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Managed Trade: The U.S.-Mexico Sugar Suspension Agreements

Colin A. Carter^a; Tina L. Saitone^a; K. Aleks Schaefer^b

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Abstract

Under the North American Free Trade Agreement (NAFTA), Mexico was granted free access to the U.S. sugar market. All other suppliers, including U.S. refiners, are subject to supply quotas. Following a surge in imports of Mexican sugar, the U.S. sugar industry initiated anti-dumping (AD) and countervailing duty (CVD) proceedings against Mexico in early 2014. The AD and CVD cases were then halted as a result of two Suspension Agreements negotiated between the U.S. and Mexico in December 2014. We find that the agreements reduced Mexican sugar exports to the U.S. by 14% during the first two years (2015–16) and increased raw and refined sugar prices in the U.S. on average by 5.8¢ and 6¢ per lb., respectively, benefiting both cane and beet farmers. The magnitude of these price impacts is equivalent to a nearly 70% *ad valorem* tariff on sugar imports from Mexico, substantially higher than preliminary Department of Commerce duties. We also find that the agreements harmed some U.S. refiners, threatening the stability of the agreements and creating problems for NAFTA.

Key Words

anti-dumping, countervailing duty, sugar, trade remedy law, trade suspension agreement, NAFTA

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^a Department of Agricultural and Resource Economics, University of California, Davis.

^b Royal Veterinary College, University of London.

“The sugar industry has been at the center of the most contentious trade issues between Mexico and the United States since NAFTA was first negotiated in the early 1990s.” The New York Times (June 4, 2017)

1 Introduction

The ongoing sugar trade dispute between the United States and Mexico has implications for the future of the North American Free Trade Agreement (NAFTA). Mexico’s free access to the U.S. sugar market (under NAFTA) has destabilized U.S. domestic sugar policy, and has led for calls to renegotiate NAFTA. In March 2014, the American Sugar Coalition initiated antidumping (AD) and countervailing duty (CVD) proceedings against Mexico, due to a surge in imports from Mexico. Following preliminary determinations by the U.S. International Trade Commission (USITC) and Department of Commerce (DOC), industry participants elected to engage in suspension negotiations. In December 2014, investigations were halted as a result of two suspension agreements signed by the U.S. and Mexican government. We find that U.S. sugar farmers were made better off by the Suspension Agreements, but some domestic refiners were made worse off.

By allowing an industry to structure its own rules to manage trade, the suspension process promotes intra-industry collusion at the expense of domestic and foreign consumers (Anderson, 1992; Prusa, 1992, 2001). Yet, parties to AD/CVD actions rarely use the suspension process in practice. Only 14 of the 550 anti-dumping petitions filed in the U.S. since the creation of the World Trade Organization (WTO) have resulted in suspension agreements (Bown, 2015). Moreover, at least three of these 14 suspension agreements have been renegotiated at the behest of the domestic industry. The scant use of suspension agreements suggests that—in spite of the opportunities for intra-industry collusion—the bargaining process for suspension often generates undesirable or unstable outcomes.

The distributional impact of the suspension process in the domestic supply chain is

especially interesting in the context of the U.S.-Mexican Agreements. First, because—apart from the Agreements—domestic sugar production and trade is heavily regulated in the U.S., a setting that eliminates the risk that cross-country trade diversion will dampen the effects of the agreement. More importantly, there was an explicit divergence of opinion in the domestic industry about the likely effects of the Suspension Agreements (80 FR 3977). Domestic cane and beet farmers strongly supported the Agreements. However, two sugar refiners argued that the Agreements would lower refiner welfare.

To reach an agreement, the terms of suspension must make all domestic producers at least as well off as they likely would have been with AD or CVD orders. The inclusion of multiple upstream and downstream groups within a domestic industry complicates suspension negotiations because it creates divergent intra-industry incentives. Producers of raw sugar care predominantly about the raw sugar price whereas intermediate and downstream processors care about the margin between input and output prices, the availability of inputs, and demand for the final product.

Suspension agreements can have very different effects on prices and the composition of trade compared to AD/CVD duties. A common *ad valorem* AD/CVD duty levied across all product categories will reduce overall trade levels, with little cross-product trade diversion. In contrast, suspension agreements, which usually take the form of quantitative restrictions or price floors, tend to divert trade toward finished products (Falvey, 1979).

Using a regime-switching model, we find that the Agreements increased domestic prices for raw and refined sugar by an average of 5.8¢ and 6¢ per lb., respectively, over the first two years. These impacts are approximately equivalent to a 70% *ad valorem* tariff on raw and refined sugar—substantially more than the 39.54–47.26% tariffs established by the U.S. Department of Commerce (DOC) during preliminary investigations. These findings suggest that U.S. cane and beet farmers are better off with the Agreements compared to AD/CVD duties. However, the Agreements have had a minimal impact (0.20¢ per lb.) on the raw-to-refined price margin over the same time period. Moreover, the Agreements dramatically

reduced the quantity of raw sugar imports for further refining. This is why some refiners were opposed to the agreements. The disparate impact of the U.S.-Mexican Sugar Suspension Agreements across segments of the domestic industry highlights the potential instability created by suspension agreements generally as resolutions to AD/CVD proceedings.

2 Literature Review

Since Viner’s (1923) seminal work, legal and economic scholars have analyzed the opportunities and incentives for collusion created under trade remedy law, both with respect to domestic producers (Dixit, 1988; Veugelers and Vandebussche, 1999) and the domestic and foreign industries combined (Staiger and Wolak, 1989, 1992). U.S. anti-dumping and countervailing duty (AD/CVD) laws provide a formal mechanism, known as the suspension process, through which domestic and foreign producers can resolve AD/CVD disputes by reaching an agreement that “eliminates the risk of injury” to domestic producers.¹ If suspension negotiations are successful, the terms of the agreement—which usually include voluntary export restraints or price restrictions—take the place of AD/CVD tariffs on subject imports.

This paper is related to two strands of literature. The first looks at the incentives for parties to settle AD/CVD proceedings. The general consensus in this literature is that settlement can benefit all parties. The domestic and foreign industries can collude to fix prices or the quantity of imports (Prusa, 1992). The parties save legal fees from continued litigation (Farr and DeFrancisco, 2006). In fact, even the government can benefit from a political economy perspective if the electoral returns from industry profits are large relative to the losses from higher consumer prices (Rosendorff, 1996).

Prior to 2004, some research suggested that settlement of AD/CVD proceedings was prevalent in the U.S. (Anderson, 1992; Prusa, 1992, 2001). The frequent withdrawal of petitions following preliminary determinations was treated as a *prima facie* signal of collusion,

¹ §§704(c) and 734(c) of the Tariff Act of 1930 govern the imposition of suspension agreements in resolution of AD/CVD disputes.

with out-of-court settlement negotiated between the parties. However, Taylor (2004) explains that out-of-court settlements are actionable under U.S. antitrust laws and finds no evidence of collusion from petitions withdrawn between 1990 and 1997. The economic research related to the issue of collusion and settlement in the AD/CVD process has thus far assumed a simple industry producing a homogenous product, which does not undergo processing. However, a more nuanced representation of the domestic industry is needed to explain the contradiction between the apparent benefits of settlement to parties-to-the-action and the infrequent use of suspension agreements and the suspension process.²

The second strand of literature—which focuses on the trade destructive and diversionary impacts of AD/CVD duties and suspension agreements—sheds light on this issue. The imposition of trade restrictions on one product affects trade with a broader class of goods, including close substitutes for the product and raw and processed goods along a common supply chain. For example, Carter and Gunning-Trant (2006) show that, following the imposition of antidumping duties on fresh garlic imports from China in the U.S., Chinese dehydrated garlic imports increased by 315%.

