



United States
Department
of Agriculture

SSSM-335-01

August 2016



Approved by USDA's
World Agricultural
Outlook Board

A Report from the Economic Research Service

www.ers.usda.gov

A New Outlook for the U.S.-Mexico Sugar and Sweetener Market

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Abstract

This report provides an overview of the U.S.-Mexico sweetener market and explains how the agreements suspending the U.S. antidumping and countervailing duty investigations on sugar imports from Mexico are likely to reshape this market. The analysis considers the circumstances leading up to the investigations, including how the North American Free Trade Agreement (NAFTA) liberalized bilateral trade in sugar and high fructose corn syrup (HFCS) and how each country's domestic sugar policies are different. Increased sugarcane area in Mexico and higher-than-average yields in both countries led to abundant crops in 2012/13 and 2013/14, which in turn placed downward pressure on prices in the integrated U.S.-Mexico market. By altering the supply of Mexican sugar in the U.S. and Mexican markets, the suspension agreements are likely to affect U.S. and Mexican demand for HFCS as well. Development of a sugarcane-based ethanol fuel industry in Mexico would increase Mexican demand for sugarcane and temper the effects of the suspension agreements. Ethanol production in Mexico, however, continues to face many challenges, including the currently low price of crude oil.

Keywords: Mexico, sugar, trade, NAFTA, United States, HFCS, high fructose corn syrup

Acknowledgments

We thank Barb Fecso (USDA, Farm Service Agency (FSA)); Mesbah Motamed (USDA, Economic Research Service (ERS)); Owen Wagner (LMC International); and Dulce Flores, Tim Harrison, Alicia Hernandez, and Ydun Donahoe (USDA's Foreign Agricultural Service (FAS)) for their valuable peer reviews. We also thank Donna Roberts (retired, ERS) and Joy Harwood (FSA) for suggesting this line of research; Adriana Herrera Moreno (Mexican Secretariat of Agriculture, Livestock, Rural Development, Fishing, and Food, General Coordination of International

Affairs) for facilitating exploratory interviews for this project in 2013, and the participants in those interviews; and Andrew Muhammad, Suzanne Thornsbury, and Joe Cooper (ERS), Steve Haley (USDA, Office of the Chief Economist), and David Magaña Lemus (Banco de México, Fideicomisos Instituidos en Relación con la Agricultura [FIRA-Funds Instituted in Relation with Agriculture]) for their feedback. Special thanks go to David Nulph (ERS) for preparing the map showing the location of U.S. and Mexican sugar crop production and to John Weber and Cynthia A. Ray (ERS) for their expert editing and design of the report. This research was conducted under Cooperative Agreement No. 58-3000-3-0064 between ERS and the Louisiana State University Agricultural Center, and was partially supported by USDA's National Institute of Food and Agriculture (NIFA) and the Louisiana State University Agricultural Center.

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Introduction

In December 2014, the United States and Mexico finalized a pair of agreements to suspend the U.S. antidumping (AD) and countervailing duty (CVD) investigations that were underway concerning U.S. imports of raw and refined sugar from Mexico (USDOC/ITA, 2014a, 2014b).¹ These agreements mark the beginning of a new period for U.S.-Mexico sugar trade because they restrict the price and quantity of Mexican sugar exports to the United States. Prior to these agreements, bilateral sugar trade had been free of such restrictions since January 2008, when the United States and Mexico instituted tariff- and quota-free trade for sugar in accordance with the North American Free Trade Agreement (NAFTA).² Mexico is currently the only major sugar-exporting country that has tariff- and quota-free access to the U.S. market.

How do the suspension agreements change the outlook for the integrated U.S.-Mexico sweetener market, and what caused the economic and policy conditions that supported the investigations? To answer these questions, this report explores the events leading up to the investigations and places them among the larger set of factors shaping the outlook for this market. In particular, it examines NAFTA's impact on U.S.-Mexico trade in sugar and competing sweeteners such as high fructose corn syrup (HFCS), changes in supply prior to the petitions for the investigations, and trends in the demand for sugar and HFCS. While rising imports from Mexico initially did not place much pressure on U.S. sugar producers, an increase in Mexican sugarcane area beginning in the 2010/11 crop year and higher U.S. and Mexican sugar crop yields in the 2012/13 crop year tightened the competition between the U.S. and Mexican sugar sectors—providing impetus for the filing of petitions for the AD and CVD investigations. Because bilateral sugar trade is part of an integrated U.S.-Mexico sweetener market, the suspension agreements in their current form have the potential for far-reaching effects—influencing not only Mexican sugar exports to the United States but also other facets of the sweetener market, such as the tradeoffs between sugar and HFCS in each country and the feasibility of sugarcane-based ethanol production in Mexico.³

¹The AD investigation was suspended by an agreement between the U.S. Government and the Mexican sugar industry (producers and exporters). The CVD investigation was suspended by an agreement between the U.S. and Mexican Governments.

²By contrast, NAFTA exempted U.S.-Canada and Canada-Mexico trade in sugar and sugar-containing products from the process of intraregional trade liberalization.

³Many of the developments discussed in this report are also examined in past issues of ERS's *Sugar and Sweetener Outlook* reports and USDA's long-term agricultural projections. Readers seeking more indepth analysis and a more extensive historical understanding of these developments are encouraged to consult the archives of these reports (USDA/ERS, 1975-2016d; 2016a).

How NAFTA Integrated the U.S. and Mexican Sweetener Markets

Prior to NAFTA's implementation in January 1994, the United States restricted sugar imports from Mexico by maintaining a tariff-rate quota (TRQ) system with a prohibitive over-quota tariff. Mexico was normally assigned a small portion of the raw-sugar quota—a “minimum boatload” of 7,258 metric tons, raw value (Suarez, 1997). Meanwhile, Mexico applied an import tariff of 15 percent to U.S. HFCS (Haley and Suarez, 1999). However, the transition to bilateral free trade in sugar and HFCS did not begin in earnest until September 2007, following the settlement of a protracted dispute about how best to implement NAFTA's provisions for these commodities. This dispute originated when the U.S. and Mexican Governments exchanged side letters modifying the sugar provisions of NAFTA's original text and then later disagreed on the content and validity of these letters. Eventually, the dispute became even more complex—involving a Mexican AD investigation on U.S. HFCS and a Mexican sales tax on beverages flavored with sweeteners other than sugar (Haley and Suarez, 1999; Zahniser, 2007).

The agreement to settle the NAFTA sweetener dispute, spelled out in a Memorandum of Understanding (MOU) between the U.S. and Mexican Governments in 2006, contained two main elements.⁴ First, the two governments specified the quantities of duty-free access for raw and refined sugar and HFCS that each gave to the other for fiscal year (FY) 2007 and the first quarter of FY 2008.⁵ Second, they established bilateral free trade for these products, beginning on January 1, 2008. Under NAFTA's original terms, U.S.-Mexico sweetener trade was to have been liberalized in 2003 for HFCS and in 2008 for sugar. Separate from the MOU, Mexico's soft drink tax was withdrawn, and U.S. sweetener firms obtained judgments against the Mexican Government regarding the adverse effects of the tax using one of NAFTA's dispute resolution procedures (Zahniser and Roe, 2011). Settlement of the dispute effectively combined the two countries' sweetener markets, and bilateral trade in sugar and HFCS increased significantly (fig. 1). During FY 2012-14, U.S. sugar imports from Mexico averaged about 1.5 million metric tons per year, and U.S. HFCS exports to Mexico averaged about 942,000 metric tons, compared with very low volumes before NAFTA.⁶

Mexican sugar gains a larger share of U.S. sweetener supply

Mexico's share of the combined U.S. supply of sugar and HFCS (from all sources, foreign and domestic) grew substantially following the start of free bilateral trade in sweeteners. Imports from Mexico accounted for about 7 percent of supply during FY 2012-14, compared with 2 percent during FY 2004-06, the last 3 fiscal years prior to the settlement of the sweetener dispute (figs. 2, 3). Meanwhile, the share obtained from U.S.-produced HFCS dropped from 43 to 38 percent. For HFCS, the competition from Mexico primarily took the form of refined sugar imported for direct

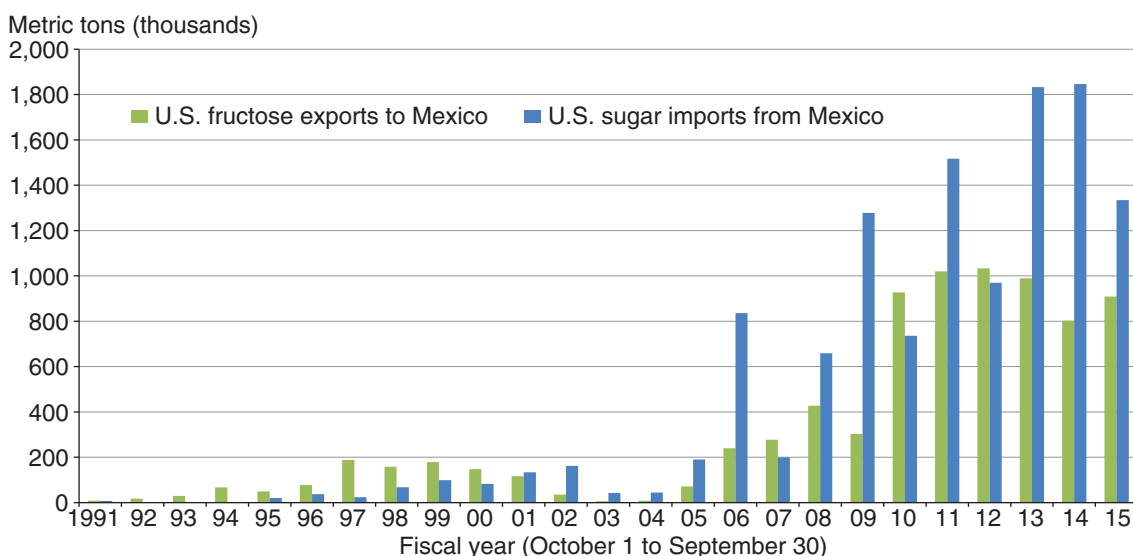
⁴Haley (2006) provides a more detailed summary of the agreement.

⁵The fiscal year of the U.S. Federal Government starts on October 1 and ends on September 30. Thus, FY 2016 began on October 1, 2015, and will end on September 30, 2016. The U.S. crop year for sugarcane corresponds with the fiscal year, so FY 2016 covers the same period as the 2015/16 sugarcane crop. In contrast, the U.S. crop year for sugarbeets begins on August 1 and ends on July 31. Thus, the 2015/16 crop year for sugar beets began on August 1, 2015, and ended on July 31, 2016.

⁶Glucose syrup (not containing fructose or containing in the dry state less than 20 percent by weight) is another substantial component of U.S. sweetener exports to Mexico. During FY 2012-14, U.S. exports to Mexico of this product averaged about 241,000 metric tons per year.

Figure 1

Trade liberalization under NAFTA led to substantial Mexican sugar exports to the United States and U.S. fructose exports to Mexico



Notes: NAFTA = North American Free Trade Agreement. Although NAFTA took effect on January 1, 1994, the agreement to settle the dispute about how to implement NAFTA's provisions for bilateral sweetener trade took effect at the start of FY 2007, and tariff- and quota-free trade in sugar began on January 1, 2008. Fructose is defined to include high-fructose corn syrup (HFCS) and crystalline fructose. Dry conversion factors: 0.71 for HS 17024000, 1.00 for HS 17025000, and 0.77 for HS 170260050 and 170260060.

Source: USDA, Economic Research Service, using data from U.S. Census Bureau, *Foreign Trade Statistics*, as cited by USDA/FAS (2016a).

consumption. The substitution of Mexican sugar for some U.S. HFCS was noted in ERS's *Sugar and Sweetener Outlook* reports soon after the institution of bilateral free trade in sweeteners (Haley et al., 2008).

