number 1, pp. 93–112.
doi:10.1093/aepp/ppv008
Advance Access publication on 12 April 2015.

Submitted Article

Quantifying the Effects of Mexico's Retaliatory Tariffs on Selected U.S. Agricultural Exports

Steven Zahniser*, Tom Hertz, and Monica Argoti

Steven Zahniser is an agricultural economist and Tom Hertz is an economist, both with the USDA Economic Research Service. Monica Argoti is an economist with the USDA Animal and Plant Health Inspection Service. Argoti contributed to this article while an intern in the Hispanic American Colleges and Universities (HACU) National Internship Program.

*Correspondence may be sent to: zahniser@ers.usda.gov.

Submitted 22 November 2011; accepted 18 February 2015.

Abstract *This article estimates the trade-reducing effects of the retaliatory import tariffs imposed by Mexico on selected U.S. agricultural products from March 2009 to October 2011 as part of the U.S.-Mexico trucking dispute. Using an autoregressive distributed-lag time series model of the targeted agricultural exports, we find that the tariffs reduced U.S. sales of these products to Mexico by $984 million (22%). We find no evidence that reduced exports to Mexico were offset by increased sales of these same goods to other countries. The large impact of the tariffs underscores the importance of the duty-free provisions of the North American Free Trade Agreement, as well as the potentially high costs of retaliatory trade measures.*

Key words: Trade, Mexico, United States, retaliatory tariffs, trucking dispute, NAFTA.

JEL codes: F13, F14, F15.

From March 2009 to October 2011, the Mexican government applied retaliatory tariffs to selected agricultural and nonagricultural products from the United States in response to U.S. noncompliance with the trucking provisions of the North American Free Trade Agreement (NAFTA) (Mexico, Secretaría de Economía 2009, 2010, 2011a, 2011b). Imposition of the tariffs took place within the framework of NAFTA's dispute resolution process and eventually yielded a formal agreement in July 2011 to end the lengthy dispute about whether and how to implement NAFTA's trucking provisions (NAFTA Arbitral Panel 2001; White House 2011). As part of the July 2011 agreement, the United States and Mexico agreed to create a new pilot program for U.S. and Mexican carriers wishing to provide cross-border, long-haul trucking services between the two countries. In addition, Mexico reduced its retaliatory tariffs by half and promised to eliminate the remaining half once the first Mexican carrier was approved under the new program. In October 2011, the first Mexican carrier was approved, and Mexico withdrew its tariffs.[1]

While the retaliatory tariffs were in effect, numerous U.S. agricultural interests complained about the tariffs' adverse effects on U.S. export sales to Mexico (Arnold 2010; Branson 2009). For example, the American Farm Bureau Federation (2008) warned that the tariffs could cost U.S. agriculture as much as $2 billion per year in lost sales to Mexico, while a back-of-the-envelope analysis by Zahniser, et al. (2015) concluded that the tariffs had reduced exports of the targeted agricultural products to Mexico by 21% ($1.1 billion) during the 32 months that the tariffs were in effect. However, a formal econometric assessment of these effects has not yet been conducted. The question of the impact of such retaliatory actions in the context of the free-trade area created by NAFTA gains urgency in light of other ongoing trade disputes, most notably the conflict regarding U.S. requirements for mandatory country-of-origin-labeling (COOL) for muscle cuts of beef and pork. This dispute, if not successfully resolved, could lead to retaliation against U.S. agricultural exporters by Canada and Mexico, just as the trucking dispute did (Menon and Tracy 2014).

To estimate the retaliatory tariffs' impact on the targeted products, we employ an autoregressive distributed-lag time series model of U.S. exports to Mexico of the agricultural tariff goods.[2,3] To explore the impact of the tariffs on specific agricultural tariff goods, we apply the estimated tariff elasticity obtained from an aggregate model of agricultural tariff good exports to Mexico to specific agricultural commodities, and we also estimate separate models for each commodity.

Background

When NAFTA was signed in 1992, the United States and Mexico agreed to allow people from either country to obtain operating authority to provide cross-border, long-haul trucking services between the two countries by January 1, 2000, following a transitional period from December 18, 1995, to December 31, 1999. During this period, operating authority would be limited to the U.S. border states for Mexico-based carriers and to the Mexican border states for U.S.-based carriers.[4] Neither the 1995 nor the 2000 deadline was met. Instead, the implementation of NAFTA's trucking provisions was repeatedly delayed.

[1]*See U.S. Department of Transportation, Federal Motor Carrier Safety Administration (2014) for program details.*

[2]*We use the term "tariff goods" to identify the products subjected to the retaliatory tariffs. A full list of these goods was compiled using the relevant announcements published by Mexico, Secretaría de Economía (2009, 2010, 2011a, 2011b) in the* Diario Oficial de la Federación—*Mexico's equivalent of the* Federal Register.

[3]*Our focus on agricultural tariff goods only is dictated by the specification of our econometric model, in which the unit value (price) of exports is a key explanatory variable. Price data are available for all agricultural tariff goods but not for all nonagricultural tariff goods.*

[4]*NAFTA's trucking provisions do not apply to routes that are exclusively within the United States or Mexico. Indeed, NAFTA preserves a U.S. moratorium on the provision of trucking services between points in the United States by persons from Mexico for domestic cargo, and it reserves the transportation of cargo by truck between points in Mexico for Mexican nationals and Mexican enterprises (see the U.S. and Mexican schedules of NAFTA's "Annex I: Reservations for Existing Measures and Liberalization Commitments [Chapters 11, 12, and 14]").*

Cross-border, long-haul trucking between the United States and Mexico is expected by some analysts to lower shipping and handling costs, shorten transit times, and reduce congestion and pollution (Haralambides and Londoño-Kent 2004; Fox, Francois, and Londoño-Kent 2003). While cross-border, *short-haul* trucking is generally allowed within the U.S. "border commercial zone" and Mexico's "northern perimeter," cross-border trucking beyond these areas usually requires at least three vehicles: "... a long-haul service that transports the cargo from Mexico/United States to a place near the border, a short-haul drayage truck that moves the goods across the border, and a third truck that delivers the cargo to its final destination beyond the U.S.-Mexico border commercial zone," (Prozzi et al. 2008: 1–2).[5] Analysis by Texas A&M International University suggests that cross-border, long-haul trucking could reduce the travel time between Chicago, Illinois, and Monterrey, Nuevo Leon, by as much as 40% (Pacific Economic Cooperation Council 2004). Cross-border, long-haul trucking is also likely to affect the relative attractiveness of trucking vis-à-vis other modes of cross-border transportation (i.e., rail and sea).[6]

Critics of NAFTA's trucking provisions have expressed concerns about the potentially negative impact of Mexican trucks on U.S. highway safety, the job security of U.S. truckers, and efforts to thwart the illegal trafficking of arms, drugs, and people. Citing concerns about highway safety, President Clinton indefinitely postponed implementation of the trucking provisions starting in December 1995, just as it was time to begin phasing in cross-border, long-haul trucking (NAFTA Arbitral Panel 2001). After consultations failed to resolve the dispute, the Mexican government successfully contested the postponement using NAFTA's dispute resolution procedure. In February 2001, a NAFTA Arbitral Panel (2001) ruled that "The U.S. blanket refusal to review and consider for approval any Mexican-owned carrier application for authority to provide cross-border trucking service was and remains a breach" of U.S. obligations under NAFTA. Under the dispute resolution procedure spelled out in Article 2019 of NAFTA, this ruling allows Mexico to suspend U.S. trade benefits of "equivalent effect" to the trucking provisions until those provisions are implemented (Organization of American States 2015).