Empirical studies of the effects of AD/CVD suspension agreements are few and have focused almost exclusively on the Suspension Agreements negotiated in resolution of the U.S.-Mexico “Tomato Wars.” Baylis and Perloff (2010) studied the trade diversionary effects of the U.S.-Mexico Tomato Suspension Agreement. They analyzed the impacts of the agreement on U.S.-Mexico-Canada tomato trade. They found that the suspension agreement decreased fresh tomato imports from Mexico, but at the same time increased fresh tomato imports from Canada. The agreement also increased imports of Mexican tomato paste into the U.S. In all, Baylis and Perloff (2010) found that over three-fourths of the Mexican fresh tomatoes restricted from entering the U.S. were ultimately imported via cross-country and cross-product trade diversion.

²Several legal articles include discussions of the ambiguities inherent to the domestic like product determination and contradictory applications of the horizontal and vertical scope of the like product (Arguea and Harper, 1994; Berg, 1996; Steen, 1987). However, the like product issue has not found its way into the economics literature.

The U.S.-Mexico Tomato Suspension Agreement was re-negotiated in 2013. Ghazalian (2015) and Kosse and Devadoss (2016) analyzed the effects of the re-negotiated agreement. Ghazalian (2015) used a gravity model that accounts for vertical linkages between fresh and processed tomatoes and found that the new suspension agreement substantially reduced the flow of fresh tomatoes from Mexico and eliminated much of the cross-country and cross-product diversion of tomatoes and tomato products entering the U.S. Kosse and Devadoss (2016) found that the suspension agreement caused Mexican producers to shift towards greenhouse production of tomatoes, which were not part of the agreement. Further, they showed that U.S., Canadian, and Mexican producers of several varieties of fresh tomatoes benefited from the suspension agreement.

We connect these two strands of literature by investigating the impacts of the U.S.-Mexico Sugar Suspension Agreements to understand the incentives within the U.S. domestic industry to engage in settlement in AD/CVD proceedings. The primary condition for successful suspension negotiations is that each domestic producer be made at least as well off under the suspension agreement as it would have been by proceeding with investigations. However, heterogeneous preferences within the domestic industry make this condition difficult to achieve in the presence of trade diversion. For example, sugar farmers prefer heavy restrictions on the import of sugar and sugar-containing products, whereas refiners may prefer raw sugar inputs to enter duty and quota free, but benefit from a high refined sugar price.

3 U.S. Sugar, Policy and Trade

Sugar is derived from both sugar beets and sugarcane. Refined sugar originating from one source is physically and chemically identical to the other. The U.S. sugar industry consists of approximately 3,913 sugar beet farms, 666 sugarcane farms, 15 beet processors and 13 cane refiners (USDA, 2012, 2015). In fiscal year 2015/16, U.S. sugar farmers produced approximately 5 million short tons raw value (STRV) of sugar from sugar beets and 3.9

million STRV of sugar from sugar cane, together amounting to about 5% of global sugar production (USDA, 2017).

An important characteristic of sugar is the degree of refining purity, known as the polarity, which is based on the product's molasses content, color, and dextran content. A polarity measurement of 100 degrees signifies pure, refined sugar. Lower measurements correspond to less refined sugar. The USDA, Food and Drug Administration (FDA), and the Customs and Border Patrol (CBP) label any sugar of polarity less than 99.5 as raw sugar and any sugar of polarity of 99.5 degrees or greater as refined. Other types of sugar include brown sugar, liquid sugar, organic raw sugar, and organic refined sugar. These other products are a small share of U.S. production and require refined or semi-refined sugar as an input. Sugar of polarity greater than 99.5 is approved by the FDA for human consumption, whereas sugar of less than 99.5 polarity is not. Very little sugar between 99.9 and 93 polarity is produced in the U.S. The majority of refined sugar produced in the U.S. is sold for industrial use. Another significant portion is sold to retailers or used in the baking sector.

Raw sugar is extracted from sugarcane through a milling process. The raw sugar is then sent to refineries to be transformed into refined sugar. In contrast to sugarcane, sugar beets do not go through the raw sugar stage. Instead, they are refined from beet to final product in a continuous process at a single manufacturing facility. The majority of beet processors in the U.S. are cooperative organizations owned by sugarbeet farmers.

In addition to standard sugar refiners and beet processing operations, there are also several "sweetener stations" or "melt houses" in the U.S., which convert food-grade or near-food grade sugar into liquid. These liquid sugar processors range from operations that melt refined sugar and add water to operations that purify lower grade sugar using more sophisticated methods and machinery during the production process. For example, CSC Sugar operates in five locations across the U.S. and uses carbon, ion exchange resin, and press filtration to purify less-than-food-grade sugar into refined liquid sugar (USITC, 2014). Liquid sugar accounts for approximately 17% of all sugar consumption in the U.S.(USITC,

2014).

The U.S. government employs several policy instruments, collectively known as the U.S. sugar program, to restrict the amount of sugar supplied to the U.S. market in an effort to support U.S. prices (Jurenas, 2012). Each fiscal year (beginning October 1st), the USDA assigns a quota to domestic processors that is equal to at least 85% of the volume of sugar needed to fill the expected annual demand for sugar in the U.S. This volume is known as the overall allotment quantity (OAQ) and is divided between beet and cane supplies. The USDA then divides up the OAQ across domestic firms based on historical production. Slightly over half of the OAQ (54.35%) is apportioned to sugar beet processors. The remainder (46.65%) is assigned to sugarcane millers. Sugar produced in excess of these allotments must be stored or sold for non-human-consumption uses (e.g., ethanol production).

The USDA offers short-term, non-recourse financing to domestic sugarcane and sugar beet processors through the Commodity Credit Corporation (CCC).³ The CCC is prohibited from selling forfeited sugar into the U.S. market for human consumption. Forfeited sugar must be disposed of through re-export program credit swaps or sales of sugar for non-food uses. In 2012/13 the USDA spent \$258.7 million to remove sugar from the U.S. market, sending it mostly to ethanol plants. This disposal program is known as the “Feedstock Flexibility Program.”

Foreign access to the U.S. sugar market is heavily regulated. Under WTO commitments, the U.S. must import at least 1.2 million STRV of raw sugar and 24,251 STRV of refined sugar annually. In addition, there is a much smaller import quota program with six countries under the Dominican Republic-Central American Free Trade Agreement, and with Colombia and Panama under separate agreements. The USDA sets a tariff-rate quota (TRQ) on raw sugar at the minimum level permitted by these agreements at the beginning of each fiscal year. The USTR then apportions the TRQ on a country-specific basis. Midway through the fiscal year, or sooner in the event of an emergency, the USDA may increase the TRQ to

³Under the 2014 Farm Bill the national average loan rate is 18.75 cents per pound for raw cane sugar and 24.09 cents per pound for refined beet sugar (USDA, 2016).

alleviate short supply conditions.