Three other factors supported the growth of the U.S. sugar industry despite rising competition from Mexico. First, demand growth enabled U.S. sugar crop growers to increase production. Between FY 2004-06 and FY 2012-14, the average annual U.S. supply of sugar and HFCS increased from 19.4 million to 20.7 million metric tons (figs. 2, 3). Sugar obtained from U.S. sugarcane increased from 3.0 million to 3.3 million metric tons, even though U.S. sugarcane's share of supply remained about the same. Meanwhile, sugar obtained from U.S. sugar beets increased from an annual average of 3.7 million metric tons to 4.6 million metric tons—sufficient growth for a slight increase in the share corresponding to U.S. sugar beets.

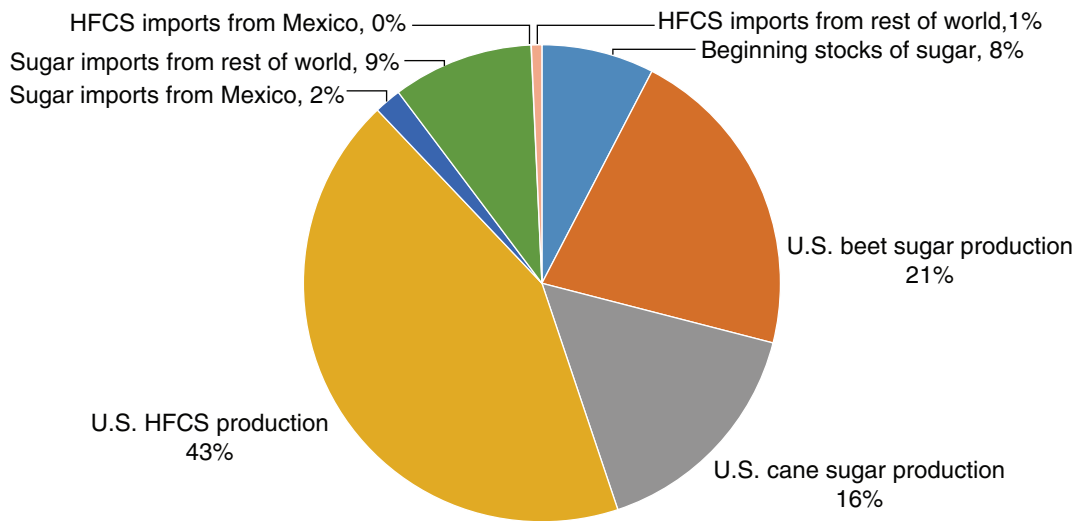
Second, use of corn-based ethanol as an oxygenate in U.S. gasoline continued to expand, particularly during the first 4 years following the initiation of free bilateral trade in sweeteners (Trostle et al., 2011). This placed upward pressure on corn prices, which raised the demand for sugar by making corn-based sweeteners more expensive relative to sugar than they would have been otherwise.

Third, U.S. consumers, food manufacturers, and food marketers had begun to reevaluate their preferences for HFCS versus sugar—thereby increasing the demand for sugar, regardless of its source. As discussed later in the report, U.S. per capita HFCS consumption peaked between 1998 and 2002 and continued to trend downward after bilateral sweetener trade was liberalized.

Figure 2

Combined U.S. supply of sugar and HFCS, FY 2004-06

Annual average = 19.4 million metric tons, dry weight (refined sugar basis)



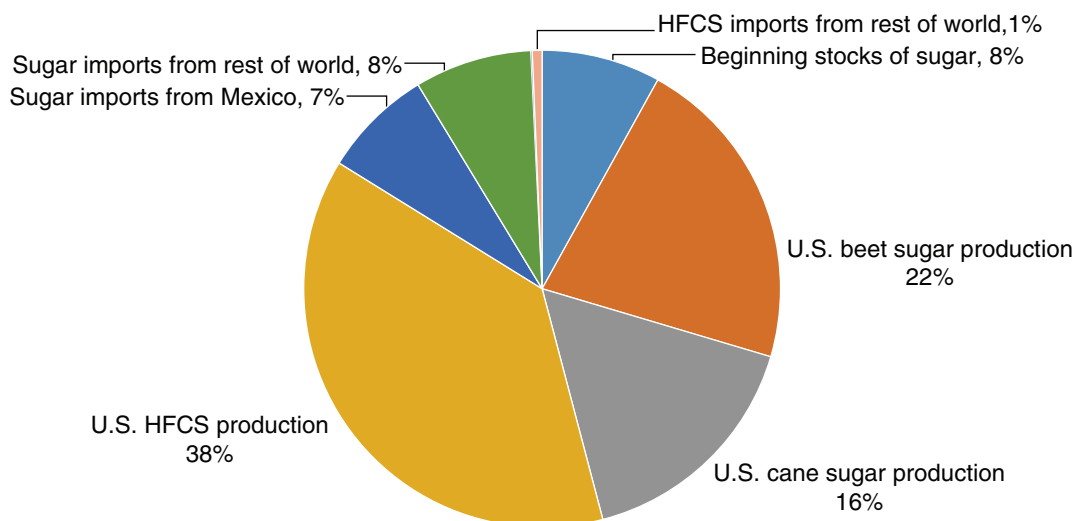
HFCS = high fructose corn syrup.

Sources: USDA, Economic Research Service, using USDA/FAS (2016a, 2016b) (imports and sugar production, respectively); and USDA, Economic Research Service (2016c) (HFCS production).

Figure 3

Combined U.S. supply of sugar and HFCS, FY 2012-14

Annual average = 20.7 million metric tons, dry weight (refined sugar basis)



HFCS = high fructose corn syrup.

Sources: USDA, Economic Research Service, using USDA/FAS (2016a, 2016b) (imports and sugar production, respectively); and USDA, Economic Research Service (2016c) (HFCS production).

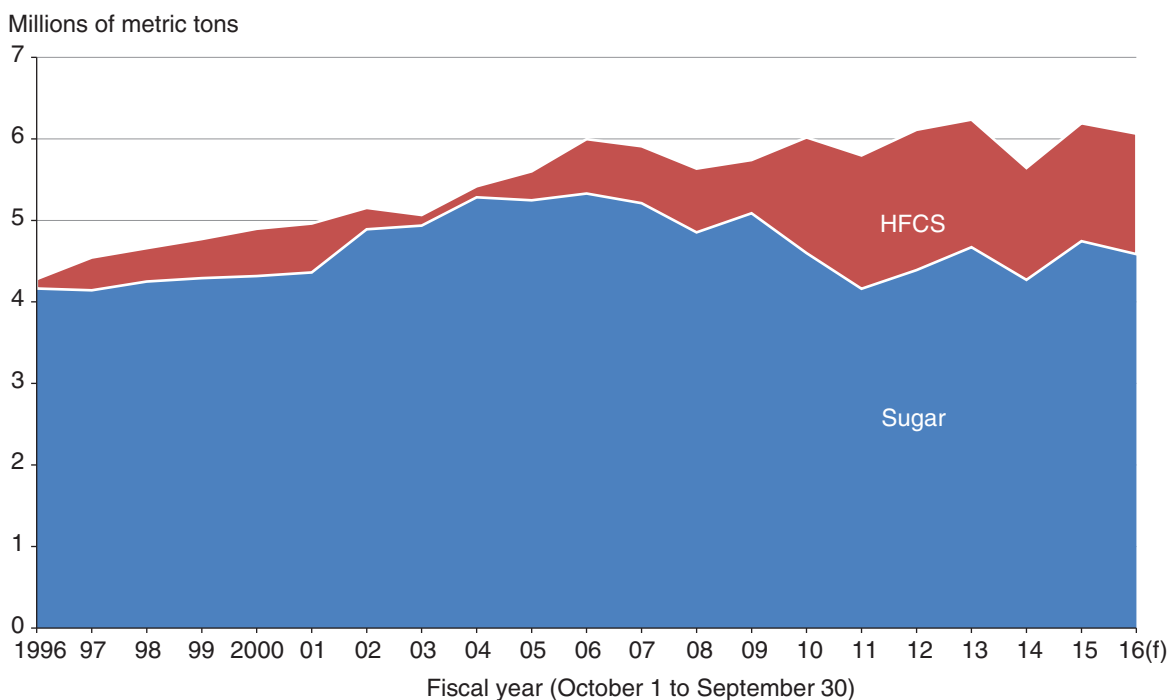
HFCS gains wider acceptance in Mexico

Greater acceptance of corn-based sweeteners among Mexican manufacturers and consumers of soft drinks and processed foods, the price competitiveness of U.S. corn-based sweeteners, and trade liberalization under NAFTA all helped to boost U.S. HFCS exports to Mexico. As such, the share of HFCS in the Mexican sweetener market increased from 9 percent during FY 2005-07 to 25 percent during FY 2012-14 (fig. 4).⁷

U.S. HFCS exports to Mexico have been consistently price-competitive with sugar produced in Mexico since the resolution of the NAFTA sugar dispute (fig. 5). This was particularly true during calendar years 2009-12, when the price of refined sugar in Mexico was especially high relative to the price of U.S. HFCS. The unit value of U.S. HFCS exports to Mexico also tends to be quite stable, compared with the price of refined sugar in Mexico. For instance, while the drought that adversely affected the U.S. corn crop of 2012 had a pronounced impact on the unit value of U.S. HFCS exports to Mexico during 2012 and 2013, this impact is slight when compared to the price fluctuations in Mexico's market for refined sugar.

Figure 4

HFCS accounts for a larger share of Mexico's combined sugar and HFCS disappearance



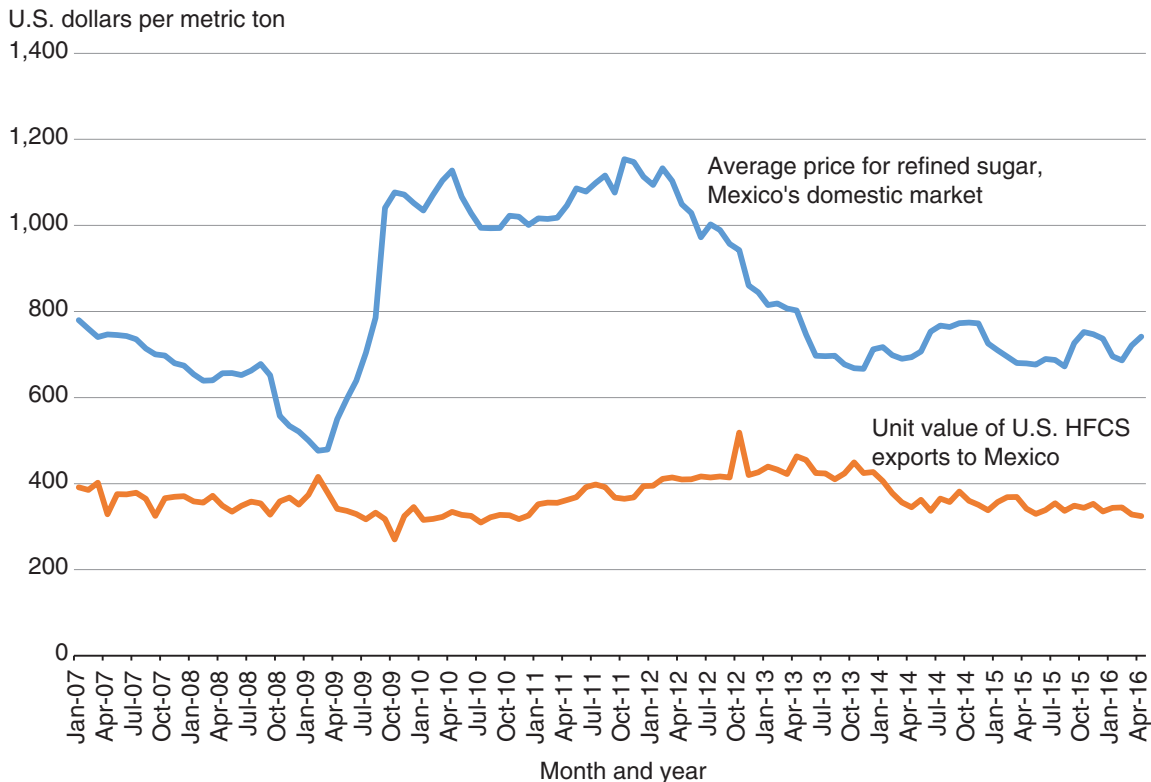
(f) = forecast. HFCS = high fructose corn syrup.