For nearly a decade, the Mexican government opted not to suspend any U.S. trade benefits, as President George W. Bush tried to fulfill his campaign promise to implement NAFTA's trucking provisions. First, the Bush administration surmounted a legal challenge that an environmental impact assessment was required before the provisions could be implemented (*U.S. Department of Transportation v. Public Citizen*; U.S. Supreme Court Reports 2006). The Bush administration then secured the cooperation of the Mexican Government to allow U.S. regulators to inspect participating Mexican carriers in Mexico, which was one of many safety requirements for cross-border, long-haul trucking enacted by the U.S. Congress in Section 350 of the Department

[5]The U.S. border commercial zone generally extends "up to 25 miles north of United States border municipalities in California, New Mexico, and Texas (or 75 miles in Arizona)" (U.S. Department of Transportation, Office of Inspector General 2014: 1). Mexico's northern perimeter for short-haul, cross-border trucking generally extends 20 kilometers (about 12 miles) south of the border (Mexico, Secretaría de Comunicaciones y Transporte 2003).

[6]Interestingly, some Mexico-domiciled carriers already had obtained limited authority to operate beyond the U.S. border commercial zone prior to 2009, when the retaliatory tariffs went into effect. Downey, et al. (2008) count a total of 861 Mexican carriers with 1,749 trucks that operated in the United States beyond this zone in 2008.

of Transportation and Related Agencies Appropriations Act, 2002 (U.S. Statutes at Large 2001). Finally, in December 2007, the Bush administration implemented a demonstration project that "allowed up to 100 Mexico-domiciled motor carriers to operate beyond the U.S. border commercial zones and the same number of U.S. carriers to operate in Mexico," (U.S. Department of Transportation, Federal Motor Carrier Safety Administration 2009).

Opposition to the pilot project crystallized in the U.S. Congress in the form of legislative amendments designed to prohibit the project's establishment or end its funding. The Consolidated Appropriations Act of 2008, signed into law by President Bush in December 2007, included one such amendment (U.S. Statutes at Large 2007), but the Bush administration interpreted this restriction as applying to future demonstration programs and not the one that was already underway (MacDonald 2009). A similar but more explicitly-worded amendment was inserted into the Omnibus Appropriations Act, 2009 (U.S. Statutes at Large 2009), which President Obama signed into law on March 11, 2009. This time, the U.S. Department of Transportation immediately terminated the demonstration project, and a week later, on March 18, 2009, the Mexican government unveiled its retaliatory tariffs, which took effect the following day (Mexico, Secretaría de Economía 2009).

Retaliation and Resolution

The initial set of retaliatory tariffs issued in March 2009 covered 34 agricultural products and 43 nonagricultural products, with rates ranging from 10–45% and generally corresponding to Mexico's most-favored-nation (MFN) tariff levels. During the 36-month period that immediately preceded the tariffs' imposition (March 2006 to February 2009), U.S. exports to Mexico of the initial tariff goods averaged $2.2 billion per year, compared with $153.0 billion for total U.S. exports to Mexico. The initial tariffs focused disproportionately on agricultural products, covering about 6% of U.S. agricultural exports to Mexico but just 1% of nonagricultural exports and of exports overall. The four largest tariff goods (in terms of annual average exports to Mexico, March 2006 to February 2009) were:

- Waste of primary cells, primary batteries, or accumulators, electric; and primary cells, primary batteries, or accumulators, electric, not functioning ($273 million).
- Articles of jewelry and parts thereof, of precious metal other than silver, excluding gold brooches and chains in continuous roll greater than or equal to 10 meters in length ($224 million).
- Prepared soups and broths and preparations for such foods ($178 million).
- Condiments other than soy sauce, ketchup, other tomato sauces, mustard, and mustard meal ($108 million).

As U.S. and Mexican negotiators attempted to resolve the growing dispute, the Mexican government expanded its retaliatory tariffs to cover an additional 21 agricultural products and 7 nonagricultural products, effective August 19, 2010 (Mexico, Secretaría de Economía 2010). Among the new tariff goods were two agricultural commodities that had been the subject of antidumping investigations since NAFTA's implementation in 1994—pork (fresh, chilled, or frozen, bone-in, representing a value of $334 million) and fresh apples (representing a value of $205 million)—and two prominent nonagricultural products—hot melt adhesives (representing a value of $145 million) and certain aluminum containers (representing a value of $57 million). At the same time, Mexico lowered the retaliatory tariffs on fresh grapes (from 45% to 10%) and frozen potatoes (20% to 5%), and it eliminated the tariffs altogether for over a dozen nonagricultural products, including the two leading products initially targeted by the tariffs.

Implementation of the bilateral agreement establishing the new pilot trucking program appears to have ended this dispute. As part of that agreement, Mexico reduced its retaliatory tariffs by half, effective July 8, 2011, and it eliminated the tariffs in their entirety on October 21, 2011 (Mexico, Secretaría de Economía 2011a; 2011b), shortly after the first Mexican truck with operating authority under the new trucking program crossed into the United States (Watson 2011). The pilot program expired on October 11, 2014, and in January 2015, the U.S. Department of Transportation's Federal Motor Carrier Safety Administration (2015) announced that it was accepting applications for Mexico-domiciled long-haul motor carriers. Participation in the pilot program was limited. Only 13 Mexico-domiciled carriers successfully participated, established records of safety, and were issued new certificates of operating authority registration at the program's end, while data on the number of participating U.S.-domiciled carriers are not readily available. Frittelli (2014) reports that "Most U.S. trucking firms offering services in Mexico do so through a partnership with a Mexican trucking firm."

Methods

We use an autoregressive, distributed-lag, time-series equation to model the relation between the retaliatory tariff rate set by the Mexican government and the quantity of monthly U.S. exports to Mexico of agricultural tariff goods. We then run a second model of agricultural tariff good exports to countries other than Mexico in order to determine whether U.S. exporters recouped some of their lost revenues by increasing sales of these products to other countries. Finally, we run a set of commodity-specific models to assess the validity of our results for the aggregate of all tariff goods.