Mexico is a large producer of sugarcane. In 2015/16, Mexico produced approximately 7 million STRV of sugar, equal to approximately 4% of global sugar production. Sugar from Mexico has entered the U.S. duty- and quota-free since January 2008 under the North American Free Trade Agreement (NAFTA). Since 2008, Mexico has been the largest exporter of sugar to the United States. Mexican sugar is primarily marketed in two forms: semi-refined and refined sugar. Mexican producers market refined sugar that is physically and chemically identical to sugar produced in the U.S. Semi-refined sugar (also called estandar) is a finished product in Mexico that is neither raw nor refined. Semi-refined (or estandar) sugar encompasses a wide range of polarities between 99.4 and 99.9 degrees and is primarily used in the United States in food products or sold to “sweetener stations” to be transformed into liquid sugar.

The diagram in Figure 1 demonstrates the differences in polarity between U.S. and Mexican sugar. Semi-refined sugar above 99.5 polarity can be sold directly for human consumption, or can be further refined to correspond to U.S.-grade refined sugar. Sugar between 99.4 and 99.5 polarity must undergo a minimal degree of further refinement—such as that provided in U.S. sweetener stations—to reach approval for human consumption.

The divergence in polarity between Mexican and U.S. sugar has led to important institutional differences with respect to tariff classifications. Table 1 delineates the U.S. Harmonized Tariff System (USHTS) and Mexican Harmonized Tariff System (MXHTS) Codes associated

with different levels of polarity for raw and refined sugar. The U.S. tariff code only distinguishes between sugar of polarity above and below 99.5. In contrast, Mexican tariff codes contain a greater disaggregation of sugar on the basis of polarity. The imperfect correspondence between USHTS classifications and Mexican sugar products creates the potential for cross-product trade diversion in the face of market regulation.

Table 1: U.S. and Mexican Tariff Classifications for Raw and Refined Sugar

USHTS Codes	Description
1701.12.00–50	<i>Raw sugar (< 99.5 polarity)</i>
1701.13.00–50	<i>Raw sugar (< 99.5 polarity)</i>
1701.14.00–50	<i>Raw sugar (< 99.5 polarity)</i>
1701.91.00–30	<i>Refined sugar (≥ 99.5 polarity)</i>
1701.99.00–99	<i>Refined sugar (≥ 99.5 polarity)</i>
MXHTS Codes	Description
1701.14.01	<i>Sugar (dry) of polarity ≥ 99.4 and < 99.5 degrees.</i>
1701.14.02	<i>Sugar (dry) of polarity ≥ 96 and < 99.4 degrees.</i>
1701.14.03	<i>Sugar (dry) of polarity < 96 degrees.</i>
1701.99.01	<i>Sugar (dry) of polarity ≥ 99.5 and < 99.7 degrees.</i>
1701.99.02	<i>Sugar (dry) of polarity ≥ 99.7 and < 99.9 degrees.</i>
1701.99.99	<i>Sugar (dry) not elsewhere specified, (i.e., polarity ≥ 99.9 degrees)</i>

Source: Chapter 17 of the U.S. and Mexican Harmonized Tariff Schedules, available under each country's respective member profile through the WTO.

4 AD/CVD Proceedings & Suspension Agreements

Beginning in late 2011, Mexican sugar exports to the U.S. nearly doubled from slightly less than 1 million MTRV to approximately 2 million MTRV and remained high for the next three years. The surge in exports came primarily in the form of semi-refined sugar between 99.5 and 99.7 polarity. On March 28, 2014, the American Sugar Coalition and its members filed anti-dumping and countervailing duty petitions against sugar from Mexico.⁴ The USITC

⁴The precise scope of investigations included all products imported under USHTS codes 1701.12.1000, 1701.12.5000, 1701.13.1000, 1701.13.5000, 1701.14.1000, 1701.14.5000, 1701.91.1000, 1701.91.3000, 1701.99.1025, 1701.99.5025, and 1701.99.5050.

defines the scope of products subject to investigation and the corresponding “domestic like product.” The “domestic like product” is determined on a case-by-case basis and is defined as a “product which is like, or in the absence of like, most similar in characteristics and uses, with the article subject to an investigation” (USITC, 1996). The U.S. industry is defined as the domestic “producers as a whole of a domestic like product, or those producers whose collective output of a domestic like product constitutes a major proportion of the total domestic production of the product” (USITC, 1996).

In determining the domestic like product and the domestic industry, the USITC defines both the “horizontal” and “vertical” scope of products that are considered “like.” The horizontal scope specifies the array of products which are sufficiently substitutable to the subject imports.⁵ The vertical determination specifies the articles at various stages of production that fall within the domestic product.⁶ In *Sugar from Mexico* the USITC deemed that the domestic like product included raw and refined cane and refined beet sugar, but did not extend to high-fructose corn syrup. The USITC also deemed that one liquid sugar producer—CSC—had sufficient capital investments to be considered part of the domestic industry. However, all other melt houses were excluded.

On May 9, 2014, the USITC made a preliminary determination that the subject imports resulted in economic injury to the U.S. sugar industry. On August 26, 2014, the U.S. DOC further determined that the subject imports received subsidies and announced preliminary duties on sugar imports from Mexico ranging from 39.54% to 47.26% (USITC, 2014).

⁵When deciding whether a domestic product falls within the horizontal scope of the like product, the USITC considers the similarity between the domestic product and the subject imports with respect to six factors: (1) the physical characteristics and uses; (2) interchangeability; (3) channels of distribution; (4) common manufacturing facilities, production processes, and production employees; (5) customer and producer perceptions; and (6) price (USITC, 1996). The USITC “disregards minor variations . . . and looks for clear dividing lines among possible like products” (USITC, 1996).

⁶In determining whether products at differing stages of processing should be included in the domestic like product, the USITC employs the *Semi-Finished Products Standard*. The USITC considers the following five factors: (1) whether the upstream article is dedicated to the production of the downstream article or has independent uses; (2) whether there are perceived to be separate markets for the upstream and downstream articles; (3) differences in the physical characteristics and functions of the upstream and downstream articles; (4) differences in the costs or value of the vertically differentiated articles; and (5) the significance and extent of the process used to transform the upstream into the downstream articles (USITC, 1996).

Table 2: U.S.-Mexico Sugar Suspension & Litigation Timeline

Date	Event
Dec-14	U.S. AD/CVD duty investigations suspended as a result of Agreements between the Mexican & U.S. governments.
Jan-15	Imperial Sugar Company (owned by Louis Dreyfus) & AmCane Sugar, both sugar cane refiners who also process raw sugar imported from Mexico, contested the Suspension Agreements & requested continuation of the Investigation.
Mar-15	ITC found that Suspension Agreements completely removed injurious effects of subject imports (unanimous vote).
Apr-15	DOC ruled that Imperial & AmCane had standing to request continuation of AD/CVD investigation.
Sep-15	DOC issued final affirmative determination.
Nov-15	USITC issued final affirmative determination. Agreements remained in force.
Dec-16	The American Sugar Coalition requested administrative review of the CVD Agreement.
Feb-17	USITC began administrative review of Agreements (preliminary decision in Nov-17).

Following an affirmative preliminary determination, AD/CVD petitioners can elect to engage in suspension negotiations rather than proceeding with investigations. If suspension negotiations are successful, the USTR and the Minister of Trade in the respondent's home country can sign a suspension agreement and all pending litigation is terminated.⁷

On December 19, 2014, *Sugar from Mexico* investigations were suspended as a result of two Agreements between the Mexican and U.S. governments.⁸ The Suspension Agreements stipulated both price and quantity restrictions on Mexican sugar exports to the U.S. Minimum FOB reference prices of 26¢ per lb. for sugar of polarity above 99.5, and 22.25¢ per lb. for all other sugar. The Agreements also limited the amount of Mexican sugar exported to the U.S. in a given fiscal year according to a "U.S. Needs" formula, computed four times each fiscal year using data from the July, September, December, and March USDA *World Agricultural Supply and Demand Estimates* (WASDE) reports.⁹ Further, a maximum of 53%

⁷Title VII of the Tariff Act of 1930, §§704(c), 734(c).