Source: USDA, Economic Research Service (2016c), Table 56.

⁷To estimate HFCS's share, we divide Mexico's HFCS consumption by the sum of Mexico's sugar disappearance and HFCS consumption. The sugar disappearance data for Mexico in figure 4 equal the sum of human consumption, other consumption, and an adjustment factor. Disappearance is not a true measure of consumption as it does not account for losses due to industrial and consumer wastage.

Figure 5

Since the liberalization of bilateral sweetener trade, HFCS imported from the United States has been consistently price-competitive with sugar produced in Mexico



Note: The unit values of U.S. HFCS exports to Mexico are weighted by the following dry conversion factors: 0.71 for HS 17024000, 0.77 for HS 1702600050 and HS 1702600060, and 1.00 for HS 170250000. HFCS = high fructose corn syrup. Sources: USDA, Economic Research Service, using México, Secretaría de Economía (2016c) (average price for refined sugar in Mexico's domestic market); U.S. Department of Commerce, Census Bureau, *Foreign Trade Statistics*, as cited by USDA/FAS (2016a) (unit value of U.S. HFCS exports to Mexico). Mexico's domestic prices were converted to U.S. dollars using the nominal monthly exchange rates in USDA/ERS (2016b).

Still, annual per capita HFCS consumption is much lower in Mexico than in the United States: 11 kilograms (about 24 pounds) versus 21 kilograms (46 pounds), according to estimates for FY 2014.⁸ Increased HFCS consumption in Mexico has important ramifications for the U.S. sugar industry because it makes available larger exportable surpluses of Mexican sugar, resulting in more sugar exports to the United States. This development was anticipated in the long-term agricultural projections issued by USDA in 2007 (USDA/OCE/WAOB, 2007), and increased HFCS consumption in Mexico was observed as early as 2010 in ERS's *Sugar and Sweetener Outlook* reports (Haley and McConnell, 2010a).

⁸The per capita estimates were calculated using population estimates from U.S. Department of Commerce, Bureau of the Census (2013) and domestic disappearance estimates from USDA/ERS (2016c) (Table 56 for Mexico and Table 30 for the United States).

One Market, but Two Domestic Sugar Policies

Implementation of NAFTA's sweetener provisions did not institute a common domestic agricultural support program for U.S. and Mexican producers. Instead, NAFTA generally preserves the autonomy of each member country to define and implement its own domestic agricultural policies. In the sugar sector, there is a key difference between U.S. and Mexican domestic policies: the presence of domestic supply controls in the United States but not in Mexico. To a certain extent, the recent suspension agreements address the lack of such policies in Mexico, since they create restrictions on the quantity of Mexican sugar that is allowed to enter the United States and the price of that sugar.⁹

Table 1 compares the domestic support programs and import policies of the United States and Mexico with respect to sugar. In general terms, the purpose of the U.S. sugar program is to influence the amount of sugar available to the U.S. market and to avoid the forfeiture of sugar under marketing loans to the Commodity Credit Corporation (CCC). Three policy instruments are used to carry out this task: price supports, TRQs, and domestic marketing allotments.¹⁰ While Mexico's sugar policies include instruments that regulate the price paid to sugarcane growers and limit imports, Mexico has no provisions that correspond to the U.S. marketing allotments.

The differences in the two countries' policies reflect the different structures of the U.S. and Mexican sugarcane sectors. The U.S. sugarcane sector is highly concentrated, while Mexico's is highly fragmented. USDA's 2012 Census of Agriculture counted just 666 sugarcane farms, with an average area devoted to sugarcane of 520 hectares (1 hectare = 2.47 acres) (USDA/NASS, 2016). By contrast, Mexico's 2007 agricultural census tallied about 140,000 sugarcane growers, with an average area devoted to sugarcane of just 5 hectares (INEGI, 2009). The U.S. sugarcane sector is predominantly a vertically integrated industry from growers to the marketing of sugar, although some refiners rely on imported raw sugar more than others.¹¹ Mexico's growers and refiners tend to be distinct entities, although there are some vertically integrated firms in the Mexican sugar industry as well. Nevertheless, the relationship between Mexican growers and mill owners is often close. Most growers are proximate to only a few mills—in many instances, a single mill. Historically, mill owners have provided growers with credit in the form of inputs and taken part in some of the growers' farm-input decisions in such areas as seed selection, fertilizer, and pest control (García Chavas et al., 2002)

One concern in the Mexican sugar sector is the prospect for consolidation and a reduction in the number of growers and refiners. In the 2014/15 crop year, for instance, six Mexican mills did not operate due to various management issues (Flores and Harrison, 2015). The concern for consolidation is reflected in several policy initiatives taken by the Mexican Government over the past decade and a half—including the expropriation, stabilization, and reselling of selected sugar mills and the

⁹Researchers have studied the perceived tensions between trade liberalization under NAFTA and U.S. domestic sugar policies. Wagner (2007), for instance, explores the possible economic ramifications of several sugar policy reforms, while Orden (2007) specifically considers the possibility of a buyout of the U.S. sugar program, along the lines of the buyouts that ended the U.S. peanut program.

¹⁰The Agricultural Act of 2014 (2014 Farm Act) left U.S. sugar policy, as specified by the Food, Conservation, and Energy Act of 2008 (2008 Farm Act), largely unchanged. See USDA/ERS (2015b) for a detailed summary of U.S. sugar policy based on the provisions of the 2014 Farm Act.

¹¹Vertical integration is the combination within a single company of two or more different stages in the production and/or distribution of a product.

Table 1

Comparison of U.S. and Mexican Sugar Policies

Policy type	United States	Mexico
Price supports	USDA's Sugar Loan Program provides price support loans (PSL) to processors of sugar beets and domestically grown sugarcane. PSL are nonrecourse (i.e., producers have option of delivering pledged sugar collateral to Commodity Credit Corporation as full payment for loan at maturity). National average loan rate for the 2014 crop (FY 2015) was 18.75 cents per pound for raw cane sugar and 24.09 cents per pound for refined beet sugar, the same as the previous year. National loan rates are adjusted regionally to reflect marketing cost differentials.	Payments to growers are based on a market reference price for sugar obtained from sugarcane that is calculated on the basis of six regional prices, the unit value of sugar exports, and whether the mill supplies sugar to the export market. Price paid for sugarcane varies across mills due to quality differences, but at any given mill, all growers receive the same price, regardless of quality.
Supply controls	Sugar sold in United States for domestic human consumption by domestic sugarbeet and sugarcane processors is subject to marketing allotments. Overall allotment quantity (OAQ) is at least 85 percent of estimated deliveries for domestic human consumption for marketing year. Refined beet sugar receives 54.35 percent of the total OAQ; raw cane sugar receives 45.65 percent.	None.
WTO import access	WTO TRQ minimum is 1.139 million metric tons, raw value (MTRV).	Minimum quantity of 180,600 MT of sugar and products with a high sugar content, with a within-quota tariff of 50 percent. Mexican Government is legally authorized to issue quotas, in addition to amount required by its obligations under international trade agreements, in order to assure sufficient domestic supply.
Tariffs	In-quota tariff for sugar of 0.625 cents per pound, with some exceptions. Over-quota tariff of 15.36 cents per pound for raw sugar and 16.21 cents per pound for refined sugar.	Import tariff for sugar of about 16 cents per pound.
Free-trade agreement import access	NAFTA: Tariff- and quota-free access for sugar and HFCS from Mexico. TRQs under other FTAs currently total about 200,000 MTRV and grow slowly.	NAFTA: Tariff- and quota-free access for sugar and HFCS from United States. Mexico-Central America Free Trade Agreement: Shares of any additional duty-free quotas issued are reserved for Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.
Government-owned mills	None.	In 2015, Mexico auctioned off 7 of 9 mills still in Government's possession, following a 2001 privatization of 25 mills. At the time of writing, Mexico was attempting to sell the remaining two.

Notes: NAFTA = North American Free Trade Agreement. FTA = free-trade agreement. TRQ = tariff-rate quota.
WTO = World Trade Organization.

Sources: USDA, Economic Research Service, using Herrera Moreno (2013); USDA/ERS (2015b); USDA/FSA (2014).

institution of a new reference price paid to sugarcane growers—as is discussed later in the report. The three most recent U.S. agricultural censuses (2002, 2007, and 2012) suggest that consolidation among U.S. sugarcane (and sugar beet) growers has slowed.

Flexible marketing allotments limit U.S. cane and beet processing

Sugar sold in the United States for domestic human consumption by domestic sugar beet and sugarcane processors is subject to marketing allotments. The overall allotment quantity (OAQ) must be set at not less than 85 percent of estimated deliveries for domestic human consumption for the marketing year (October to September). Allotments are in effect the entire year, subject to quarterly reviews and adjustments; there are no criteria for suspension under current legislation.

The OAQ is divided between refined beet sugar at 54.35 percent of the overall quantity and raw cane sugar at 45.65 percent. For cane sugar, Hawaii is allotted 325,000 short tons, raw value (STRV), while the allocations for Florida, Louisiana, and Texas are assigned based on the production histories of these States and their processors. In January 2016, however, the only sugar plantation still in operation in Hawaii announced that it would phase out production by year's end (McAvoy, 2016). For beet sugar, processors are assigned allotments based on their sugar production histories. The 2014 Farm Act (also known as the Agricultural Act of 2014) sets out allocation conditions for new entrants and for those cases when a factory is closed, dissolved, or sold to another processor.

The marketing allotments are flexible in that the 2014 Farm Act provides for a number of contingencies that could require reassignment of allotments during the crop year. If USDA determines that a cane processor cannot market its OAQ allocation, USDA can reassign the unused portion (i.e., the deficit) to other processors within the same State, taking into account their ability to make up the deficit. If the deficit cannot be eliminated by this step, then the remainder is allocated to those cane-producing States determined to need more allotments, and then to the processors in those States that require a larger allocation in order to market their sugar supplies. If the deficit still is not eliminated, it is assigned to the CCC for sale from the CCC's inventories. If these inventories are insufficient to cover the deficit, then the deficit is assigned to imports. The procedure for a beet-sugar-processor deficit is similar, except there is no reassignment based on the State where processing takes place. There is no provision for cane sugar OAQ deficits to be reassigned to beet sugar processors or for beet sugar OAQ deficits to be reassigned to cane sugar processors. With the upcoming cessation of sugarcane production in Hawaii, the entirety of the State's cane sugar allocation is likely to be reassigned in the future.

Mexico's market reference price for sugarcane payments

To regulate the price that mills pay to sugarcane growers, Mexico's Law of Sustainable Development of Sugarcane (*Ley de Desarrollo Sustentable de la Caña de Azúcar*), enacted in 2005, provides a market reference price for sugarcane. Roughly speaking, a grower receives 57 percent of the final reference price ("final adjustment price") calculated for the annual sugar cycle (October 1 to September 30). Fifty-seven percent may be thought of as the growers' share of the reference price. Similar reference price mechanisms had been in effect under different legal frameworks since at least the mid-1990s.

The purpose of the reference price is to institute a more favorable grower price for sugarcane. Since most sugarcane growers in Mexico are located in close proximity to at most a few mills, a monopsony price could result in the Mexican sugarcane market in the absence of government regulation. A monopsony exists in a market for a specific product when only one buyer is present. Basic micro-economic theory indicates that an unregulated monopsonist buys at a price lower than the one that prevails under perfect competition. In actuality, Mexican sugarcane growers may possess some power to affect the price of sugarcane by applying political pressure through their producer unions. In December 2007, for instance, growers secured a 6-percent increase in the nominal reference price above the 2005/06 level for the 2006/07 and 2007/08 crops (Haley and Kelch, 2008). The reference price also formally links the grower price for sugarcane to the domestic wholesale price and the export price for sugar, as discussed later in the report.