The aggregate regressions have the following form:

$$\begin{aligned} LogQ_t = {} & \alpha + \beta_1 LogTariff_t + \beta_2 LogTariff_{t-1} + \gamma_1 LogGDP\_IMP_t \\ & + \gamma_2 LogGDP\_US_t + \rho_1 LogP_t + \rho_2 LogP_{t-1} + \rho_3 LogP_{t-2} \\ & + \rho_4 LogQ_{t-1} + \rho_5 LogQ_{t-2} + \lambda Time_t + \sum_{m=2}^{12} \delta_m D_m + u_t. \end{aligned} \quad [1]$$

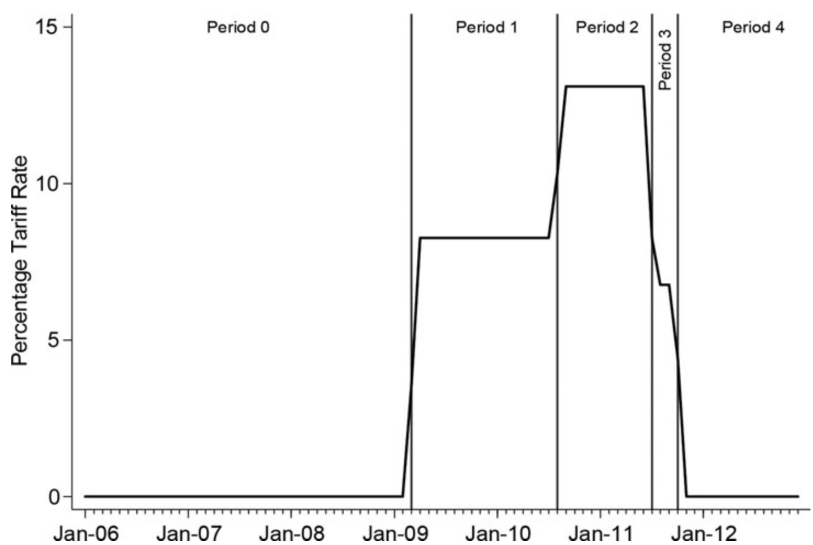
In this equation, the dependent variable is the natural logarithm of the quantity (in metric tons) of U.S. exports of the agricultural tariff goods to the specified destination (Mexico or all countries other than Mexico) in month t.[7] The explanatory variables of primary interest are $LogTariff_t$ and

[7] *Because the equation is specified in logarithms of prices and quantities, and because the log of the average price per ton appears as an explanatory variable, the results from this equation are identical to*

LogTariff$_{t-1}$, which equal the log of 100, plus the value-weighted average tariff rate (expressed as a percentage) that was in effect for tariff goods exported to Mexico in month t (or $t-1$). A 5% average tariff is thus represented as log(105), while the *LogTariff* variable takes on a constant value of log(100) when the retaliatory tariffs are not in effect. As the average tariff rate rises and then falls over time, the change in *LogTariff*$_t$ captures the *ex ante* percentage change in the price faced by importers that is attributable to the imposition of the tariff. Figure 1 shows the evolution of the value-weighted average tariff rate for the agricultural tariff goods, where the weights are fixed in time and are determined by the long-run average distribution of export revenues across these products. This use of fixed weights means that endogenous changes in the mix of commodities exported to Mexico will not distort the analysis. Figure 1 also illustrates the five periods relevant to our analysis of the retaliatory tariffs: period 0 (pre-tariff, January 2006 to February 2009); period 1 (first set of tariffs in effect, March 2009 to August 2010); period 2 (second set in effect, September 2010 to July 2011); period 3 (third set in effect, August 2011 to October 2011); and period 4 (post-tariff, November 2011 to December 2012).

The inclusion of the one-month lag term *LogTariff*$_{t-1}$ allows for a delayed effect of the tariffs on exports. The full tariff effect is then captured by $\beta_1 + \beta_2$, which is an elasticity of exports with respect to the price faced by importers and is expected to be negative. An alternative specification containing higher-order lags of the tariff variable was rejected using the Bayesian

Figure 1 Average retaliatory tariff rate on agricultural tariff goods, January 2006 to December 2012



Note: Vertical lines, from left to right, denote the months of March 2009 (when the retaliatory tariffs were first imposed), August 2010 (when the tariffs were modified), July 2011 (when the tariffs were cut by half as part of the agreement-in-principle to settle the trucking dispute), and October 2011 (when the tariffs were eliminated).
Source: Authors' calculations.

those that are obtained using the log of the nominal dollar value of exports as the dependent variable, and controlling for the corresponding lagged terms on the right-hand side of the equation.

Information Criterion (BIC), as was an alternative specification with no lags in this variable.

In order for equation (1) to identify the causal effect of the tariff, we must control for contemporaneous economic factors that affect exports and may be incidentally correlated with the rise and fall of the average tariff. Most important among these are the wide swings in national income for the United States, Mexico, and the rest of the world that resulted from the international financial crisis and recession of 2008–09. Just prior to the first tariff period, the dollar value of Mexico's national income, and hence Mexico's ability to purchase U.S. products, fell by about one-third due to the combined effects of a contraction in Mexico's real gross domestic product (GDP) and a depreciation of the Mexican peso against the U.S. dollar. Over the course of period 1, the Mexican economy recouped about half of these losses. This variation in purchasing power is captured by the variable $LogGDP\_IMP_t$, which is the log of nominal dollar GDP for Mexico (in the main regression) or the trade-weighted average of nominal dollar GDP for all other importing countries (in the second regression; in constructing this weighted average GDP, long-run export revenue shares for each country are used as fixed weights). Its coefficient (γ_1) is expected to be positive.

The U.S. economy contracted by a smaller percentage than the Mexican economy in 2008 but has recovered more slowly since, and this variation is captured by $LogGDP\_US_t$. Because almost all of the commodities that were subject to tariffs are sold into domestic as well as foreign markets, increases in U.S. GDP and hence in aggregate demand are expected to divert U.S. output away from export markets, implying a negative sign for the parameter γ_2. Lagged terms in U.S. and foreign GDP were rejected by the BIC.

Commodity prices are assumed to be determined exogenously by world market conditions and not affected by Mexico's retaliatory tariffs; $LogP_t$ is the log of a value-weighted price index of tariff goods (average dollars per metric ton). This index was highly volatile, with seasonal variation on the order of 30%, and a positive secular trend of almost 5% per year. The inclusion of $LogP_t$ prevents any spurious correlation between these price changes (which may be expected to have an effect on export quantities) and the changes in the tariff rate from biasing our estimates of the tariffs' impact, while the inclusion of $LogP_{t-1}$ and $LogP_{t-2}$ allows price changes to have a delayed impact on foreign demand for U.S. exports. Higher-order lags in the price variable were rejected by the BIC, as were the models with one or no lagged price terms. The inclusion of two lags of the dependent variable ($LogQ_{t-1}$ and $LogQ_{t-2}$) improves the model's fit and eliminates first-order serial autocorrelation in the residuals, according to Durbin's (1970) test; the use of additional lags of the dependent variable was rejected by the BIC, as was the model with no lagged dependent variable.[8]

The final variables are a linear time trend ($Time_t$, counted in months) and a set of dummy variables for the 12 calendar months (omitting January as the reference group) to account for seasonal variation in export supply and demand. Higher order polynomial terms in $Time_t$ were considered, but

[8] *It is sometimes asserted that including a lagged dependent variable in the presence of autocorrelated error terms necessarily results in bias, but this is true only under the assumption that the error terms follow an AR(1) process. If present, this bias can be detected by adding higher-order lag terms. In the present application, higher-order lags in the dependent variable generally made little difference to the estimates, were statistically insignificant, and were not preferred by the information criterion.*

their coefficients were small, statistically insignificant, and not preferred by the BIC. The use of year dummies (a more flexible, nonparametric approach to controlling for annual time trends) was rejected because of their high collinearity with the tariff variable. Last, the random error term (u_t) is assumed to be contemporaneously exogenous, so that $E(u_t|LogTariff_t \ldots D_{12}) = 0$ for all t.