⁸The terms of the Suspension Agreements are detailed in USITC (2015).

⁹"U.S. Needs" are defined as the difference between 113.5% of estimated U.S. total annual use (implying a 13.5% stocks-to-use ratio) and expected supply, where expected supply is the sum of beginning stocks, total production, and all imports except those originating from Mexico. Up to 70% of "U.S. Needs" may be imported from Mexico during the July Period, 80% during the December period, and 100% during the March period, provided that the calculated limit is at least as large as the applied limit from the previous period. The DOC may increase the applied limit on April 1 of each fiscal year at the request of the USDA.

of exports from Mexico to the U.S., in any given period, could be refined sugar (99.5 polarity or higher), with the remainder being raw (below 99.5 polarity).¹⁰

The suspension procedure allows any member of the domestic industry to unilaterally challenge a suspension agreement on the grounds that the agreement does not “eliminate completely the injurious effects” of subject imports on the domestic industry.¹¹ As part of the challenge, a firm can unilaterally force the USITC to continue investigations.¹²

After the U.S.-Mexico Sugar Suspension Agreement were reached, two sugar refiners—Imperial Sugar Company and AmCane Sugar—contested the Suspension Agreements arguing that the Suspension Agreements did not eliminate the injurious effects of the subject imports and requested continuation of the investigations. A timeline for the post-suspension litigation process is presented in Table 2. On March 19, 2015 the USITC found by unanimous vote that the Suspension Agreements completely removed the injurious effects. Imperial and AmCane argued that the agreement would restrict imports of raw sugar from Mexico and thereby hurt U.S. refiners of Mexican sugar. The USITC ruled that the terms “eliminates completely the injurious effects of subject imports” did not mean every member of the domestic industry must be made better off from the Agreements, rather that the Agreements benefited the domestic industry as a whole (USITC, 2015).

Nevertheless, Imperial and AmCane requested the investigations continue. In September and November 2015, the DOC and USITC issued final affirmative determinations meaning that the Agreements remained in effect. The DOC monitors and enforces Suspension Agreements, which are subject to administrative review and termination procedures. In December 2016, the American Sugar Coalition alongside Imperial and AmCane requested administrative review of the CVD Agreement. The USITC review process began in February 2017 with preliminary decisions scheduled for November.

¹⁰On June 6, 2017 the agreement was revised to further limit the percentage of Mexican imports that could be refined from 53% to 30%.

¹¹Title VII of the Tariff Act of 1930, §§704(c), 734(c).

¹²§§704(g) and 734(g) allow any manufacturer, producer, or wholesaler of a domestic like product to request continuation of the investigation within 20 days after notice of the suspension agreement.

5 Conceptual Framework

The suspension process allows any domestic firm to unilaterally challenge an agreement negotiated in resolution of AD/CVD proceedings. Thus, to go uncontested, all firms must prefer the terms of the agreement to the expected value of proceeding with investigations (equal to the probability of a positive final determination times the benefits of duties levied). When the domestic industry is defined to include heterogeneous groups, such as a group of farmers and processors of an agricultural commodity, it may be infeasible to construct an agreement that meets this criterion, even given the opportunity for intra-industry collusion.

Profitability for domestic cane producers is primarily determined by the price of raw sugar. In contrast, beet sugar does not have a raw stage and most beet processing companies are cooperatively owned by beet farmers, thus, profitability for beet producers is primarily influenced by the price of refined sugar. Revenue for sugar refiners is a function of both the raw-to-refined margin and the availability of raw sugar to be refined. Thus, to have simultaneous appeal across the domestic industry, the Suspension Agreements must increase the raw price, the refined price, and the product of the raw-to-refined margin and refined.

Figure 2 presents a schematic diagram of price formation in the U.S. sugar market.¹³ Supply can be disaggregated into two components—regulated and unregulated supply. The regulated supply comes from OAQ sales (originating from domestic cane and beet production and inventories) and from TRQ raw and refined imports. The regulated supply is relatively constant within a given fiscal year.

Conversely, the unregulated component of supply from raw, semi-refined, and refined Mexican sugar exports is highly variable. Prior to the imposition of the Suspension Agreements, annual imports from Mexico varied widely from 807,000 MTRV in FY 2009/10 to 2.13 million MTRV in FY 2013/14.

Figure 3 is a stylized representation of the U.S. sugar market that displays the intended

¹³Note that re-exports are not shown in the diagram because they represent a minimal portion of sugar trade in the U.S.

Figure 2: Schematic Representation of Price Formation in the U.S. Sugar Market

Shaded boxes correspond to producer groups included in the USITC domestic industry definition.

*One sweetener station (CSC Sugar, LLC) was also deemed to fall within the domestic industry.

effects of the volumetric and price restrictions implemented under the Suspension Agreements in this market. The demand schedule for sugar use in the U.S. is shown by the downward sloping line D . TRQ quotas shift the schedule D leftward to D_q , where the horizontal distance between D and D_q represents the total volume of TRQ sugar imports in a given year. Sales of domestic sugar are controlled and therefore the domestic supply curve is vertical, rising from Q_S in Figure 3. Mexico's supply curve is represented by the schedule S_{MX} .

In an unregulated equilibrium, Mexico supplies $0Q_e - 0Q_S$, the domestic industry supplies Q_S , and the difference between D and D_q is supplied by TRQ imports. The equilibrium price is P_e , which we have represented as lying below the support price (P_S) to capture the state of the U.S. market prior to the initiation of AD/CVD proceedings.

The Agreements impose a volumetric restriction according to "U.S. Needs", such that Mexico may supply a maximum of $0Q_R - 0Q_S$. The resulting price is P_m . This scenario

Figure 3: Intended Effects of the Suspension Agreements

depicts an equilibrium in which the volumetric export restriction is binding while the price restriction is non-binding. Alternatively, suppose “U.S. Needs” overestimate demand, giving Mexico the right to export a much larger volume of sugar. In the absence of a minimum price, the price could fall below P_S and result in domestic sugar forfeitures to the government. However, that outcome is prevented by the Suspension Agreement because Mexico cannot sell at a price below the minimum P_m . This scenario is an example of an equilibrium where the minimum price is binding. The combination of the volumetric import regulation and the minimum price requirement results in a minimum price equal to P_m , irrespective of the position of the Mexican supply curve.

A critical factor to the success of the Agreements is the imperfect correspondence between the USHTS and the types of sugar products marketed by Mexican producers. Mexican semi-refined sugar, which ranges between 99.4 and 99.9 polarity, is commonly marketed directly to sugar users or sold to sweetener stations for slight refinement and liquidation. Sugar between polarity 99.4 and 99.5 enters under “raw” tariff classifications in the U.S. Thus,

the USHTS distinction between sugar above and below 99.5 polarity does not precisely distinguish between sugar imported for further refining and sugar to be sold directly to sugar users, and therefore cannot prevent all cross-product trade diversion. This type of trade diversion can have a negative effect on the welfare of U.S. refiners.