The reference price is calculated by the National Committee for the Sustainable Development of Sugar Cane (CONADESUCA—Comité Nacional para el Desarrollo Sustentable de la Caña de Azúcar), an entity created by the Law of Sustainable Development of Sugarcane.¹² Through the 2014/15 crop year, the reference price was calculated as the weighted average of the domestic price of standard (“estándar”) bulk sugar and the average price of sugar exports during the period in question. The domestic price came from the National System of Information and Integration of Markets (SNIIM—Sistema Nacional de Información e Integración de Mercados), published by Mexico’s Secretariat of Economy (México, Secretaría de Economía, 2016c), and was calculated as an average of six regional wholesale prices. The average price of exports was based on the U.S. or world raw sugar futures markets, weighted by the volume shipped to each destination.

Starting with the 2015/16 crop year, mills are required to declare whether they intend to compete in the domestic market only or in both the domestic and export markets. This requirement, instituted after the signing of the suspension agreements, is intended to encourage mills to pledge exports to the U.S. market. The formula that now determines the payments to growers is differentiated between these two options. For mills that decide to compete in the domestic market only, the reference price equals the domestic price, calculated as before but then multiplied by a factor of 1.2. The reference price is multiplied by 1.2 in order to provide sugarcane mills with an incentive to export their surplus product. For mills that decide to compete in both the domestic and export markets, the reference price equals the weighted average of the domestic price and the export price. The export price in turn is calculated as the weighted average of the export prices for shipments to the United States, companies participating in the IMMEX Promotion Program (described in the section on Mexico’s import policy), and third countries. For sales to the United States and to IMMEX companies, the futures price for No. 16 sugar, multiplied by 1.06, less 50 dollars per metric ton, is used as a proxy for the export price. For sales to third countries, the futures price for No. 11 sugar, multiplied by 1.06, less 30 dollars per metric ton, is used.¹³ The reference price is published by the Secretariat of Economy in the *Diario Oficial de la Federación*, Mexico’s correspondent to the *Federal Register*.

¹²The Secretary of SAGARPA (Secretariat of Agriculture, Livestock, Rural Development, Fishing, and Food—Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca, y Alimentación) is president of CONADESUCA’s Board of Directors. Other board members include representatives of other cabinet-level secretariats, such as the Secretariat of Economy, and industry and grower organizations.

¹³The factor of 1.06 is intended to account for the quality difference between Mexican estandar sugar and raw sugar on the world market. The \$50 deduction for sales to the United States is intended to reflect transport costs to the U.S. customer, while the \$30 deduction for sales to third countries is intended to reflect transport costs to the port from which the sugar will depart Mexico.

Payments to growers are made in three installments: the pre-liquidation payment (several weeks after the cane is delivered to the mill), the liquidation payment (June), and a final adjustment (made after the crop year is completed in September). Each installment is based on the reference price during a specific period or point in time. The pre-liquidation payment is equal to 57 percent of the “pre-liquidation price,” which is the previous crop year’s final adjustment price, on 80 percent of the sugarcane delivered by the grower. The sugar obtained from that sugarcane is estimated using the mill’s average sugar yield (sugar obtained per ton of cane) over the previous 5 years. All growers at a given mill receive the same price per ton of cane, regardless of the quality of the cane delivered by an individual grower. This uniform payment system thus prevents the provision of a price premium to individual growers whose sugarcane has a higher sucrose content, as is the practice in the United States and many other sugarcane-producing countries. However, the price per ton of cane can vary across mills, as it is dependent on the quantity of sugar recovered per ton of cane at a specific mill, since the reference price is expressed in terms of sugar and not cane.

Each December, February, May, and September, sugar mills are required to conduct an audit of their sales, exports, stocks, and production. Based on the audits conducted by the mills in May, CONADESUCA calculates a “liquidation price” and announces that price in June. After the harvest is completed, mills must settle with their growers based on that liquidation price. A grower receives 57 percent of the liquidation price based on 100 percent of his or her crop, less the pre-liquidation payment made in December.

At the end of grinding, each mill calculates the weighted average recoverable sugar, obtained from the total net tons of cane harvested and ground (kilograms of recoverable sugar, standard base, per metric ton of sugarcane), according to the final official technical report reconciled by cane and industrial suppliers. The standard base recoverable sugar is based on polarity, cane fiber percentage, and juice purity.

Based on the audits conducted by the mills in September, along with the production report, customs data, and sugar market prices, CONADESUCA calculates the final adjustment price for the crop year that has just ended and announces that price in October. Soon after, a final payment is made to the grower. This final payment equals 57 percent of the final adjustment price based on the grower’s actual crop, less the pre-liquidation and liquidation payments already received by the grower.

Mexico’s import policy

Annex 703.2 of NAFTA requires Mexico to apply a TRQ for sugar and syrup goods imported from countries with normal trade relations (NTR), also referred to as most-favored-nation (MFN) status. The over-quota tariffs must not be less than the lesser of (1) the corresponding MFN rates of the United States in effect on the date that Mexico starts to apply its TRQ and (2) the prevailing MFN rates of the United States.¹⁴ Thus, Mexico’s over-quota sugar tariffs are the same as the U.S. over-quota tariffs: about 15.36 cents per pound for raw sugar and 16.21 cents per pound for refined sugar (USDA/ERS, 2015b). The ad valorem equivalent of Mexico’s tariff is currently about 50 percent, based on import values and quantities for 2014 (México, Secretaría de Economía, 2016b). In addition, Mexico allocates an annual TRQ of 183,300 metric tons for sugar and products with a high sugar content, such as condensed milk and powders used to flavor puddings and gelatins, at a tariff

¹⁴The Foreign Trade Information System (SICE—Sistema de Información sobre Comercio Exterior), maintained by the Organization of American States (OAS, 2015), contains the full texts of NAFTA and numerous other trade agreements in force in the OAS countries.

rate of 50 percent, as one of its obligations under the Agreement on Agriculture of the World Trade Organization (WTO, 2015b).

Under NAFTA, the United States has tariff- and quota-free access to Mexico's sugar market. Since 2008, U.S. sugar exports to Mexico have averaged 144,000 metric tons (\$101 million) per year. The majority of these exports utilized Mexico's IMMEX Promotion Program (Promotion of the Manufacturing, Maquila and Export Services Industry—Fomento de la Industria Manufacturera, Maquiladora y de Servicios de Exportación). In the case of sugar, IMMEX provides certain tax benefits to the importer, subject to the requirement that the imported sugar is exported as part of a sugar-containing product not later than 6 months after the sugar's importation (Flores, 2008). For example, under IMMEX, an importer can avoid paying certain taxes on domestically purchased ingredients that are combined with imported sugar to manufacture sugar-containing products (Cobos, 2009).¹⁵ In January 2016, Mexico's Secretariat of Economy published a notice announcing that sugar imported from the United States would no longer qualify for duty-free treatment under the IMMEX Program if that sugar was the beneficiary of the U.S. Sugar Re-export Program or some similar program (México, Secretaría de Economía, 2016a). This policy change may motivate Mexican food manufacturers that formerly bought sugar from the Sugar Re-export Program to increase their sugar purchases from Mexican companies instead (Flores and Harrison, 2015).

Mexican law also authorizes the Secretariat of Economy, in consultation with SAGARPA and CONADESUCA, to provide additional market access on a unilateral basis as necessary to cover the country's sugar supply needs. Percentages of this additional access are reserved for Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua, as part of Mexico's obligations under the Mexico-Central America Free Trade Agreement (OAS, 2015). For these countries, any additional quotas are duty-free.

Imports from countries other than the United States make it possible for Mexico to export more of its domestic sugar production to the United States—a practice sometimes referred to as “back-filling.” Since FY 2008, annual Mexican sugar imports from countries other than the United States have generally remained well below 300,000 metric tons, except for FY 2010 and FY 2012, when such imports equaled about 828,000 metric tons and 438,000 metric tons, respectively (table 2). FY 2010 was noteworthy for following a year of low U.S. sugarcane and sugar beet output. As discussed later in the report, the agreement to suspend the U.S. countervailing duty investigation concerning sugar imported from Mexico expressly prohibits Mexico from using imports from third countries to increase its sugar exports to the United States.

¹⁵México, Secretaría de Economía (2015) provides a general overview of the IMMEX Program.

Table 2

Mexican sugar imports, FY 2001-15

Source country	Fiscal year														
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	<i>Metric tons (thousands)</i>														
Total	40.0	52.6	59.5	313.9	253.0	104.4	413.7	213.0	149.8	827.8	289.2	438.4	190.5	131.4	128.2
United States	40.0	45.7	46.6	127.9	150.7	102.0	265.7	193.5	123.9	140.8	164.3	177.2	156.8	124.2	99.0
Guatemala	0.0	6.6	7.4	84.4	78.2	2.0	32.4	1.7	19.3	386.3	43.0	103.4	16.2	2.4	11.4
Colombia	0.0	0.0	5.5	23.0	0.5	0.1	63.8	0.0	0.0	102.9	24.2	60.7	0.0	0.0	0.0
Canada	0.0	0.1	0.0	0.0	0.0	0.0	11.7	16.0	0.1	8.1	17.9	17.2	15.1	1.1	4.1
Nicaragua	0.0	0.0	0.0	0.0	0.0	0.0	12.2	0.2	5.4	46.3	14.5	24.3	0.0	0.0	0.0
Brazil	0.0	0.1	0.0	78.5	0.0	0.0	16.7	1.4	0.0	103.6	14.0	54.6	1.5	3.2	13.4
Other	0.1	0.0	0.0	0.1	23.5	0.2	11.2	0.2	1.0	39.7	11.3	0.9	0.9	0.5	0.2

Source: USDA, Economic Research Service, using (FY 2010), México, Secretaría de Economía (2016b); (for all other fiscal years), México, Instituto Nacional de Estadística y Geografía, as cited by IHS Markit (2016).

Expropriated sugar mills

One focus of the AD and CVD investigations was the role of 9 sugar mills that were owned and operated by the Mexican Government during calendar year 2013, the period covered by the investigations. During the 21st century, a number of Mexican sugar mills have been owned and operated by the Mexican Government through an entity called the Fund of Expropriated Firms of the Sugar Sector (FEESA—Fondo de Empresas Expropiadas del Sector Azucarero). The 9 mills in FEESA's possession during 2011-13 accounted for an annual average of about 134,000 hectares of sugarcane—about 19 percent of the national average. Government ownership of sugar mills dates back to September 2001, when a total of 27 mills were expropriated. The reasons cited by the Government at the time for its actions included the high indebtedness of the mills and the economic dangers presented to thousands of mill employees and the national sugar supply (Flores, 2012b). FEESA is now working to sell the remaining mills in its possession. In 2015, it sold seven mills (Flores and Hernandez, 2015; Barrera, 2015), and in June 2016, it placed the last two up for sale (Flores, 2016).

The Abundant Crops of 2012/13 and 2013/14

The integrated U.S.-Mexico sweetener market was shaken by much larger-than-usual sugar production in 2012/13 and 2013/14. The United States and Mexico produced a total of roughly 15.5 million metric tons of centrifugal sugar in 2012/13 and 14.1 million metric tons in 2013/14, compared with an annual average of 12.5 million metric tons during 2008/09 to 2011/12 (table 3).¹⁶ (See box “Where Are Sugarcane and Sugar Beets Grown?” for an overview of the location of U.S. and Mexican production.) This increased supply, combined with a period of several consecutive years in which global sugar production exceeded global consumption, contributed to downward pressure on sugar prices, pushing them to levels not seen in 5 years. The unit value of U.S. sugar imports from Mexico, for instance, dropped from an average of \$734 per metric ton (33 cents per pound) during FY 2009-12 to \$558 per metric ton (25 cents per pound) in FY 2013 and \$517 per metric ton (23 cents per pound) in FY 2014.