All regression models were tested for serial autocorrelation using Durbin's (1970) alternative test statistic, and some statistically significant autocorrelation was detected at higher lags. To correct for this, all inference is based on Newey-West standard errors, calculated using the first 12 lags of the error term; this approach is robust to both heteroskedasticity and autocorrelation of an unspecified form. The outcome variables in the main and ancillary regressions were also tested for unit root behavior using Dickey and Fuller's (1979) statistic; in both regressions, the unit root hypothesis was rejected, provided a time-trend term was included in the test regression (as it is in the estimation equations). This increases our confidence that the relationship we quantify between tariffs and exports is not spurious, but rather captures a causal connection.

The model's parameter estimates were used to calculate a set of fitted values for U.S. exports to Mexico of tariff commodities in each month, and a set of counterfactual predicted values, which differ only in that the tariff rate is set to zero during the tariff period. These predicted values are estimates of the value of U.S. exports of tariff goods to Mexico that would have occurred had tariffs not been imposed.[9]

Our data cover the period from January 2006 to December 2012, which includes the entire 32-month period when the retaliatory tariffs were in effect, as well as the 38 months prior to the tariffs and the 14 months that followed them. Agricultural export data were drawn from the *Global Agricultural Trade System* of USDA's Foreign Agricultural Service (FAS; 2015). This dataset features detailed U.S. agricultural trade data (values, quantities, and unit values) obtained from the Census Bureau's *Foreign Trade Statistics*. Nominal GDP data for the United States, Mexico, and other countries were obtained from the *World Economic Outlook Database* of the International Monetary Fund (IMF; 2011). To convert Mexico's GDP from pesos to dollars, Mexico's nominal GDP was multiplied by the nominal exchange rate found in the *Agricultural Exchange Rate Data Set* of USDA's Economic Research Service (ERS; 2011), which compiles data from the IMF's *International Financial Statistics* and the Federal Reserve Board's *Financial Statistics*.

Mexico's tariff schedule differs somewhat from the U.S. schedule, so a harmonization of the two was required in order to match the commodities subject to the tariffs with the corresponding U.S. export data. For instance, the single U.S. tariff line for dates corresponds to two Mexican tariff lines, while the single Mexican tariff line for concentrates of juice from fruit or vegetables enriched with vitamins or minerals corresponds to two U.S. tariff lines. In addition, we eliminate fresh Christmas trees from our analysis since U.S. export statistics do not include a specific category for this product and since Mexico rarely imports fresh Christmas trees during any month other than November and December. Overall, the 34 tariff lines in Mexico's original set of retaliatory tariffs correspond to 32 tariff lines in the U.S.

[9]Duan's (1983) smearing adjustment was used to correct for the bias introduced by transforming log fitted values back into dollar terms; the correction factor, however, was trivial, at 1.002.

export data. Table 2 includes a concordance between the Mexican tariff lines subject to the retaliatory tariffs and the U.S. tariff lines associated with our models. We would have liked to include in our analysis the nonagricultural products targeted by the retaliatory tariffs, but U.S. trade data provide limited information regarding the unit prices of these exports.

Results from Aggregate Model

Table 1 lists the parameter estimates from the model of aggregate exports of agricultural tariff goods to Mexico. The sum of our two main coefficients of concern—the logarithm of the average tariff rate and the one-period lag of this logarithm—measures the elasticity of exports in response to the tariff. This sum equals −2.60 and is statistically less than zero according to a one-tailed t-test, with $p < 0.001$. We interpret the relatively high price elasticity estimates from our model as a sign of the potency of tariffs as a retaliatory tool.

The coefficient on the first lag of the dependent variable is positive and significant, indicating the presence of positive, first-order serial correlation in exports, while the second-order term is insignificant. The coefficient for the contemporaneous price effect is negative, as is expected in a demand equation.[10] The positive coefficient for Mexican GDP captures the positive impact of Mexican income on demand for the agricultural tariff goods, while the negative coefficient for U.S. GDP reflects the negative impact of U.S. income on the supply of the tariff goods available to Mexican buyers. The positive coefficient for the time trend reveals an upward trend in the targeted exports during the period studied. As a group, the coefficients for the month indicators suggest a strong seasonal pattern in U.S. agricultural exports that peaks in the fourth quarter of the calendar year, as farm products enter the market after harvest.

To investigate whether the retaliatory tariffs diverted trade from Mexico to other markets, we estimate an identical model in which the dependent variable is the log of U.S. exports of agricultural tariff goods to countries other than Mexico. In this model (whose results are also presented in table 1), the sum of the coefficients for the log of the average tariff rate and the one-period lag of this log equals −0.03 and is not statistically significant. This finding indicates that U.S. exporters were unable to offset their lost sales in Mexico due to the retaliatory tariffs by selling to third-country markets, and suggests that our model of tariff products exported to Mexico captures the net rather than gross loss in sales.

Estimates of Tariff Impact

The full effect of the retaliatory tariffs over the period examined is calculated by comparing the model's fitted values with its predicted export levels had the tariffs not been implemented. Figure 2 graphically represents the aggregate model's estimation of the targeted U.S. agricultural exports to Mexico before the tariffs' imposition (period 0), during their application (periods 1, 2, and 3), and after their removal (period 4). As one can see in

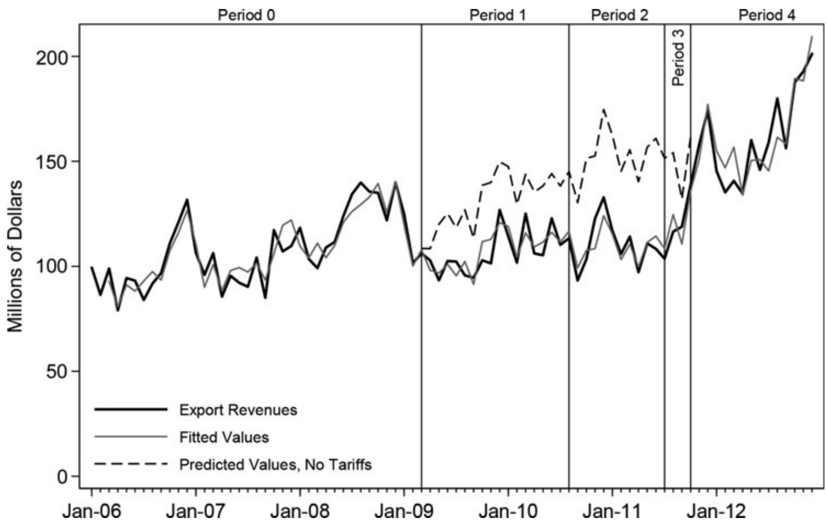
[10] The first lag of price also enters with a significant negative coefficient; and while the second lag carries a significant positive coefficient, the sum of the three price terms, which is an estimate of the medium-run price effect, is negative (−0.66) and statistically significant ($p<0.01$).