Figure 4 illustrates the potentially perverse impacts of the Suspension Agreements on U.S. refiner surplus. Panel (a) depicts the alternative sources of refined sugar in the U.S. market. Segment S_D represents the supply of refined sugar that is produced domestically, which consists of domestic cane and refined beet OAQ sugar, raw TRQ imports, and Mexican sugar imports for further refining. Segment S_I represents the supply of refined sugar sold in the U.S. that is refined abroad. Because TRQ and FTA imports of refined sugar are minimal, supply S_I consists almost exclusively of Mexican semi-refined and refined sugar.

Panel (b) of Figure 4 depicts equilibrium in the U.S. market for refined sugar. Schedule D represents end users' demand for food grade sugar. The upward sloping supply curve is the horizontal sum of S_I and S_D . In equilibrium, refined sugar is sold in the U.S. at price P_f . Domestic refiners produce Q_D units of refined sugar, and Q_I units of refined sugar are imported, such that the total quantity sold is $Q = Q_I + Q_D$. U.S. refiner surplus is equal to areas $a + b + c$.

If the Agreements induce semi-refined sugar intended for sweetener stations to enter the U.S. under “raw” USHTS classifications, segment S_D pivots inward while segment S_I pivots outward. In words, there is less sugar intended for further refining in the U.S. available to at every refined price because the sugar is now refined in Mexico. For simplicity, assume that the Suspension Agreements induce a pivot is such that the two supply curves switch. Segment S_D becomes the supply of imported refined sugar, and S_I becomes the supply of domestically refined sugar. In this scenario, the equilibrium price and quantity of refined sugar sold in the U.S. remains unchanged. However, U.S. refiners now produce only Q_I units of sugar, and U.S. refiner surplus falls to area a from $a + b + c$.

6 Analysis

In this section we assess the returns to U.S. cane and beet farmers and sugar refiners over the first two years during which the Suspension Agreements have been in place. We develop an empirical model to analyze the impact of the Agreements on U.S. raw and refined prices, the raw-to-refined margin, and the quantity and composition of sugar imports from Mexico. Using the results from the empirical estimation, we calculate an “equivalent” *ad valorem* tariff for raw and refined imports from Mexico. We then compare the returns to domestic industry participants under the Agreements to two counter-factual scenarios, one in which AD/CVD duties are imposed and another “status quo” scenario in which sugar from Mexico continues to enter the U.S. duty and quota free. We find that U.S. cane and beet farmers strongly prefer the terms of the Suspension Agreements over AD/CVD duties. However, the Agreements have reduced U.S. refiner revenue below even the “status quo” policy regime.

6.1 U.S. Raw and Refined Sugar Prices

To analyze the impact of the Agreements on U.S. raw and refined sugar prices, we compare the historically observed relationship between domestic and world sugar prices prior to the

implementation of the Agreement with the domestic-world price relationship observed under the new regulatory regime. Our data includes monthly observations of U.S. and world prices for raw and refined sugar from January 2011 to December 2016. The U.S. domestic raw sugar price is the Intercontinental Exchange (ICE) Sugar No. 16 nearby futures contract.¹⁴ The world raw price is the nearby price for the ICE No. 11 contract.¹⁵ The world refined price is the nearby price for the No. 5 London Daily futures contract for refined sugar free-on-board in Europe. There is no monthly U.S. futures market for refined sugar in the U.S., thus, we use the average monthly spot price for refined cane sugar as published by *Milling & Baking Magazine*.¹⁶ These price series are shown in Figure 5 alongside prices for refined and semi-refined sugar in Mexico for reference.¹⁷ The start date is purposely chosen to correspond with the surge in Mexican sugar imports that gave rise to the AD/CVD proceedings.

Table 3 reports the results of Augmented Dickey-Fuller (ADF) tests for stationarity for each series (Said and Dickey, 1984). The second column reports the test statistic generated by the ADF test. The third column reports the corresponding MacKinnon approximate p-value. As shown in Table 3, we fail to reject the null hypothesis of non-stationarity for all prices series. We address potential concerns about spurious correlation in the discussion of estimation results below.

As another preliminary matter, it is also useful to ask whether there is evidence that the agreement has had any impact on domestic prices. To answer this question, we use common procedures to test for the presence of a structural break in historical U.S.-world

¹⁴“Nearby” refers to the contract with the closest settlement date. The ICE No. 16 contract specifies that 112,000 pounds of raw cane sugar be physically delivered to one of five U.S. refinery ports: New York, Baltimore, Galveston, New Orleans, or Savannah. Delivery months are January, March, May, July, September, and November.

¹⁵The No. 11 contract specifies delivery of 112,000 pounds of raw cane sugar in delivery months March, May, July, and October. Delivery on the No. 11 contract occurs at a port in the country of origin free-on-board the receiver’s vessel. Delivery can originate in about 30 different countries, including Australia, Brazil, Costa Rica, South Africa, etc.

¹⁶In recent months the U.S. price for refined beet sugar has diverged somewhat from the price for refined cane sugar due, at least in part, to recent state and federal regulations concerning the labeling of genetically modified organisms in food products. Because this price divergence is unrelated to the implementation of the sugar Suspension Agreements, we elect to use the U.S. refined cane price.

¹⁷The price series for semi-refined and refined sugar in Mexico are obtained from Servicio Nacional de Informacion de Mercados SNIIM-Economica.

Figure 5: Historical Prices for Raw and Refined Cane Sugar

(a) Raw Prices

(b) Refined Prices

Source: The U.S. raw price series is the monthly nearby ICE No. 16 price obtained from Table 4 of the USDA ERS Sugar and Sweeteners Yearbook. World raw and refined price series are obtained from Tables 03a and 03b from the USDA ERS Sugar and Sweeteners Yearbook. The world raw price series is the monthly nearby ICE No. 11 price. The refined price is the average nearby price for Contract No. 407 (aka no.5), London Daily Price, f.o.b. Europe. The price series for estandar and refined sugar in Mexico are obtained from Servicio Nacional de Informacion de Mercados SNIIM-Economica. The U.S. refined sugar price is the simple monthly average of the lower end of the range for refined cane sugar as published by Milling & Baking Magazine.

Table 3: Augmented Dickey-Fuller Tests for Stationarity

Price Series	Test-Statistic	P-Value	Conclusion
World Raw	-2.288	0.18	<i>Fail to Reject</i>
World Refined	-2.068	0.26	<i>Fail to Reject</i>
U.S. Raw	-1.724	0.42	<i>Fail to Reject</i>
U.S. Refined (Cane)	-1.580	0.49	<i>Fail to Reject</i>

price relationships in January 2015. Table 4 reports the results of tests for a known and an unknown structural break in the historical U.S.-world raw price relationship and the U.S.-world refined price relationship (Andrews, 1993; Chow, 1960). Results from the known structural break tests in Table 4, columns two and three strongly reject the null hypothesis of no structural break in January 2015 for both the raw and refined series. The unknown break tests also strongly support the presence of a structural break, but suggest that the break may have occurred slightly earlier, consistent with literature that finds AD/CVD announcements impact the market (Mahdavi and Bhagwati, 1994). Taken together these findings constitute strong evidence that the Agreements impacted raw and refined sugar prices in the U.S.