Two factors account for this turn of events. First, Mexico’s area harvested with sugarcane increased from an annual average of about 672,000 hectares during 2008/09 to 2011/12 to roughly 790,000 hectares in 2013/14 (table 3). While the U.S. sugar program uses domestic marketing allotments to influence domestic production levels, Mexico’s sugar policies lack similar controls—a factor that allowed this 17-percent increase in area harvested to occur. Although signs of increased investment and area expansion in the Mexican sugarcane sector were noted as early as April 2010 (Flores et al., 2010) and the possibilities of further increases in investment, area, and production were discussed in April 2012 (Flores, 2012a), official forecasts of Mexico’s 2012/13 sugarcane crop evolved substantially over the course of the crop year, as CONADESUCA’s forecast of area harvested climbed from about 687,000 hectares to around 775,000 hectares. High sugar prices in the U.S. and world markets during FY 2010-12 provided a strong incentive for this expansion.

Second, U.S. and Mexican cane growers experienced higher-than-average yields in 2012/13, which further boosted supply. In the United States, sugarcane growers obtained 10.2 metric tons of sugar per harvested hectare of sugarcane, compared with an annual average of 9.2 metric tons per hectare from the 2008/09 through 2011/12 sugarcane crops (table 3). Meanwhile, U.S. sugar beet farmers produced their largest crop to date—obtaining an average of 9.5 metric tons of sugar per harvested hectare of sugar beets. By contrast, the annual sugar yields from the 2008/09 through 2011/12 sugar beet crops averaged just 9.1 metric tons per hectare.

In Mexico, “timely rainfall and good weather conditions” lifted yields to high levels (Flores, 2013). In 2012/13, growers obtained an average of 8.9 metric tons of sugar per harvested hectare of sugarcane, compared with an annual average of 7.5 metric tons per hectare during 2008/09 to 2011/12 (table 3). Increased use of fertilizer and the rejuvenation of plantings may also have contributed to the high yields. Such practices were reported to have taken place in 2011/12 in an effort to respond to high prices by improving sugar content and raising mill yields (Hernandez and Flores, 2011).

Mexico’s unusually large sugarcane crop in 2012/13 had a dramatic impact on U.S. sugar imports from that country (fig. 6). Imports totaled 1.8 million metric tons in FY 2013—89 percent higher than in FY 2012 and 63 percent higher than the annual average during FY 2009-12. Refined sugar imports saw a smaller proportionate increase than all other sugar imports. Refined sugar imports equaled about 1.1 million metric tons in FY 2013—47 percent higher than in FY 2012 and 53

¹⁶We use the crops from 2008/09 to 2011/12 for purposes of comparison, since this period began about 1 year after the initiation of bilateral free trade in sweeteners and ended just before the first crop year of unusually large sugar production.

Table 3
U.S. and Mexican sugar production, crop years 2003/04 to 2015/16

	Crop year												
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Production of centrifugal sugar (PSD Online)													
Total, U.S. and Mexico (1,000 metric tons)	13,177	13,295	12,317	13,295	13,248	12,093	12,339	12,599	13,051	15,541	14,058	14,189	14,411
Mexico, cane sugar (1,000 metric tons)	5,330	6,149	5,604	5,633	5,852	5,260	5,115	5,495	5,351	7,393	6,382	6,344	6,419
U.S., beet sugar (1,000 metric tons)	4,257	4,183	4,032	4,543	4,283	3,823	4,150	4,226	4,446	4,605	4,349	4,439	4,604
U.S., cane sugar (1,000 metric tons)	3,590	2,963	2,681	3,119	3,113	3,010	3,074	2,878	3,254	3,543	3,327	3,406	3,388
Prices (dollars per metric ton, unless otherwise indicated)													
Unit value, U.S. imports of Mexican sugar (GATS)	466	446	482	463	447	471	756	836	874	558	517	563	n.a.
World raw sugar price, ICE Contract No. 11 nearby futures price (Sugar and Sweetener Yearbook Table 3a)	143	200	327	227	259	329	463	627	506	397	370	296	n.a.
U.S. raw sugar price, Contract No. 14/16, duty fee paid, New York (Sugar and Sweetener Yearbook Table 4)	453	462	499	460	469	487	755	848	717	463	508	545	n.a.
Mexico, final reference price, estandar sugar	506	534	579	549	501	500	811	751	825	508	529	481	460
Mexico, final reference price, estandar sugar (pesos per metric ton)	5,760.00	5,760.00	6,356.45	5,996.13	5,500.00	6,579.21	10,222.26	10,368.58	10,617.72	6,697.06	7,099.83	8,130.65	8,130.65
Mexico, cane sugar (Sistema INFOCaña)													
Sugar production (1,000 metric tons)	5,024	5,796	5,282	5,314	5,521	4,962	4,826	5,184	5,048	6,975	6,021	5,985	n.a.
Area harvested (1,000 hectares)	612	658	664	675	683	663	647	673	704	780	790	784	n.a.
Yield (metric tons per hectare)	8.2	8.8	8.0	7.9	8.1	7.5	7.5	7.7	7.2	8.9	7.6	7.6	n.a.
U.S., beet sugar (Sugar and Sweetener Yearbook Table 17)													
Sugar production (1,000 metric tons)	4,257	4,183	4,032	4,543	4,283	3,780	4,151	4,227	4,446	4,605	4,349	4,439	4,550
Area harvested (1,000 hectares)	545	529	503	528	505	407	465	468	491	487	467	464	463
Yield (metric tons of sugar per hectare)	7.8	7.9	8.0	8.6	8.5	9.3	8.9	9.0	9.1	9.5	9.3	9.6	9.8
U.S., cane sugar (Sugar and Sweetener Yearbook Table 15)													
Sugar production (1,000 metric tons)	3,599	2,962	2,714	3,111	3,134	3,004	3,080	2,868	3,265	3,542	3,327	3,408	3,458
Area harvested (1,000 hectares)	377	356	347	343	335	332	331	334	335	346	348	333	343
Yield (metric tons of sugar per hectare)	9.6	8.3	7.8	9.1	9.4	9.0	9.3	8.6	9.8	10.2	9.6	10.2	10.1

Notes: Production data from different sources may not match precisely. Reference price for 2015/16 is the reference price announced at the start of the crop year, not the final reference price. Unit values for U.S. imports of Mexican sugar and futures prices for sugar are expressed for U.S. fiscal years, not crop years.

n.a. = not available. (f) = forecast. Production data from different sources may not match precisely.

Sources: USDA, Economic Research Service, using USDA/FAS (GATS, 2016a; PSD Online, 2016b); *Diario Oficial de la Federacion*, various issues; SAGARPA and CONADESUCA (Sistema INFOCaña, 2016); and USDA/ERS (Sugar and Sweetener Yearbook Tables, 2016c); Banco de Mexico (2016).

Box 1

Where Are Sugarcane and Sugar Beets Grown?

Sugar beets and sugarcane are the two primary agricultural commodities used to manufacture sugar in the United States, while sugarcane is the main agricultural commodity used for this purpose in Mexico. During the 2010/11 to 2012/13 crop years, the United States and Mexico together produced an annual average of 13.7 million metric tons of centrifugal sugar (see table 3). Mexico accounted for 44.3 percent of this total, U.S. sugar beet growers accounted for 32.2 percent, and U.S. sugarcane growers accounted for 23.5 percent.

In Mexico, sugarcane is grown in multiple river basins that are widely dispersed along the coasts of the Gulf of Mexico and the Pacific Ocean (see map). Three regions are responsible for about 85 percent of Mexico's production: (1) the Central Gulf (the central and southern parts of the State of Veracruz, plus the State of Puebla); (2) the Northern Gulf (the States of Tamaulipas and San Luis Potosí, plus several northern municipalities in the State of Veracruz); and (3) the North-Central Pacific (the States of Colima, Jalisco, Michoacán, Nayarit, and Sinaloa). Only a small amount of sugar beets appears to be grown in Mexico for the purpose of making sugar. During agricultural years 2001-13, Mexico produced an average of about 16,000 metric tons of sugar beets (SAGARPA/SIAP, 2016).

The Central Gulf accounted for 38 percent of Mexico's sugarcane production in 2013. This region includes a large part of the State of Veracruz, Mexico's leading cane-producing State, and it is the closest producing region to the Mexico City and Puebla metropolitan areas, Mexico's first and fourth largest, respectively, in terms of population. The North-Central Pacific region accounted for 29 percent of Mexico's sugar production in 2013. Of the three regions, the North-Central Pacific is closest to the Guadalajara metropolitan area, Mexico's second largest. The Northern Gulf accounted for 18 percent of the country's sugarcane production in 2013 and is closest to Monterrey, Mexico's third largest metropolitan area.

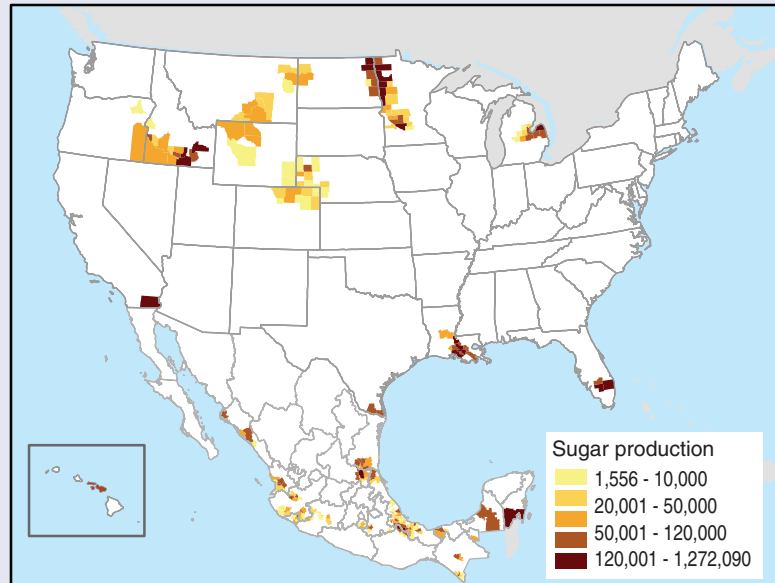
In the United States, sugar from sugar beets accounts for about 56 percent of total sugar production, while sugar from sugarcane accounts for 44 percent. These percentages correspond fairly closely to the division of the overall allotment quantity between refined beet sugar (54.35 percent) and raw cane sugar (45.65 percent) in the U.S. flexible marketing allotment program.

Sugar beets are produced in 5 U.S. regions encompassing 14 States. The leading sugar-beet-producing region is the Red River Valley and surrounding areas of western Minnesota and eastern North Dakota. Together, Minnesota and North Dakota accounted for about 52 percent of U.S. sugar beet production in 2012. Other sugar-beet-growing regions include the Northwest (Idaho, 18 percent, with small amounts in Oregon and Washington), the Great Lakes (Michigan, 13 percent, with small amounts in Ohio), and the Northern Great Plains (Wyoming, Montana, Colorado, and Nebraska, with a combined share of 13 percent).

Sugarcane is produced in Florida, Louisiana, Hawaii, and Texas. Florida contributed nearly half (48 percent) of U.S. sugarcane production in 2012, while Louisiana accounted for 45 percent. Growers in Texas and Hawaii supply only a small fraction of U.S. sugarcane production.