Table 1 Parameter Estimates and Newey-West Standard Errors (in parentheses) from Aggregate Models of U.S. Exports of Agricultural Tariff Goods

Variable	**Exports to Mexico model**	**Exports to rest of world model**
Log of tariff rate	−0.16	−0.55
	(0.445)	(0.342)
One-period lag of log of tariff rate	−2.45 ***	0.53
	(0.787)	(0.330)
Total effect	−2.60 ***	−0.03
	(0.575)	(0.204)
Log of price	−0.673 ***	−0.707 ***
	(0.093)	(0.208)
One-period lag of log of price	−0.368 ***	0.099
	(0.177)	(0.223)
Two-period lag of log of price	0.672 ***	−0.070
	(0.135)	(0.204)
One-period lag of log of export quantity	0.292 ***	0.495 ***
	(0.099)	(0.090)
Two-period lag of log of export quantity	−0.002	−0.078
	(0.093)	(0.087)
Log of Mexican/rest of world GDP	0.880 ***	0.096
	(0.313)	(0.177)
Log of U.S. GDP	−4.926 **	0.970
	(1.944)	(0.586)
Month trend	0.012 ***	0.003 **
	(0.004)	(0.001)
Seasonality:		
February	−0.104 ***	0.048
	(0.035)	(0.052)
March	0.028	0.146 ***
	(0.056)	(0.024)
April	−0.118 ***	−0.005
	(0.037)	(0.038)
May	0.031	0.113 **
	(0.045)	(0.044)
June	0.054	0.046
	(0.032)	(0.045)
July	−0.029	0.065
	(0.040)	(0.047)
August	0.047	0.063 **
	(0.037)	(0.028)
September	−0.030	0.097 ***
	(0.038)	(0.031)
October	0.124 ***	0.266 ***
	(0.036)	(0.043)
November	0.123 ***	0.187
	(0.038)	(0.032)
December	0.192 ***	0.078 *
	(0.038)	(0.040)
Intercept	56.863 ***	0.707
	(17.947)	(4.667)

****Significant at the 99% level using a two-tailed t-test.*
***Significant at the 95% level. *Significant at the 90% level.*
Source: Authors' estimates.

Figure 2 Mexico's retaliatory tariffs had a marked effect on the targeted U.S. agricultural exports to that country



Note: Vertical lines, from left to right, denote the months of March 2009 (when the retaliatory tariffs were first imposed), August 2010 (when the tariffs were modified), July 2011 (when the tariffs were cut by half as part of the agreement-in-principle to settle the trucking dispute), and October 2011 (when the tariffs were eliminated).
Source: Authors' estimates based on model results.

the figure, the model does a good job of capturing the decline of these exports following the imposition of the tariffs and the recovery of these exports following the tariffs' removal, as well as the seasonal and secular fluctuations in these exports. The fitted values (light solid line) move closely together with the actual values (dark solid line), usually reaching their highest values during the last quarter of the calendar year, when many U.S. farm products enter the market. Pears, onions, and grapes are the principal products among the tariff goods that are responsible for this pattern.

The dashed line in figure 2 indicates the predicted value of exports of tariff goods had the tariffs not been imposed. By subtracting the fitted values from the predicted values, one can estimate the reduction in exports due to the tariffs. For instance, in October 2009, the fitted value of the targeted exports to Mexico was $112 million, and the predicted value in the absence of the tariffs was $139 million, so the estimated reduction in exports was $27 million, or 19% of the predicted value in absence of the tariffs. We calculate the total estimated reduction in exports by summing up the estimated reductions for each month during the tariff period. According to the aggregate model, the total reduction during the 32-month period equals about $984 million, or 22%. This amount is nontrivial in size and indicative of the importance of duty-free access to the Mexican market to U.S. agricultural exporters, as provided by NAFTA.

Commodity-Specific Results

To explore the impact of the retaliatory tariffs at the commodity level, we adopt two approaches. First, we apply the estimated tariff effect from our aggregate model of agricultural tariff good exports to Mexico to the export levels and retaliatory tariff rates for each individual tariff good in our analysis. For example, a commodity subject to a 10% tariff would see a 26% reduction in exports, given the estimated tariff elasticity of −2.60 obtained from the aggregate model. Second, we estimate a set of commodity-specific models for each of our agricultural tariff goods. In this set of models, our model specification is largely identical to our aggregate model, except that our price and quantity variables reflect the export levels for the tariff good in question, while our tariff variables measure the retaliatory tariff rate in effect for that particular commodity. We do not make further modifications to the model's specification that might account for the influence of factors specific to the market for that commodity, such as changes in production levels due to unusual weather conditions or the opening of new processing facilities, in either Mexico or the United States. For many of the tariff goods, there are some months when zero exports to Mexico are observed. To cope with this feature of the data, we estimate our model using the Poisson pseudo-maximum likelihood (PPML) technique, which has a functional form that is equivalent to the logarithmic model of equation 1. The results of these models are used to compare actual exports to estimates of what exports would have been absent the tariffs, for each commodity, in exactly the same way that the aggregate model was used to estimate total export losses.

Table 2 summarizes the findings of our commodity-specific analysis.[11] When the estimated tariff elasticity from our aggregate model is applied to the individual tariff goods, the sum of the tariff effects is about $923 million. This total is somewhat less than the total from our aggregated model ($984 million) because the weighted average tariff in the aggregate model is calculating using fixed weights (i.e., the composition of tariff goods is held constant over time in order to avoid endogeneity), whereas the individual models implicitly use weights that vary as the product mix changes over time. In this approach to the commodity-specific analysis, the four agricultural tariff goods with the largest lost sales to Mexico due to the retaliatory tariffs are as follows: condiments other than soy sauce, ketchup and other tomato sauces, mustard meal, and prepared mustard ($126 million); fresh apples ($119 million); prepared soups and broths and preparations for such foods ($98 million); and fresh pears ($71 million).

When separate models are estimated for each agricultural tariff good, the sum of the logarithm of the average tariff rate and the one-period lag of this logarithm is negative and statistically significant at the 90% level using a one-tailed *t*-test in 26 of the 50 commodity-specific models, and the sum is negative but insignificant in another 11 models. We attribute the varying performance of these regressions to the absence of explanatory variables specific to the market for each agricultural tariff good that might more fully explain variations in export levels. Among the 26 models where the sum of coefficients is negative and significant, the four agricultural tariff goods that experienced the largest reductions in exports to Mexico due to the tariffs are as follows: fresh grapes ($116 million); fresh apples ($51 million); prepared and processed nuts other than peanuts and almonds ($49 million); and prepared soups and broths and preparations for such foods ($48 million).