Table 4: Structural Break Analysis

	Known Break (<i>Jan-15</i>)		Unknown Break		
	Chi-Squared	p-value	Estimated Break	Sup. Wald	p-value
U.S. & World Raw Prices	79.8453	0.0000	Apr-14	187.5528	0.0000
U.S. & World Refined Prices	319.4484	0.0000	Aug-14	360.7173	0.0000

We formally estimate the effects of the agreement on the U.S.-world raw price relationship and the U.S.-world refined price relationship using a regime-switching model. For each U.S. price series we estimate the following equation

$$p_t = \alpha + \delta\lambda_t + \sum_{i=1}^n (1 - \lambda_t)\beta_i w_{t-i} + \sum_{i=1}^n \gamma_i \lambda_t w_{t-i} + \epsilon_t \quad (1)$$

where p_t is the dependent price (U.S. raw or refined) observed at time t and w_{t-i} is the corresponding world price at time $t - i$. The variable λ_t is an indicator equal to unity if the Suspension Agreements are in effect at time t and zero otherwise. The constant α is a

parameter that measures the average wedge between the dependent price variable in the U.S. and the corresponding world price over the time horizon. The inclusion of the additional parameter δ allows this domestic-to-world price wedge to vary once the Suspension Agreements have been enacted. Coefficients β_i and γ_i , respectively, measure the responsiveness of domestic prices to shocks to the world market before and after the implementation of the Agreements. The final variable, ϵ , is a residual, which we have assumed is uncorrelated with the other explanatory variables at time t . Optimal lag structure (n) for each series is determined according to the Hannan-Quinn Information Criterion. Table 5 shows the estimation results.

Table 5: Impact of the Suspension Agreements on U.S. Sugar Prices

VARIABLES	(1)	(2)
	Log	Log
	U.S. Raw Price	U.S. Refined Price
Agreement	2.273*** (0.246)	4.349*** (0.425)
Pre-Agreement*Log World Raw Price (L1)	1.003*** (0.076)	
Agreement*Log World Raw Price (L1)	0.266*** (0.018)	
Pre-Agreement*Log World Refined Price (L1)		0.688* (0.367)
Agreement*Log World Refined Price (L1)		-0.230** (0.109)
Pre-Agreement*Log World Refined Price (L2)		0.688* (0.345)
Agreement*Log World Refined Price (L2)		0.209** (0.103)
Constant	0.271 (0.241)	-0.769* (0.419)
Observations	71	70
R-squared	0.767	0.754

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

As shown in Table 5, based on monthly data, the imposition of the Agreements coincides

with a large and statistically significant increase in the U.S.-world margin for both the raw and refined estimation equations. Coefficient $\hat{\delta}$ is 2.273 in the raw equation and 4.349 in the refined equation. These estimates suggest that the Suspension Agreements have increased the average domestic-to-world price wedge by over 200% for raw sugar and 400% for refined sugar. Both estimates are statistically significant at the 1% level.

At the same time, the agreement has reduced the responsiveness of U.S. prices to shocks to the world market. In the raw equation, the coefficient on the lagged world price goes from 1.003 (significant at the 1% level) in the pre-agreement regime to 0.266 (significant at the 1% level) under the Agreements. In the refined equation, the coefficients on lagged world prices go from 0.688 (significant at the 10% level) for both the first and second lag to -0.230 (significant at the 5% level) and 0.209 (significant at the 5% level), respectively. In both equations, the coefficients measuring the responsiveness of domestic prices to world prices in the pre-agreement regime were statistically indistinguishable from 1, which means that a shock to the world market was fully absorbed in the domestic market. However, each coefficient measuring the responsiveness of domestic prices to world prices after the implementation is statistically less than one.

Table 6 formally tests the hypothesis that the responsiveness of domestic prices to world prices has changed under the Suspension Agreements. Column 3 of the Table reports the F-statistic for a Wald test of the restriction that $\hat{\beta}_i = \hat{\gamma}_i$ for the corresponding domestic-world price combination shown in columns 1 and 2 of the Table. For example, in the raw equation, a test that the coefficients on lagged world prices are equivalent between the pre- and post-agreement regimes yields an F-statistic of 88.05. We reject equivalence at the 1% level. As shown in the Table, we reject equivalence across all equations and domestic-world price combinations at the 5% level.

The solid black line in Figure 6 is the predicted U.S. raw price over the estimation horizon. We contrast predictions for U.S. raw and refined sugar prices with counterfactual “status quo” price series in which the Suspension Agreements were never implemented, no

Table 6: Wald tests for Equivalence of Pre- and Post-Agreement World Price Coefficients

Equation	World Price	F-statistic	p-value
(1) Log Raw Prices	L1	88.05	0.0000
(2) Log Refined Prices	L1	5.73	0.0196
	L2	4.05	0.0221

Figure 6: Predicted and Counter-Factual U.S. Raw Price Scenarios

duties were assessed, and sugar trade with Mexico carried on as usual. These counterfactual prices ($\tilde{p}_t$) are constructed from the pre-agreement coefficients estimated in equation (1) as

$$\tilde{p}_t = \hat{\alpha} + \sum_{i=1}^n \hat{\beta}_i w_{t-i} \quad (2)$$

The “status quo” scenario is depicted as the dotted red line of Figure 6. Comparing the predicted prices with the counterfactual “status quo” series, over their first two years of existence the Suspension Agreements increased U.S. raw sugar prices by an average of 5.80¢ per lb. and increased U.S. refined sugar prices by an average of 6¢ per lb.

Finally, to assess whether U.S. cane and beet farmers prefer the Suspension Agreements to AD/CVD duties, we deduce a third, “equivalent” *ad valorem* tariff scenario. Domestic prices ($\bar{p}_t$) are equal to the world price plus an *ad valorem* tariff, i.e., $\bar{p}_t = (1 + \tau)w_t$, where

Table 7: Average Impact of Suspension Agreements and Equivalent Tariff

Price Series	Impact of Suspension Agreements (cents per lb.)	Equivalent Tariff (Ad Valorem)
U.S. Raw Sugar	5.80 (3.05)	68%
U.S. Refined Sugar	6.00 (7.08)	69%

Standard deviation in parenthesis.

the tariff (τ) is calculated in order to generate an impact on U.S. prices that is equivalent, on average, to the Suspension Agreements. In other words, we calculate the *ad valorem* tariff on raw sugar that induces a 5.80¢ increase in U.S. raw prices and the *ad valorem* tariff on refined sugar that induces a 6¢ increase in U.S. refined prices. The equivalent tariff scenario is depicted as the green dashed line in Figure 6. As shown in Table 7, the equivalent tariff is 68% for raw sugar and 69% for refined sugar. This tariff is considerably higher than the preliminary duties assessed by the USITC, which ranged from approximately 40% to 47%. Our calculation of the *ad valorem* tariff equivalent to the Suspension Agreements is striking because it implies not only that U.S. cane and beet farmers prefer the terms of the Suspension Agreements to duties, but also that the returns to the different producer groups, as a percentage of initial revenue, was similar.

6.2 Refiner Revenue

To assess the impact of the Suspension Agreements on U.S. sugar refiner revenue, we analyze both the change in the raw-to-refined price margin and the availability of raw sugar under the Agreements. The estimates from equation (1) imply a slight increase in the raw-to-refined margin from 7.26¢ per lb. in the “status quo” scenario to 7.46¢ per lb. as a result of the Suspension Agreements. Thus, the impact of the Agreements on refiner revenue hinges critically on the quantity and composition of sugar imports from Mexico.