Box figure 1

U.S. and Mexican production of sugar from sugar crops in 2012, by county or municipio of crop production

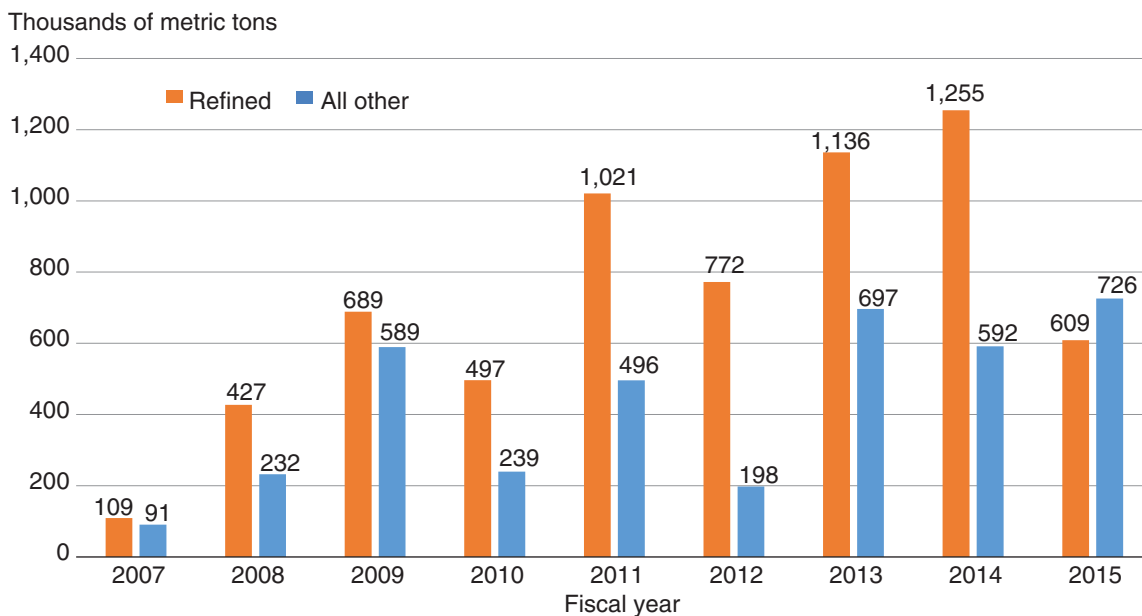


Note: Crop production data were converted to sugar equivalents using recovery rates of 0.1441 for U.S. sugar beets, 0.1280 for U.S. sugarcane, and 0.1092 for Mexican sugarcane.

Sources: Map prepared by David Nulph, USDA, Economic Research Service, using U.S. survey data for the 2012 crop from USDA/NASS (2016) and Mexican production data for Mexico's 2012 agricultural year from México, SAGARPA/SIAP (2016).

Figure 6

U.S. sugar imports from Mexico, FY 2007-15: Refined versus all other sugar



Note: Sugar is defined using the commodity classification of USDA's Foreign Agricultural Trade of the United States (FATUS) system. Refined sugar consists of those tariff lines in HS 1701.91 and HS 1701.99 within FATUS's definition of sugar. Source: USDA, Economic Research Service, using U.S. Department of Commerce, Census Bureau, *Foreign Trade Statistics*, as cited by USDA/FAS (2016a).

percent higher than the FY 2009-12 average, while all other sugar imports equaled about 697,000 metric tons in FY 2013—252 percent higher than in FY 2012 and 83 percent higher than the FY 2009-12 average.

The additional sugar production in Mexico resulting from the increase in sugarcane area almost certainly placed downward pressure on the price of sugar in the integrated U.S.-Mexico market, but the increase in sugar yields in the two countries is also likely to have played a role. A simple comparative statics¹⁷ analysis—using the data in table 3 and treating the annual average for 2008/09 through 2011/12 as a comparison period—suggests the relative importance of area expansion and yield growth. If Mexico's sugar from sugarcane yield in 2012/13 had equaled the average for the comparison period, then the increase in Mexico's sugarcane area by itself would have boosted Mexican cane sugar production by about 968,000 metric tons. This amount corresponds to about 33 percent of the increase in total U.S. and Mexican sugar production between the comparison period and 2012/13. By contrast, if U.S. and Mexican area harvested for sugar crops had been held in 2012/13 to the comparison period's level, then the increase in sugar from sugar crop yields would have generated an additional 1.7 million metric tons of sugar. This quantity corresponds to about 59 percent of the increase in total U.S. and Mexican sugar production between the comparison period and 2012/13. That being said, one should remember that yields are not perfectly suited for a comparative statics analysis because they are only partially under the control of growers and millers.

¹⁷Comparative statics is “the comparison of different equilibrium states that are associated with different sets of values of parameters and exogenous variables” (Chiang, 1967: 132). The focus is on the changes in an economic model's endogenous variables that result from a change in its parameters and/or exogenous variables.

What explains the increase in Mexican sugarcane area?

Two economic conditions motivated the pronounced increase in Mexican sugarcane area: (1) the long-term opportunity to export sugar to the United States given the duty-free access provided by NAFTA; and (2) the short-term expectation of selling sugar at the high price levels that had prevailed for several years. The timing of the area increase suggests that the expectation of high prices was the more influential of the two. Specifically, the increase in area did not occur immediately after bilateral free trade in sugar was established in 2008 but rather in 2011/12—the last crop year of a 3-year period when sugar prices were unusually high, both in the integrated U.S.-Mexico market and in the world market (table 3).

There are also signs that the Mexican sugar industry was more fully exploring its long-term competitive advantage as a sugar exporter. Sentfies-Herrera et al. (2014: 26) report “significant innovations across the value-chain [of the Mexican sugar industry]... , including a robust breeding program, digitalization of sugarcane fields and novel investments in research and development.” Prentice (2016) discusses the emergence and expansion of “melt houses” located in the United States that use imported sugar to produce liquefied sugar, an ingredient in ice cream and coatings. Imported estándar sugar from Mexico has been the primary input for this developing segment of the U.S. sugar industry.

The increase in area harvested took place in multiple sugar-growing regions throughout Mexico. Crops in 2004-06 were the last three grown prior to the resolution of the sweetener dispute, while crops in 2011-13 were the last three grown before the petitions for the AD and CVD investigations were filed. Of the 15 Mexican States where sugarcane is grown, all but 2 (Michoacán and Sinaloa) experienced increases in area harvested between the two periods (table 4). The largest proportionate increases occurred in Colima, Campeche, and Quintana Roo—all States with small areas devoted to sugarcane cultivation. The largest absolute increases took place in Veracruz, San Luis Potosí, and Oaxaca—Mexico’s first, third, and fourth leading sugarcane-producing States.

Mexico’s government-owned mills played a relatively small role in the expansion of sugarcane area. First, as was mentioned earlier, the government-owned mills accounted for just 19 percent of the area harvested with sugarcane in Mexico during 2001-13. Second, between 2004-06 and 2011-13, the area harvested corresponding to the government-owned mills increased by a much smaller percentage than the area harvested corresponding to the private-sector mills (3 percent versus 14 percent, table 3). Indeed, five of the nine government-owned mills saw their area harvested decrease over this period—including one of the mills sold to the private sector in June 2015. As discussed later in this report, the final determination in the CVD investigation identified a number of countervailable subsidies received by the government-owned mills, which as a group formed one of Mexico’s largest sugar exporters during the period covered by the investigation. These subsidies appear to have had little influence on the area harvested by the growers supplying sugarcane to the government-owned mills.

In hindsight, the expansion of Mexican sugarcane area had the twin misfortunes of occurring toward the end of a boom period in sugar prices and generating the additional production that extended the bust period that followed. Not until 2015/16, with the suspension agreements in place, did sugarcane area in Mexico retreat to its earlier levels. Throughout the world, the supply of sugar crops tends

Table 4

Mexican sugarcane area harvested, by mill, 2004-06 versus 2011-13

State/Mill	Annual average		Change		State/Mill	Annual average		Change	
	2004-06	2011-13				2004-06	2011-13		
	<i>Thousands of hectares</i>		<i>Percent</i>		<i>Thousands of hectares</i>		<i>Percent</i>		
Total, Mexico	645	719	74	11					
Government-owned mills	130	134	4	3					
Private-sector mills	515	585	70	14					
<u>Campeche</u>	7	10	2	34	<u>San Luis Potosí</u>	65	77	12	19
La Joya	7	10	2	34	Alianza Popular	17	18	1	5
					Plan de Ayala	16	17	1	8
<u>Colima</u>	11	15	5	45	Plan de San Luis*	15	16	1	7
Queseria	11	15	5	45	San Miguel de Naranjo	17	26	9	54
<u>Chiapas</u>	26	31	5	18	<u>Sinaloa</u>	22	19	-3	-15
Huixtla	11	14	3	24	Eldorado	5	6	2	36
Pujiltic (Cia. La Fe)	15	17	2	13	La Primavera	4	5	2	47
					Los Mochis	14	7	-7	-47
<u>Jalisco</u>	62	69	7	12	<u>Tabasco</u>	27	33	5	20
Bellavista	6	6	0	4	AZSUREMEX - Tenosique	4	3	-0	-8
Jose Ma. Martinez (Tala)	19	22	3	14	Presidente Benito Juárez	15	19	4	24
José María Morelos	7	8	1	10	Santa Rosalía	8	11	2	25
Melchor Ocampo	8	9	1	10					
San Francisco Ameca	9	13	3	36	<u>Tamaulipas</u>	27	31	4	14
Tamazula	13	12	-1	-6	Aarón Sáenz Garza	14	17	3	22
<u>Michoacán</u>	14	13	-0	-2	El Mante	13	14	1	6
Lázaro Cárdenas	3	3	0	5	<u>Veracruz</u>	267	285	17	6
Pedernales	3	4	1	18	Central Motzorongo	19	20	1	5
Santa Clara	7	6	-1	-14	Central Progreso	10	12	1	12
<u>Morelos</u>	13	16	2	18	Constancia	11	15	4	34
Casasano (La Abeja)*	3	5	2	46	Cuatotlapam	9	11	2	22
Emiliano Zapata*	10	11	1	9	El Carmen	8	9	1	18
					El Higo	14	17	3	19
<u>Nayarit</u>	27	29	1	5	El Modelo*	11	10	-1	-8
El Molino	9	11	2	19	El Portrero*	19	21	2	12
Puga	19	18	-0	-2	Independencia	3	--	--	--
					La Concepción	2	--	--	--
<u>Oaxaca</u>	40	48	8	21	La Gloria	15	17	2	14
Adolfo López Mateos	19	27	8	43	La Providencia*	12	11	-1	-5

Continued—

Table 4

Mexican sugarcane area harvested, by mill, 2004-06 versus 2011-13—continued

State/Mill	Annual average			Change	State/Mill	Annual average			Change
	2004-06	2011-13				2004-06	2011-13		
	<i>Thousands of hectares</i>		<i>Percent</i>		<i>Thousands of hectares</i>		<i>Percent</i>		
El Refugio	6	6	0	5	Mahuiztlan	5	6	1	29
Pablo Macho (La Margarita)	14	15	1	5	Nuevo San Francisco (El Naranjal)	7	7	-0	-4
Santo Domingo	1	--	--	--	San Cristobal*	41	39	-2	-6
					San Gabriel	7	1	-6	-83
<u>Puebla</u>	14	16	2	17	San José de Abajo	8	8	0	1
Atencingo*	12	15	3	26	San Miguelito*	6	6	-1	-12
Calipam	2	2	-1	-27	San Nicolás	8	13	5	63
					San Pedro	13	15	2	12
<u>Quintana Roo</u>	22	28	5	24	Tres Valles	26	35	8	31
San Rafael de Pucté	22	28	5	24	Zapoapita - Pánuco	14	15	1	9

* = Government-owned mill, as of May 31, 2015.

Source: USDA, Economic Research Service, using SAGARPA/CONADESUCA (2016).

to respond slowly to price changes—particularly for sugarcane, a perennial crop—and the recent Mexican case was no exception to this pattern.¹⁸

Sugar forfeited in the wake of abundant crops

Forfeiture of sugar under the U.S. sugar program is intended to be a last resort when domestic processors default on their loans at the end of the fiscal year. For the first time since NAFTA's liberalization of bilateral sweetener trade in 2008, U.S. sugar market prices fell below loan forfeiture levels for refined beet sugar and raw cane sugar in FY 2013. This was also the first time since 2000 that USDA decided to purchase U.S. sugar in order to reduce the cost of expected sugar program loan forfeitures and help stabilize sugar prices. In total, about 382,000 short tons (roughly 346,000 metric tons) of sugar were forfeited to USDA. The forfeited sugar was then auctioned to bioenergy producers at discount prices under the Feedstock Flexibility Program for Bioenergy Producers (FFP) (McMinimy, 2015).