[11] *The full set of results for the commodity-specific models is available from the authors upon request.*

Table 2 Commodity-specific Analysis of Retaliatory Tariffs

Mexican HS code	U.S. HS code in GATS	Commodity (Mexican HS code)	Estimated impact of retaliatory tariffs: Based on elasticity from aggregate model	Based on commodity-specific model
			Millions of dollars	
		Aggregate model, 50 commodities	**−984.0**	**n.a.**
		Total, 50 commodity-specific models	**−923.3**	**−550.1**
0203.12.01	0203.12	Meat of swine, legs, ham, & cuts thereof, bone-in, fresh or chilled	−48.7	−37.8
0203.22.01	0203.22	Meat of swine, legs, ham, & cuts thereof, bone-in, frozen	−5.2	−6.5
0406.10.01	0406.10	Fresh cheese (unripened or uncured), including that from whey cheese, and curd	−12.3	−14.1
0406.30.99	0406.30	Processed cheese, not grated or powdered	−1.1	−1.3
0406.90.04 & 0406.90.99	0406.90.9550	Cheese, not elsewhere specified or indicated	−58.6	−14.7
0604.91.02	0604.91 (2006–11) & 0604.90 (2012) (Nov. & Dec. only)	Christmas trees, fresh		
0703.10.01	0703.10	Onions	−9.8	−17.5
0705.11.01	0705.11	Iceberg lettuce	−2.7	−4.3
0710.40.01	0710.40	Sweet corn, frozen	−2.7	n.s.
0802.12.01	0802.12	Almonds, shelled	−34.9	n.s.
0802.50.01 & 0802.50.99	0802.50, 0802.51, & 0802.52	Pistachios, fresh or dried	−3.4	−12.8
0804.10.01 & 0804.10.99	0804.10	Dates, fresh or other	−0.6	n.s.
0805.10.01	0805.10	Oranges, fresh or dried	−2.5	−0.9
0805.40.01	0805.40	Grapefruit or pomelos, fresh or dried	−0.2	n.s.
0806.10.01	0806.10	Grapes, fresh	−54.3	−115.9

Continued

Table 2 *Continued*

			Estimated impact of retaliatory tariffs:	
		Commodity (Mexican HS code)	Based on elasticity from aggregate model	Based on commodity-specific model
			Millions of dollars	
		Aggregate model, 50 commodities	**−984.0**	**n.a.**
Mexican HS code	**U.S. HS code in GATS**	**Total, 50 commodity-specific models**	**−923.3**	**−550.1**
0808.10.01	0808.10	Apples, fresh	−118.7	−51.4
0808.20.01	0808.20 & 0808.30	Pears, fresh	−70.7	−40.5
0809.10.01	0809.10	Apricots, fresh	−0.7	n.s.
0809.20.01	0809.20, 0809.21, & 0809.29	Cherries, fresh	−1.1	n.s.
0810.10.01	0810.10	Strawberries, fresh	−19.3	n.s.
0813.30.01	0813.30	Apples, dried	−1.1	n.s.
0813.50.01	0813.50	Mixtures of dried fruit or nuts	−5.9	−4.2
1104.12.01	1104.12	Oats, rolled or flaked	−2.6	n.s.
1602.49.01	1602.49	Swine meat, prepared	−9.0	−5.8
1704.10.01	1704.10	Chewing gum, including those coated in sugar	−2.4	n.s.
1806.31.01	1806.31	Chocolate, filled	−8.8	n.s.
1806.32.01	1806.32	Chocolate, not filled	−4.4	−3.3
1902.19.99	1902.19.2000	Pasta, not containing egg, not cooked, filled, or otherwise prepared	−0.3	−2.2
2004.10.01	2004.10	Potatoes, frozen	−42.2	−26.4
2005.40.01	2005.40	Peas, prepared or preserved, except in vinegar or ascetic acid, not frozen	−0.1	n.s.
2008.11.01 & 2008.11.99	2008.11	Peanuts, prepared or preserved	−9.8	n.s.
2008.19.01	2008.19.4000	Almonds, prepared or preserved	−4.4	n.s.

2008.19.99	2008.19 less 2008.19.4000	Nuts, prepared & preserved (includes mixed nuts but is separate from the categories for peanuts & almonds)	−48.6	−48.6
2008.60.01	2008.60	Cherries, prepared or preserved	−2.5	−2.4
2009.80.01	2009.80, 2009.81, & 2009.89	Fruit or vegetable juice, other than orange, grapefruit, other citric fruit, tomato, apple, or grape	−8.2	n.s.
2009.90.01	2009.90.2000	Mixtures of vegetable juice only	−0.5	−4.0
2009.90.99	2009.90.4000	Mixtures of fruit or vegetable juice, other than mixtures of vegetable juice only	−8.7	n.s.
2103.10.01	2103.10	Soy sauce	−7.5	n.s.
2103.20.01	2103.20.2000	Ketchup	−8.0	n.s.
2103.90.99	2103.90	Condiments other than soy sauce, ketchup & other tomato sauces, mustard meal, & prepared mustard	−125.9	n.s.
2104.10.01	2104.10	Prepared soups & broths & preparations for such foods	−98.2	−47.6
2106.90.06	2106.90.4800 & 2106.90.5200	Concentrates of juice from a single fruit or vegetable, enriched with vitamins or minerals	−3.4	n.s.
2106.90.07	2106.90.5400	Concentrates of juice from more than one fruit or vegetable, enriched with vitamins or minerals	−1.0	−6.7
2106.90.08	2106.90.6580	Food preparations not elsewhere specified or indicated, with a content of milk solid greater than 10% in weight	−26.8	−39.1
2201.10.01	2201.10	Mineral water	−1.9	n.s.
2204.10.99	2204.10	Sparkling wine, other than champagne	−1.1	n.s.

Continued

Table 2 *Continued*

Mexican HS code	U.S. HS code in GATS	Commodity (Mexican HS code)	Estimated impact of retaliatory tariffs: Based on elasticity from aggregate model (Millions of dollars)	Based on commodity-specific model
		Aggregate model, 50 commodities	**−984.0**	**n.a.**
		Total, 50 commodity-specific models	**−923.3**	**−550.1**
2204.21.02	2204.21.4000	Red, rose, claret, or white wine, whose alcoholic strength by volume is up to 14 percent at a temperature of 20 degrees Celsius (equivalent to 14 degrees on the Gay-Lussac hydrometer scale at a temperature of 15 degrees Celsius), in containers of clay, ceramics, or glass les than or equal to 2 liters	−7.2	−15.0
2206.00.99	2206.00	Other fermented beverages or mixtures of fermented & non-alcoholic beverages, not elsewhere specified	−9.4	n.s.
2306.30.01	2306.30	Sunflower seed meal and oilcake	−0.4	n.s.
2306.49.99	2306.49	Rape seed meal or oilcake with a high content of erucic acid	−2.4	−12.2
2309.10.01	2309.10	Dog or cat food, for retail sale	−22.9	−14.9

Note: Christmas trees are excluded from the analysis.
n.a. = Not applicable.
n.s. = Statistically insignificant at 90% level using one-tailed t*-test.*
Source: Authors' estimates.

When the estimated impacts are tallied from all these 26 models, the total estimated impact of the tariffs is $550 million.