Table 8 reports average monthly Mexican sugar imports into the U.S. before and after the agreement. We present data under both USHTS and MXHTS classifications. The top number in each row of columns 2 and 3 corresponds to the average monthly imports in 1,000 MTRV for the relevant HTS category. The value in parenthesis corresponds to the share of total imports over the relevant timeframe. Values in column 4 signify percentage changes from column 2 to column 3 with statistical significance of the change indicated by stars.¹⁸

Table 8: Impact of Suspension Agreements on Quantity and Composition of Imports

Variable	Average Monthly Imports		Change	
	Oct-11–Dec-14	Jan-15–Dec-16		
	<i>1,000 MTRV</i> <i>(share of total)</i>	<i>1,000 MTRV</i> <i>(share of total)</i>	% (%)	
USHTS Classification				
Total Imports	127.46 (1.00)	108.36 (1.00)	-15 (-)	
Polarity < 99.5	38.60 (0.25)	58.74 (0.50)	52 (103)	** ***
Polarity > 99.5	88.86 (0.75)	49.62 (0.50)	-44 (-34)	*** ***
MXHTS Classification				
Total Imports	122.52 (1.00)	105.45 (1.00)	-14 (-)	
Polarity 96–99.4	20.68 (0.11)	17.34 (0.13)	-16 (15)	
Polarity 99.4–99.5	16.59 (0.10)	42.78 (0.42)	158 (329)	*** ***
Polarity 99.5–99.7	17.18 (0.15)	3.07 (0.04)	-82 (-77)	*** ***
Polarity 99.7–99.9	6.17 (0.05)	2.10 (0.02)	-66 (-55)	** **
Polarity > 99	61.72 (0.58)	39.88 (0.39)	-35 (-32)	*** ***

***p<0.01, **p<0.05, *p<0.1

¹⁸Statistical significance of the change is assessed according to a conventional mean comparison test.

At the aggregate level, USHTS and MXHTS statistics are similar. First looking at total trade volume, average monthly imports totaled 127,000 MTRV prior to the implementation of the Agreements and 108,000 thereafter. Similarly, under the MXHTS, average exports to the U.S. totaled 122,000 MTRV and 105,000 MTRV. The two data sources also produce a similar breakdown between sugar above and below 99.5 polarity before and after the agreement.

Referring to the USHTS data, we see that the Suspension Agreements appear to be operating as intended. Total import volume has decreased by over 19,000 MTRV per month on average, or 15%, from pre-agreement levels. Additionally, the composition of imports appears to have dramatically shifted. Prior to the imposition of the Agreements, three-fourths of all imports were of polarity above 99.5. After the imposition of the Agreements, the volume of imports above 99.5 polarity has fallen by 44%. In contrast, the volume of imports below 99.5 polarity has increased by 52%. Thus, under the agreement, import shares are approximately equal for sugar above and below 99.5 polarity. The substantial increase in sugar below 99.5 polarity suggests an increase in the availability in sugar for further refining, and thus, that sugar refiners may have benefited under the agreement.

However, the more disaggregated MXHTS data tell a very different story. These data are also depicted on a monthly basis in Figure 7. As shown from Table 8 and Figure 7, the increase in sugar imports below 99.5 polarity came exclusively from an expansion in imports between 99.4 and 99.5 polarity—sugar that is sold to sweetener stations or “melt houses” instead of sugar refiners (Sterk, 2016). Referring to Table 8, average monthly imports of sugar between 99.4 and 99.5 polarity increased by 158% after the implementation of the Agreements.

In contrast to semi-refined imports, sugar imported for further refining decreased under the Agreements. Table 8 shows that average monthly imports of sugar between 96 and 99.4 polarity fell from 20,680 MTRV before the Suspension Agreements to 17,340 MTRV under the Agreements. Thus, although the Agreements increased the raw-to-refined price margin,

Figure 7: Mexican Sugar Exports to the U.S., by Tariff Classification

(a) Export Volume

(b) Composition of Total Sugar Exports

Mexican HTS Categories are as follows:

- 17011401: Sugar (dry) of polarity between 99.4 and 99.5 degrees.
- 17011402: Sugar (dry) of polarity between 96 and 99.4 degrees.
- 17011403: Sugar (dry) of polarity less than 96 degrees.
- 17019901: Sugar (dry) of polarity between 99.5 and 99.7 degrees.
- 17019902: Sugar (dry) of polarity between 99.7 and 99.9 degrees.
- 17019999: Sugar (dry) not elsewhere specified.

they also left some U.S. refiners with less access to inputs under the Suspension Agreements.

Table 9 reports estimates of the net impact of the Agreements on monthly refiner revenue. As discussed, the Agreements increased the raw-to-refined price margin over the “status quo” from 7.29¢ to 7.46¢ per lb. Refiners receive this higher price not only for sugar imports, but also for domestic raw sugar and sugar imports from countries other than Mexico. In FY 2015/16, the U.S. produced an average of 292,570 MTRV of raw sugar and imported 98,460 MTRV of raw sugar from other countries. Because U.S. production is restricted under USDA marketing allotments and all imports of non-Mexican origin are restricted under tariff rate quotas and free trade agreements, these quantities would have been the same under the “status quo” counterfactual scenario.

Table 9: Average Monthly Refiner Revenue, Jan 2015–Dec 2016

	Status Quo	Suspension Agreements	“Equivalent” Tariff
	<i>(1,000 MTRV)</i>		
U.S. Raw Sugar Production	292.57	292.57	292.57
Mexico Imports for further refining	38.60	17.34	32.81
Other Raw Imports	98.46	98.46	98.46
Total Sugar to be refined	429.63	408.37	424.84
Raw-to-Refined Margin (<i>¢ per lb.</i>)	7.26	7.46	7.46
Total Refiner Revenue (<i>Millions</i>)	\$687.9	\$671.3	\$698.4
Δ from “Status Quo” (<i>Millions</i>)		-\$16.6	\$10.4

After accounting for the raw sugar available for refining from all other sources (i.e., domestic cane production and non-Mexican raw imports), average monthly refiner revenue under the Agreements is \$671 million per month compared to \$687 million in the “status quo” unregulated scenario. In other words, the Suspension Agreements have not benefited all U.S. refiners. Rather, over their first two years of existence, the Suspension Agreements have cost U.S. refiners \$16.6 million per month—or 2.5%—in lost revenue.¹⁹

The final column of Table 9 calculates refiner revenue under an “equivalent tariff” scenario

¹⁹Note that these findings do not suggest that all U.S. refiners have been hurt by the Agreements. Some refiners, such as those not dependent on raw sugar from Mexico, could have benefited. Our finding is a net effect across refiners as a whole.

in which the total volume of trade decreases by 15% as a result of the tariff (equivalent to the Suspension Agreements), but that the composition of trade remains unaffected by the policy. We also make the conservative assumption that the raw-to-refined price margin remains at 7.26¢ per lb. as in the “status quo” scenario. In this scenario, average monthly refiner revenue is \$698 million—\$10.4 million greater than in the “status quo” and \$27 million greater than under the Suspension Agreements.

7 Conclusion

Access to the U.S. sugar market is heavily regulated. The USDA prescribes marketing allotments on domestic sugar refiners, and, with the exception of Mexico, all imported sugar is subject to WTO tariff-rate quotas or other restrictions under regional trade agreements. Following a surge in Mexico sugar exports to the U.S. in FY2011/12, the U.S. sugar industry initiated AD and CVD investigations against sugar from Mexico. On December 19, 2014, these investigations were suspended as a result of two Agreements that imposed volumetric and minimum price restrictions on Mexican sugar entering the U.S.