¹⁸Gudoshnikov et al. (2004) briefly review the various reasons for the slow supply-responsiveness of sugar crops, including the high cost of switching crops, the capital intensiveness of sugar crop transportation and milling, domestic support programs, and trade policies.

From Investigations to Suspension Agreements

On March 28, 2014, the U.S. Department of Commerce (USDOC) and U.S. International Trade Commission (USITC) received AD and CVD petitions from the American Sugar Coalition and its individual members claiming injurious effects to the U.S. industry due to sugar imports from Mexico. The AD petition alleged that Mexican sugar was being sold in the United States at less than fair value, with the petitioners making a country-wide allegation that these sales were below the cost of production. The CVD petition alleged that the Mexican Government was offering countervailable subsidies affecting U.S. sugar imports from Mexico, with the result of materially injuring the U.S. industry and threatening material injury to that industry. Under NAFTA, each member country retains the ability to apply its AD and CVD laws to imports from the other member countries, and the agreement establishes a mechanism by which a party involved in an AD or CVD investigation can challenge the final determination before an arbitral panel.

On April 17, 2014, the USDOC responded to the allegations by launching an AD investigation and a CVD investigation on sugar imports from Mexico. In both investigations, sugar derived from sugarcane and sugar beets was the product covered, and calendar year 2013 was the period of investigation. Preliminary findings were released for the CVD investigation on August 25, 2014, and for the AD investigation on October 24, 2014. Both sets of findings went against Mexico, with preliminary AD margins ranging from 39.54 to 47.26 percent and preliminary CVD margins ranging from 2.99 to 17.01 percent, depending on the producer/exporter (table 5). After extensive negotiations involving representatives of the U.S. and Mexican sugar sectors, the USDOC announced on December 19, 2014, that it had signed a pair of agreements suspending the two investigations.

Table 5

Margins in preliminary and final determinations in AD and CVD cases concerning sugar imports from Mexico

Producer/exporter	Countervailing duty (CVD)		Antidumping duty (AD)	
	Preliminary	Final	Preliminary	Final
	<i>Percent</i>			
FEESA	17.01	43.93	39.54	40.48
Grupo GAM	2.99	5.78	47.26	42.14
All others	14.87	38.11	40.76	40.74

Sources: USDA, Economic Research Service, using USDOC/ITA (2015a, 2015b, 2014c, 2014d).

Suspension Agreements Establish Price and Quantity Limits for Mexican Sugar Exports to the United States

The suspension agreements institute restrictions on the price and quantity of Mexican sugar exports to the United States. In the Antidumping Suspension Agreement (ADSA), signed by the USDOC and Mexican producers/exporters, each signatory producer/exporter agreed to adhere to a minimum reference price and other price restrictions when exporting to the United States. These restrictions are intended to prevent price suppression and undercutting. In the Countervailing Duty Suspension Agreement (CVDSA), signed by the USDOC and the Mexican Government, Mexico agreed (1) to restrict the volume of direct and indirect exports of Mexican sugar to the United States and (2) not to provide any new or additional export or import substitution subsidies related to sugar exports to the United States. As discussed in the next section, the new trade restrictions instituted by the suspension agreements have the potential to constrain Mexican sugar exports to the United States under certain market conditions and are more complicated than a tariff or a TRQ.

Antidumping Suspension Agreement establishes minimum export prices

The ADSA establishes free-on-board plant reference prices of 26 cents per pound (about \$573 per metric ton) for refined sugar and 22.25 cents per pound (\$496 per metric ton) for all other sugar.¹⁹ Refined sugar is defined as having a polarity, or degree of refining purity, of 99.5 or above. In addition, for each individual entry of sugar, “the amount by which the estimated normal value exceeds the export price (or constructed export price) will not exceed 15 percent of the weighted-average amount by which the estimated normal value exceeds the export value (or constructed export value) for all less-than-fair-value entries of the producer/exporter examined during the course of the investigation” (USDOC/ITA, 2014: 78040).

The ADSA also specifies how these variables are to be calculated. The USDOC’s calculation of normal value is based on either the comparison market method or the constructed-value method. A comparison market price—also known as a third-country price—is the price of a like product exported to an appropriate third country, provided that the price is representative (WTO, 2015a). Under the comparison market method, normal value equals the gross unit price, less billing adjustments, movement expenses, discounts and rebates, direct selling expenses, commissions, and home market packing expenses. Under the constructed value method, normal value equals the sum of production costs (direct materials, direct labor, factory overhead, and home market selling, general, and administrative expenses), U.S. packing, and profit.

The ADSA further states that “Both the export price and constructed export price are based on the price at which the subject merchandise is first sold to a person not affiliated with the foreign producer or exporter” (USDOC/ITA, 2014e). The export price equals the gross unit price—less movement expenses and discounts and rebates, plus packing expenses and rebated import duties, and also accounting for billing adjustments (plus or minus). The constructed export price equals the

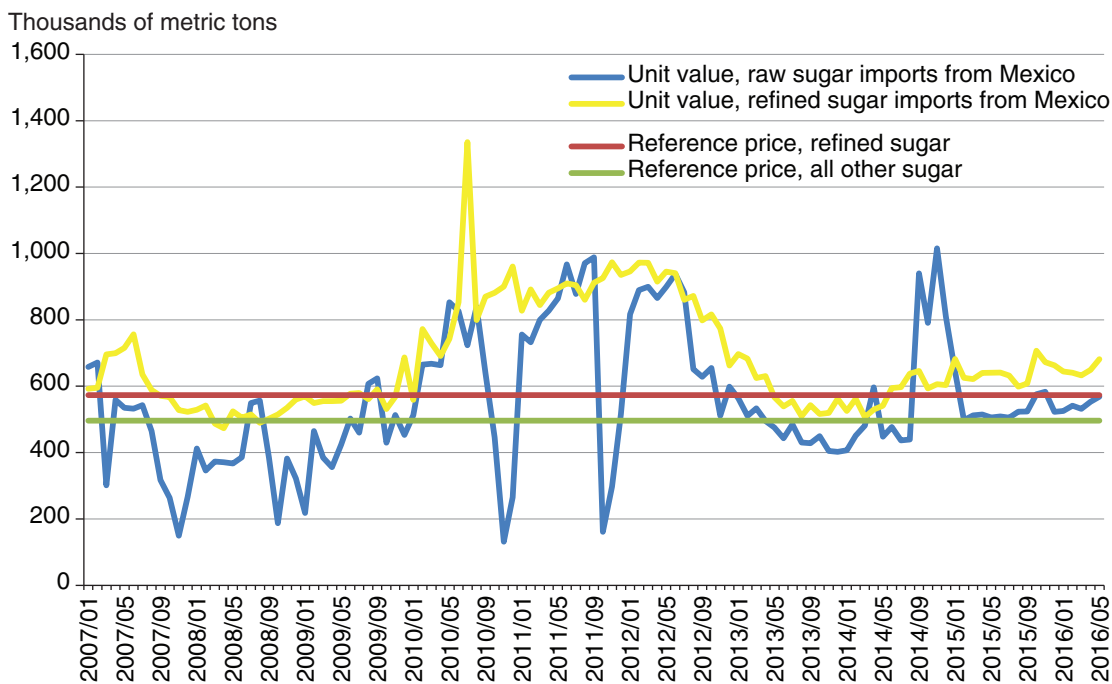
¹⁹The USDOC may propose to revise the reference prices, as the need may arise resulting from consultations under the ADSA. Should this occur, the USDOC will disclose the preliminary reference prices, including any methodology used to calculate those prices, not less than 30 days prior to the date on which the new reference prices are to become final and effective.

gross unit price—less movement expenses, discounts and rebates, direct selling expenses, indirect selling expenses that related to commercial activity in the United States, the cost of any further manufacture or assembly incurred in the United States, profit, and commissions; it also accounts for billing adjustments (plus or minus). The above-mentioned calculations are to be done in a manner that ensures a “fair” comparison. Thus, the USDOC may account for physical differences between product sold in the United States and product sold in Mexico; it will add U.S. direct selling expenses, U.S. commissions, and packing expenses to the export price; and it will subtract the amount of the constructed export price offset from the constructed export price and, if warranted, add U.S. packing expenses.

An evaluation of normal values, export prices, and constructed export prices using data for previous years is well beyond the scope of this report. However, a crude comparison of the unit value of U.S. sugar imports from Mexico since the resolution of the NAFTA sweetener dispute in 2006 and the reference prices established by the ADSA shows that the unit value has fluctuated widely over time (fig. 7). This suggests that the unit value has the potential to rise high enough on some occasions such that the reference prices would not be a binding constraint and to fall low enough on other occasions such that the reference prices would be binding.

Figure 7

Reference prices established by the Antidumping Suspension Agreement are likely to be binding some of the time



Note: Sugar is defined as encompassing those tariff codes within the commodity “sugar, cane or beet” in USDA’s Foreign Agricultural Trade of the United States (FATUS) classification system. Within that definition of sugar, raw sugar encompasses those tariff lines in HS-6 codes 121291, 121293, 121299, 170111, 170112, 170113, and 170114, while refined sugar encompasses those tariff lines in 170191 and 170199.
 Source: USDA, Economic Research Service, using U.S. Department of Commerce, Bureau of the Census, *Foreign Trade Statistics*, as cited by USDA/FAS (2016a).

Countervailing Duty Suspension Agreement limits export quantities

The CVDSA specifies several mechanisms by which the Mexican Government will limit Mexican sugar exports to the United States and ensure compliance with the agreement. First, the agreement specifies Export Limits using a formula that determines expected “U.S. Needs” for sugar imports from Mexico. The *World Agricultural Supply and Demand Estimates* (WASDE), published monthly by USDA’s World Agricultural Outlook Board (WAOB), plays an important supporting role in this process, in that the USDOC uses specific WASDE reports in its calculations of U.S. Needs and Mexican Export Limits.

Under the terms of the CVDSA, U.S. Needs are calculated on a fiscal year basis as the difference between total sugar supplies originating from domestic production or imports from countries other than Mexico and estimated total sugar use, plus an additional 13.5 percent. The precise formula is as follows:

$$\text{U.S. Needs} = (\text{Total Use} * 1.135) - \text{Beginning Stocks} - \text{Production} - \text{TRQ Imports} - \text{Other Program Imports} - (\text{“Other high tier” and “other” sugar imports, as indicated in Footnote 5 of the WASDE’s U.S. Sugar Supply and Use table}).$$

The full amount of this calculation is formally labeled as the “Target Quantity of U.S. Needs.” This quantity provides the basis for determining the Export Limit, the maximum quantity of sugar that Mexico is allowed to export to the United States during a specific Export Limit Period.

The Export Limit is established by the USDOC in July prior to the beginning of the Export Limit Period (October 1 to September 30) and then updated in September, December, and finally March. For each of the WASDE reports published in these months, the USDOC calculates the Export Limit as a percentage of the Target Quantity of U.S. Needs: 70 percent of July and September’s calculation, 80 percent of December’s calculation, and 100 percent of March’s calculation. The only exception is that the Export Limit cannot be lowered from one period to the next. If the applicable percentage of the Target Quantity is less than the previous Export Limit, then the Export Limit remains at its previous level.²⁰

Second, the agreement restricts the timing of Mexican sugar exports to the United States. Not more than 30 percent of the U.S. Needs calculated in July can be shipped during the period from October 1 through December 31 of the Export Limit Period, and not more than 55 percent of the U.S. Needs calculated in December can be shipped prior to March 31 of the Export Limit Period. Third, refined sugar may account for not more than 53 percent of Mexican sugar exports to the United States during any Export Limit Period. While this restriction is intended to help ensure that U.S. sugar refining capacity continues to be utilized, it is not accompanied by any provision establishing a “U.S. Need” for a specific quantity of refined sugar. Fourth, the Mexican Government is charged with the task of establishing an Export Limit licensing system and enforcing that system in order to prevent exports from exceeding the Export Limit.