Conclusion

The retaliatory tariffs associated with the U.S.-Mexico trucking dispute adversely affected U.S. agricultural exports to Mexico. According to our aggregate model, the tariffs reduced exports of the agricultural commodities subject to these restrictions by about $984 million (22%) during the period from March 2009 to October 2011, when the retaliatory tariffs were in effect. In our commodity-specific models, we find that the retaliatory tariffs had a deleterious effect on U.S. exports to Mexico for 26 of the 50 agricultural tariff goods. Models that more fully represent the idiosyncrasies of individual commodity markets can potentially generate better estimates of the tariffs' impact on individual commodities.

Overall, our results provide a strong indication of the importance of trade liberalization to U.S. agricultural exports to Mexico, and they underscore the importance of avoiding situations in which other countries are authorized to apply retaliatory tariffs on imports from the United States. With the removal of the retaliatory tariffs in October 2011, all of the targeted products once again qualify for duty-free treatment under NAFTA. Indeed, U.S. exports to Mexico of the agricultural tariff goods have recovered and now exceed the levels that existed prior to the tariffs' imposition. While the trucking dispute appears to be resolved, the application of retaliatory tariffs to U.S. exports to Canada and Mexico are a distinct possibility in a separate dispute concerning the compatibility of the United States' mandatory COOL requirements for beef and pork with U.S. obligations at the World Trade Organization (WTO). In the COOL dispute, Canadian authorities have signaled their willingness to retaliate if authorized, should the issue not be resolved (Menon and Tracy 2014). With Canada and Mexico accounting for a total of $41.3 billion and a combined 27% of total U.S. agricultural exports in 2014, U.S. industry representatives may need to be prepared to repeat the old refrain, "They knew right where to hit us."

Acknowledgments

An earlier version of this article was presented at the 2011 annual meeting of the International Agricultural Trade Research Consortium (IATRC), St. Petersburg, Florida, December 11–13, 2011. The authors thank John Wainio for presenting the earlier version in their absence and Andrew Muhammad, Greg Pompelli, and Tom Vollrath for their useful feedback. The views expressed herein are those of the authors and should not be attributed to the Economic Research Service, the Animal and Plant Health Inspection Service, or the USDA.

References

American Farm Bureau Federation. 2008. $2 Billion at Stake for U.S. Ag in Trucking Dispute. Press release, March 10. Available at http://www.fb.org/index.php?fuseaction=newsroom.newsfocus&year=2008&file=nr0310.html (accessed April 8, 2015).

Arnold, C. 2010. U.S. Farmers Suffer from Ban on Mexican Trucks. National Public Radio. Available at http://www.npr.org/templates/story/story.php?storyId=126967979 (accessed April 8, 2015).

Branson, H. 2009. NAFTA Trucking War Leads to Mexican Retaliation, U.S. Farm Pain. Houston Chronicle. April 11. Available at http://blog.chron.com/txpotomac/2009/04/nafta-trucking-war-leads-to-mexican-retaliation-u-s-farm-pain/ (accessed April 8, 2015).

Cattan, N. 2011. U.S. and Mexico Resolve Trucking Dispute, but How Will it Affect U.S. Roads? *Christian Science Monitor*. July 7. Available at http://www.csmonitor.com/World/Americas/2011/0707/US-and-Mexico-resolve-trucking-dispute-but-how-will-it-affect-US-roads (accessed April 8, 2015).

Dickey, D.A., and W.A. Fuller. 1979. Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association* 74: 427–31.

Downey, III, M., J. Kolbe, and K. Mead. 2008. U.S.-Mexico Cross-border Trucking Demonstration Project. Independent Evaluation Panel Report to the U.S. Secretary of Transportation. Available at http://www.landlinenow.com/documents/PanelReport.pdf (accessed April 8, 2015).

Duan, N. 1983. Smearing Estimate: A Nonparametric Retransformation Method. *Journal of the American Statistical Association* 78: 605–10.

Durbin, J. 1970. Testing for Serial Correlation in Least-squares Regressions When Some of the Regressors are Lagged Dependent Variables. *Econometrica* 38: 410–21.

Fox, A., J. Francois, and P. Londoño-Kent. 2003. Measuring Border Crossing Costs and their Impact on Trade Flows: The United States-Mexican Trucking Case. April 30. Available at https://www.gtap.agecon.purdue.edu/resources/download/1492.pdf (accessed April 8, 2015).

Frittelli, J. 2014. *Status of Mexican Trucks in the United States: Frequently Asked Questions*. Washington DC: Congressional Research Service Report. Available at https://www.fas.org/sgp/crs/misc/R41821.pdf (accessed April 8, 2015).

Haralambides, H., and M. Londoño-Kent. 2004. Supply Chain Bottlenecks: Border Crossing Inefficiencies between Mexico and the United States. *International Journal of Transport Economics* 31 (2): 171–72.

International Monetary Fund. 2011. World Economic Outlook Database. September. Available at http://www.imf.org/external/data.htm (accessed April 8, 2015).

MacDonald, C. 2009. NAFTA Cross-border Trucking: Mexico Retaliates After Congress Stops Mexican Trucks at the Border. *Vanderbilt Journal of Transnational Law* 42: 1631–62. Available at http://www.vanderbilt.edu/jotl/2012/07/nafta-cross-border-trucking-mexico-retaliates-after-congress-stops-mexican-trucks-at-the-border/ (accessed April 8, 2015).

Menon, N., and T. Tracy. 2014. WTO Panel Finds U.S. Meat-Labeling Requirements Violate WTO Rules. *Wall Street Journal*. October 20. Available at http://www.wsj.com/articles/wto-panel-finds-u-s-meat-labeling-requirements-violate-wto-rules-1413824655 (accessed April 8, 2015).

Mexico, Secretaría de Comunicaciones y Transporte (Secretariat of Communications and Transport). 2003. Acuerdo por el que se establecen las modalidades en el servicio de autotransporte federal de carga, denominados transporte o arrastre de remolques y semiremolques en los cruces fronterizos, cuyos ámbito de operación exclusivamente comprende la franja de 20 kilómetros parelela a la línea divisoria internacional con los Estados Unidos de América (Agreement for establishing the modalities for the service of federal trucking of cargo, called transport or towing trailers and semitrailers at the border crossings, whose scope of operation includes only the band of 20 kilometers parallel to the international boundary line with the United States of America). *Diario Oficial de la Federación* (Official Diary of the Federation). March 18. Available at www.dof.gob.mx (accessed April 8, 2015).

Mexico, Secretaría de Economía (Secretariat of Economy). 2011a. Decreto que abroga el diverso por el que se modifica el artículo 1 del diverso por el que se establece la Tasa Aplicable durante 2003, del Impuesto General de Importación, para las mercancías originarias de América del Norte, publicado el 31 de diciembre de 2002, por lo que respecta a las mercancías originarias de los Estados Unidos de América

(Decree that abrogates the text that modifies Article 1 of the text that establishes the applicable rate during 2003 of the General Import Tax for merchandise originating in North America, published on December 31, 2002, with respect to merchandise originating in the United States of America). *Diario Oficial de la Federación* (Official Diary of the Federation) October 21. Available at www.dof.gob.mx (accessed April 8, 2015).