We investigate the effects of these Suspension Agreements on the welfare of U.S. beet and cane farmers and sugar refiners. Because domestic production is restricted by quota, profitability for domestic cane and beet producers is primarily determined by raw and refined prices. In contrast, revenue for sugar refiners is a function of both the raw-to-refined margin and the availability of sugar for further refining, including imports. The imperfect correspondence between U.S. tariff classifications and the types of sugar produced in Mexico created, under the Agreements, the potential for cross-product trade diversion between refined, semi-refined, and raw sugar.

We develop an empirical model to compare U.S. raw and refined prices under the Agreements to two counter-factual scenarios, one in which sugar from Mexico enters the U.S. duty- and quota-free and another in which AD/CVD duties are imposed. We find that the

Suspension Agreements increased domestic prices for raw and refined sugar by an average of 5.8¢ and 6¢ per lb., respectively. These impacts are approximately equivalent to those induced by 70% *ad valorem* tariffs on sugar imports from Mexico, substantially higher than those assessed under the DOC's preliminary findings. Thus, domestic sugar farmers were made better off by the Suspension Agreements than they would have been by proceeding with investigations.

However, the Agreements have resulted in a major shortfall in U.S. imports of sugar for further refining. Imports destined for liquid sugar producers have increased, while sugars of lower polarity have decreased by 16%. The reduction in the availability of refiners' raw inputs has been somewhat offset by a small increase in the raw-to-refined price margin from 7.26¢ to 7.4¢ per lb. The net effect is a revenue loss of \$16.6 million per month for refiners in aggregate relative to a scenario in which sugar from Mexico are unrestricted. Therefore, some domestic refiners have been made worse off by the Suspension Agreements.

These findings shed light on the potential disconnect between the apparent benefits of suspension agreements to industry participants and the scant use of such instruments in practice. As a preliminary matter for AD/CVD investigations, the USITC defines the scope of domestic products that are considered "like" the subject imports, including the array of products which are sufficiently substitutable with imports and the various stages of production that fall within the domestic product. The inclusion of multiple upstream and downstream firms within a domestic industry creates divergent intra-industry bargaining incentives and complicates suspension negotiations. Under these circumstances, trade suspension may generate undesirable or unstable Nash bargaining equilibria.

References

Anderson, James E. 1992. "Domino dumping, i: competitive exporters." *American Economic Review*, 65–83.

- Andrews, Donald WK.** 1993. "Tests for parameter instability and structural change with unknown change point." *Econometrica: Journal of the Econometric Society*, 821–856.
- Arguea, Nestor M., and Richard K. Harper.** 1994. "Industry Definition and Less Than Fair Value Pricing: an Analysis of ITC Practice." *Journal of Economic Integration*, 9(1): pp. 106–127.
- Baylis, Kathy, and Jeffrey M Perloff.** 2010. "Trade diversion from tomato suspension agreements." *Canadian Journal of Economics/Revue Canadienne d'Économie*, 43(1): 127–151.
- Berg, Gerald C.** 1996. "An Economic Interpretation of "Like-Product"." *Journal of World Trade*, 30(2): 195–209.
- Bown, Chad P.** 2015. "Global Antidumping Database."
- Carter, Colin A., and Caroline Gunning-Trant.** 2006. "China's Food Exports Face Dumping Laws." *American Journal of Agricultural Economics*, 88(5): 1227.
- Chow, Gregory C.** 1960. "Tests of equality between sets of coefficients in two linear regressions." *Econometrica: Journal of the Econometric Society*, 591–605.
- Dixit, Avinash.** 1988. "Anti-dumping and countervailing duties under oligopoly." *European Economic Review*, 32(1): 55–68.
- Falvey, Rodney E.** 1979. "The composition of trade within import-restricted product categories." *Journal of Political Economy*, 87(5, Part 1): 1105–1114.
- Farr, Wilkie, and Robert E. DeFrancisco.** 2006. "The New Big Thing in Trade Law: Post-Order Antidumping And Countervailing Duty Settlements." *Metropolitan Corporate Counsel*.
- Ghazalian, Pascal L.** 2015. "The New Tomato Suspension Agreement: What Are the Implications for Trade Flows?" *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie*, 63(3): 359–380.
- Jurenas, Remy.** 2012. "Sugar Program: The Basics (Report for Congress Prepared for Members and Committees of Congress)." *Congressional Research Service*.
- Kosse, Elijah, and Stephen Devadoss.** 2016. "Welfare Analysis Of The US-Mexican Tomato Suspension Agreement." *Journal of Agricultural and Applied Economics*, 48(4): 430–449.
- Mahdavi, Mahnaz, and Amala Bhagwati.** 1994. "Stock market data and trade policy: dumping and the semiconductor industry." *International Trade Journal*, 8(2): 207–221.
- Prusa, Thomas J.** 1992. "Why are so many antidumping petitions withdrawn?" *Journal of International Economics*, 33(1): 1–20.

- Prusa, Thomas J.** 2001. "On the spread and impact of anti-dumping." *Canadian Journal of Economics/Revue Canadienne d'Économique*, 34(3): 591–611.
- Rosendorff, B Peter.** 1996. "Voluntary export restraints, antidumping procedure, and domestic politics." *American Economic Review*, 544–561.
- Said, Said E, and David A Dickey.** 1984. "Testing for unit roots in autoregressive-moving average models of unknown order." *Biometrika*, 71(3): 599–607.
- Staiger, Robert W, and Frank A Wolak.** 1989. "Strategic use of antidumping law to enforce tacit international collusion." National Bureau of Economic Research.
- Staiger, Robert W, and Frank A Wolak.** 1992. "The effect of domestic antidumping law in the presence of foreign monopoly." *Journal of International Economics*, 32(3): 265–287.
- Steen, Bruce M.** 1987. "Economically Meaningful Markets: An Alternative Approach to Defining "Like Product" and "Domestic Industry" under the Trade Agreements Act of 1979." *Virginia Law Review*, 73(8): pp. 1459–1499.
- Sterk, Ron.** 2016. "U.S. Sugar Market Seeking Equilibrium." *Food Business News*.
- Taylor, Christopher T.** 2004. "The economic effects of withdrawn antidumping investigations: is there evidence of collusive settlements?" *Journal of International Economics*, 62(2): 295 – 312.
- USDA.** 2012. "2012 Agricultural Census." *National Agricultural Statistics Service*.
- USDA.** 2015. "USDA-Recognized Cane Refiners." *Farm Service Agency*.
- USDA.** 2016. "Sugar Loan Program: Sugar MarMarket Allotments and Feedstock Flexibility Program." *FSA 2014 Farm Bill Fact Sheet*.
- USDA.** 2017. "Sugar and Sweeteners Yearbook Table 16." *Economic Research Service*.
- USITC.** 1996. *Antidumping and Countervailing Duty Handbook*. United States International Trade Commission and United States International Trade Commission and others.
- USITC.** 2014. "Publication 4467: Sugar from Mexico, Investigation Nos. 701-TA-513 and 731-TA-1249 (Preliminary)."
- USITC.** 2015. "Publication 4523, Sugar from Mexico Investigation Nos. 704-TA-1 and 734-TA-1 (Review)."
- Veugelers, Reinhilde, and Hylke Vandenbussche.** 1999. "European anti-dumping policy and the profitability of national and international collusion." *European Economic Review*, 43(1): 1 – 28.