——. 2011b. Decreto por el que se modifica el artículo 1 del diverso por el que se establece la Tasa Aplicable durante 2003, del Impuesto General de Importación, para las mercancías originarias de América del Norte, publicado el 31 de diciembre de 2002, por lo que respecta a las mercancías originarias de los Estados Unidos de América (Decree that modifies Article 1 of the text that establishes the applicable rate during 2003 of the General Import Tax for merchandise originating in North America, published on December 31, 2002, with respect to merchandise originating in the United States of America.). *Diario Oficial de la Federación* (Official Diary of the Federation) July 7. Available at www.dof.gob.mx (accessed April 8, 2015).

——. 2010. Decreto por el que se modifica el artículo 1 del diverso por el que se establece la tasa aplicable durante 2003, del Impuesto General de Importación, para las mercancías originarias de América del Norte, por lo que respecta a las mercancías originarias de los Estados Unidos de América, publicado el 31 de diciembre de 2002 (Decree that modifies Article 1 of the text that established the applicable rate during 2003 of the General Import Tax for merchandise originating in North America, with respect to merchandise originating in the United States of America, published on December 31, 2002). *Diario Oficial de la Federación* (Official Diary of the Federation) August 18. Available at www.dof.gob.mx (accessed April 8, 2015).

——. 2009. Decreto por el que se modifica el artículo 1 del diverso por el que se establece la Tasa Aplicable durante 2003, del Impuesto General de Importación, para las mercancías originarias de América del Norte, por lo que respecta a las mercancías originarias de los Estados Unidos de América, publicado el 31 de diciembre de 2002 (Decree that modifies article 1 of the text that established the Applicable Rate during 2003 of the General Import Tax for merchandise originating in North America, with respect to merchandise originating in the United States of America, published on December 31, 2002). *Diario Oficial de la Federación* (Official Diary of the Federation) March 18. Available at www.dof.gob.mx (accessed April 8, 2015).

North American Free Trade Agreement Arbitral Panel Established Pursuant to Chapter Twenty in the Matter of Cross-Border Trucking Services (NAFTA Arbital Panel). 2001. "Final Report of the Panel." Secretariat File No. USA-MEX-98-2008-01, February 6. Available at https://www.nafta-sec-alena.org/Home/Dispute-Settlement/Decisions-and-Reports (accessed April 8, 2015).

Organization of American States. 2015. North American Free Trade Agreement. Foreign Trade Information System. Available at http://www.sice.oas.org/trade/nafta/naftatce.asp (accessed April 8, 2015).

Pacific Economic Cooperation Council. 2004. *Pacific Food System Outlook 2004–2005: The Role of Transportation Infrastructure in a Seamless Food System*. Singapore. Available at https://www.pecc.org/resources/638-pacific-food-system-outlook-the-role-of-transportation-infrastructure-in-a-seamless-food-system?path= (accessed April 8, 2015).

Prozzi, J., J. Prozzi, J. Villa, D. Middleton, and J. Warner. 2008. Integration and Consolidation of Border Freight Transportation Data for Planning Applications and Characterization of NAFTA Truckloads for Aiding in Transportation Infrastructure Management: Second Year. Report No 0-5339-2, Project No. 0-5339. Performed in cooperation with the Texas Department of Transportation and the Federal Highway Administration. College Station, Texas: Texas Transportation Institute, The Texas A&M University System, July. Available at http://tti.tamu.edu/documents/0-5339-2.pdf (accessed April 8, 2015).

U.S. Department of Agriculture, Economic Research Service. 2011. Nominal Monthly Average Exchange Rates Database. Washington DC. Available at http://www.ers.usda.gov/data-products/agricultural-exchange-rate-data-set.aspx (accessed April 8, 2015).

U.S. Department of Agriculture, Foreign Agricultural Service. 2015. Global Agricultural Trade System. Washington DC. Available at www.fas.usda.gov/gats (accessed April 8, 2015).

U.S. Department of Transportation, Federal Motor Carrier Safety Administration. 2015. Acceptance of Applications for Mexican-domiciled Long-haul Operations. *Federal Register* 80: 2179. Available at: https://federalregister.gov/a/2015-00555 (accessed April 8, 2015).

——. 2014. U.S.-Mexico Cross-border Trucking Pilot Program. Available at http://www.fmcsa.dot.gov/intl-programs/trucking/trucking-program.aspx (accessed April 8, 2015).

——. 2009. Demonstration Project on NAFTA Trucking Provisions. *Federal Register* 74: 11628. Available at https://federalregister.gov/a/E9-5956 (accessed April 8, 2015).

U.S. Department of Transportation, Office of the Inspector General. 2014. FMCSA Adequately Monitored its NAFTA Cross-Border Trucking Pilot Program but Lacked a Representative Sample to Project Overall Safety Performance. Report No. ST-2015-014. December 10. Available at https://www.oig.dot.gov/sites/default/files/NAFTA%20Pilot%20Final%20Report_508.pdf (accessed April 8, 2015).

U.S. Statutes at Large. 2009. Omnibus Appropriations Act, 2009. Public Law 111-8. Available at http://www.gpo.gov/fdsys/pkg/STATUTE-123/pdf/STATUTE-123-Pg524.pdf (accessed April 8, 2015).

——. 2007. Consolidated Appropriations Act of 2008. Public Law 110-161. Available at http://www.gpo.gov/fdsys/pkg/STATUTE-121/pdf/STATUTE-121-Pg1844.pdf (accessed April 8, 2015).

——. 2001. Department of Transportation and Related Agencies Appropriations Act, 2002. Public Law 107-87. Available at: http://www.gpo.gov/fdsys/pkg/STATUTE-115/pdf/STATUTE-115-Pg833.pdf (accessed April 8, 2015).

U.S. Supreme Court Reports. 2006. Department of Transportation v. Public Citizen. 541 U.S. 752 (2004). Available at http://www.supremecourt.gov/opinions/boundvolumes.aspx (accessed April 8, 2015).

Watson, J. 2011. First Mexican Truck Set to Enter U.S. Interior. Updated version. Associated Press. October 20. Available at http://www.msnbc.msn.com/id/44971132/ (accessed April 8, 2015).

White House. 2011. Fact Sheet: Enhancing U.S.-Mexico Cooperation. Office of the Press Secretary, Statements & Releases. March 3. Available at https://www.whitehouse.gov/the-press-office/2011/03/03/fact-sheet-enhancing-us-mexico-cooperation (accessed April 8, 2015).

Zahniser, S., S. Angadjivand, T. Hertz, L. Kuberka, and A. Santos. 2015. NAFTA at 20: North America's Free-trade Area and Its Impact on Agriculture. Washington DC: U.S. Department of Agriculture, Economic Research Service, Outlook Report No. WRS-15-01. February 3. Available at http://www.ers.usda.gov/publications/wrs-international-agriculture-and-trade-outlook/wrs-15-01.aspx (accessed April 8, 2015).