²⁰Appendix A explains in greater detail how the Export Limits are calculated, using FY 2014 as a hypothetical example. Because the suspension agreements were not signed until December 2014, the first calculation of the Target Quantity of U.S. Needs for FY 2015 was made using the December 2014 WASDE.

Under the CVDSA, the USDOC is empowered to increase the Export Limit in order to address potential shortages in the U.S. market, subsequent to written notification from USDA. In May 2016, USDA submitted such a notification, requesting that the FY 2016 Export Limit be increased by 60,000 metric tons, all of which would need to have a polarity of less than 99.2 degrees (USDA/OC, 2016). Soon after, the USDOC found this request to be consistent with the CVDSA and approved the request. In addition, the Mexican Government is required to notify the USDOC prior to March 31 of a given Export Limit Period if Mexican exporters will be unable to supply any portion of U.S. Needs during the second half of the period. If necessary, the USDOC will adjust the Export Limit downward, and the Mexican Government agrees that it will not supply Mexico's needs with imports from third countries in order to fill the Export Limit with Mexican sugar.

The Export Limits: In Practice and in Theory

Table 6 indicates the Export Limits in effect for FY 2015 and those that have been calculated so far for FY 2016, along with the *WASDE* data used to calculate those limits. According to the December 2015 *WASDE*, U.S. sugar imports from Mexico in FY 2015 (not shown in table 6) totaled 1,532 thousand STRV (about 1.4 million metric tons), about 0.3 percent above the final calculation of the Export Limit for FY 2015 of 1,527.57 thousand STRV based on the March 2015 *WASDE*. Refined sugar's share of imports was about 46 percent, well under the ceiling of 53 percent set by the CVDSA. It is not clear whether the Export Limit was actually exceeded, however, given the different reporting systems for the data, the way the data are entered into these systems, and the timing of the implementation of the CVDSA—about 3 months after the start of the fiscal year.

Previous *WASDE* projections for FY 2012-14 suggest that the Export Limits have the potential to constrain U.S. sugar imports from Mexico in some years but not in others. In FY 2012, the Export Limit ultimately would not have affected the amount of sugar shipped from Mexico to the United States. Imports from Mexico that year totaled 1.071 million STRV, while the Export Limit would have been set at 1.641 million STRV, based on data from the March 2012 *WASDE*. The projections for that year (fig. 8) demonstrate how the Target Quantity and Export Limit can fluctuate over the course of a projection period based on the Interagency Commodity Estimate Committee for Sugar's evolving assessments of changing market conditions.

By contrast, if the ADSA had been in place during FY 2013, the Export Limit would have significantly impaired Mexico's ability to ship sugar to the United States. As was discussed above, exceptional weather conditions and an expansion of sugarcane area resulted in record production that year in Mexico. Moreover, expectations for U.S. beet and cane sugar production grew from the beginning of the year, which would have lowered the calculated Target Quantity of U.S. Needs. Under the terms of the CVDSA, the Export Limit for FY 2013 would have been 912,000 STRV. Mexican shipments totaled 2.124 million STRV, however, which partially substituted imports from quota programs and resulted in higher ending stocks. Additionally, the illustration for FY 2013 demonstrates how the final Export Limit for a given fiscal year can exceed the Target Quantity (fig. 9). Because of the dramatic changes in market outlook over the course of the projection period, the Export Limit established in September 2013 (70 percent of U.S. Needs) was greater than the Export Limits calculated in December 2013 and March 2013.

Shipments from Mexico during FY 2014 would have also been constrained if the suspension agreement had been in place then, although to a lesser degree than in our hypothetical case for FY 2013. Although there was some variation over the course of the projection period, actual imports of Mexican sugar in FY 2014 were not far off from forecasts made earlier in the year (fig. 10). Had the ADSA been in place then, the Export Limit for FY 2014 would have equaled 1.806 million STRV, compared with actual imports of 2.130 million STRV.

Table 6

Calculation of Export Limits according to formulas specified by Countervailing Duty Suspension Agreement

WASDE report used as data source	Total use	Total use times 1.135	Beginning stocks	Production	TRQ imports	Other program imports	"Foot-note 5" imports	Target Quantity of U.S. Needs	Export Limit	Comments
<i>Thousands of short tons, raw value (STRV)</i>										
Export Limits for FY 2015										
December 2014	12,244	13,896.94	1,796	8,610	1,479	400	10	1,601.94	1,281.55	(80 percent of Target Quantity) Not more than 704.85 thousand STRV (55 percent of Export Limit) were allowed to be exported during period from 10/1/2014 to 3/31/2015
March 2015	12,219	13,868.57	1,796	8,645	1,492	400	10	1,525.57	1,527.57	(100 percent of Target Quantity) Export Limit is revised because new calculation is larger than Export Limit calculated in December 2014
Export Limits for FY 2016										
July 2015	12,210	13,858.35	1,729	8,765	1,491	315	10	1,548.35	1,083.85	(70 percent of Target Quantity) Not more than 325.15 thousand STRV (30 percent of Export Limit) is allowed to be exported during period from 10/1/2015 to 12/31/2015
September 2015	12,210	13,858.35	1,730	8,734	1,524	315	15	1,540.35	1,083.85	No change in Export Limit, because 70 percent of new Target Quantity (0.7 times 1,540.35 = 1,078.25) is less than Export Limit calculated in July 2015
December 2015	12,290	13,949.15	1,767	8,991	1,529	315	15	1,332.15	1,083.85	No change in Export Limit, because 80 percent of new Target Quantity (0.8 times 1,332.15 = 1,065.72) is less than Export Limit determined in September 2015.

Table 6

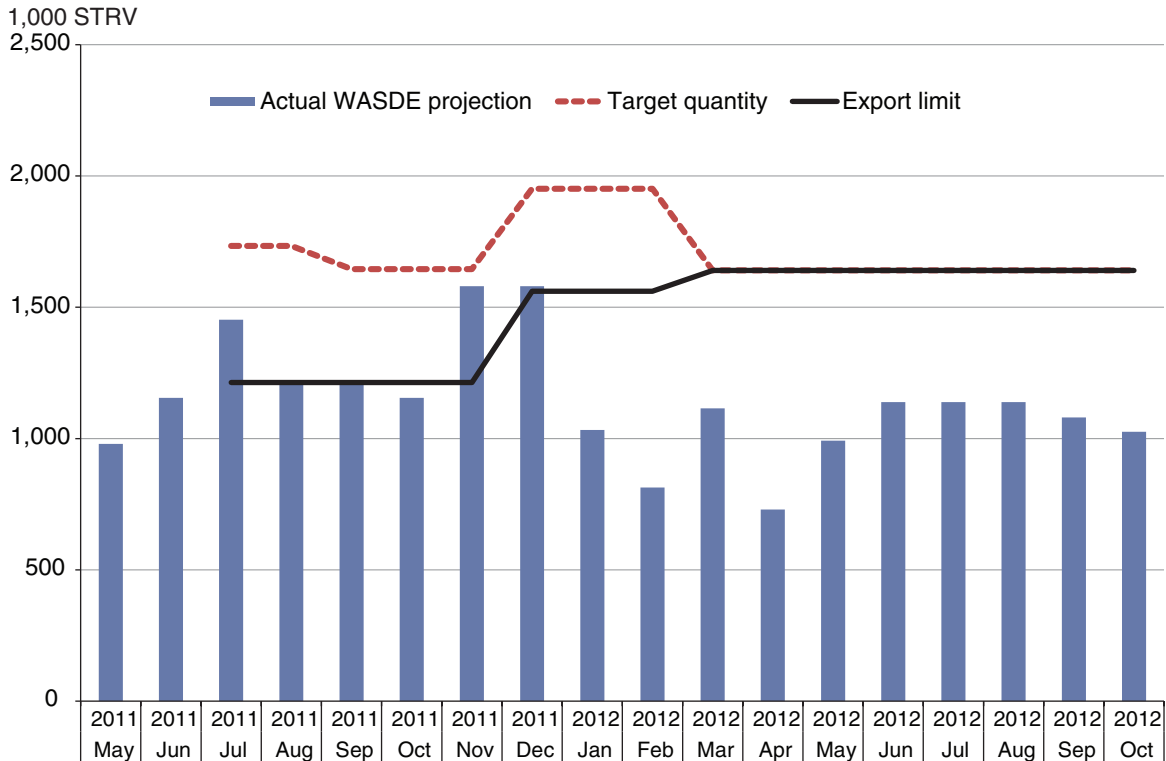
Calculation of Export Limits according to formulas specified by Countervailing Duty Suspension Agreement—continued

WASDE report used as data source	Total use	Total use times 1.135	Beginning stocks	Production	TRQ imports	Other program imports	“Foot-note 5” imports	Target Quantity of U.S. Needs	Export Limit	Comments
<i>Thousands of short tons, raw value (STRV)</i>										
March 2016	12,190	13,835.65	1,809	8,827	1,586	300	15	1,298.65	1,298.65	(100 percent of target quantity) Export Limit is revised because 100 percent of new Target Quantity (1,298.65) is larger than Export Limit calculated in December 2015.

Source: USDA, Economic Research Service, using data from USDA/OCE/WAOB (2014-16).

Figure 8

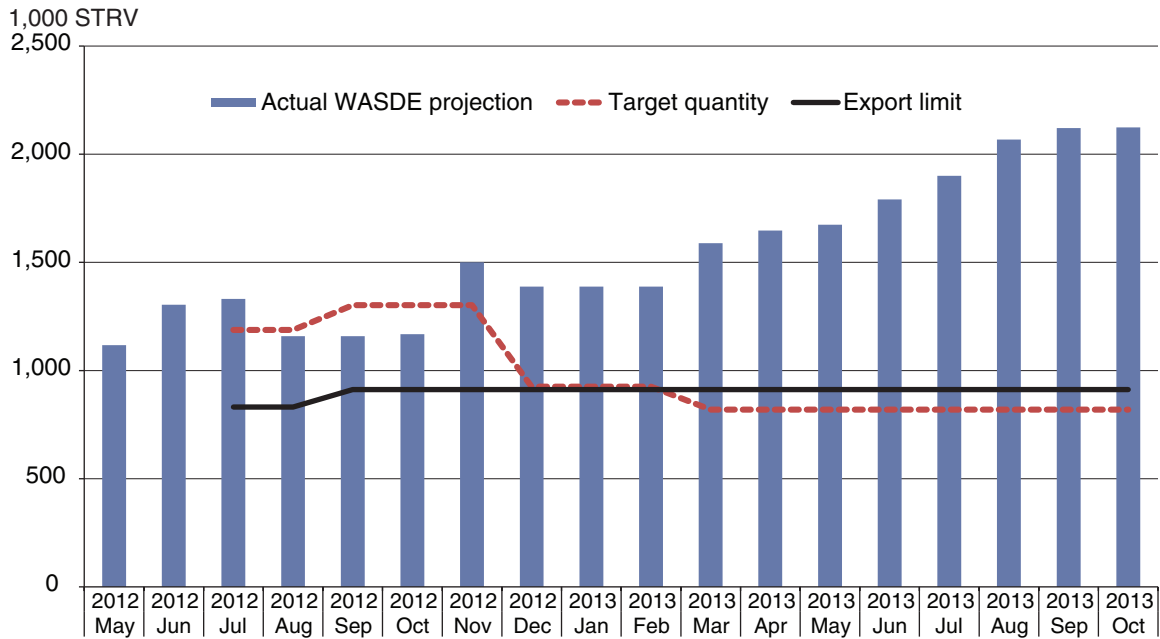
Hypothetical Export Limit scenario and actual WASDE projections of sugar imports from Mexico, FY 2012



STRV = Short tons, raw value. WASDE = World Agricultural Supply and Demand Estimates.
Source: USDA, Economic Research Service calculations, using data from USDA/OCE/WAOB (2011-12).

Figure 9

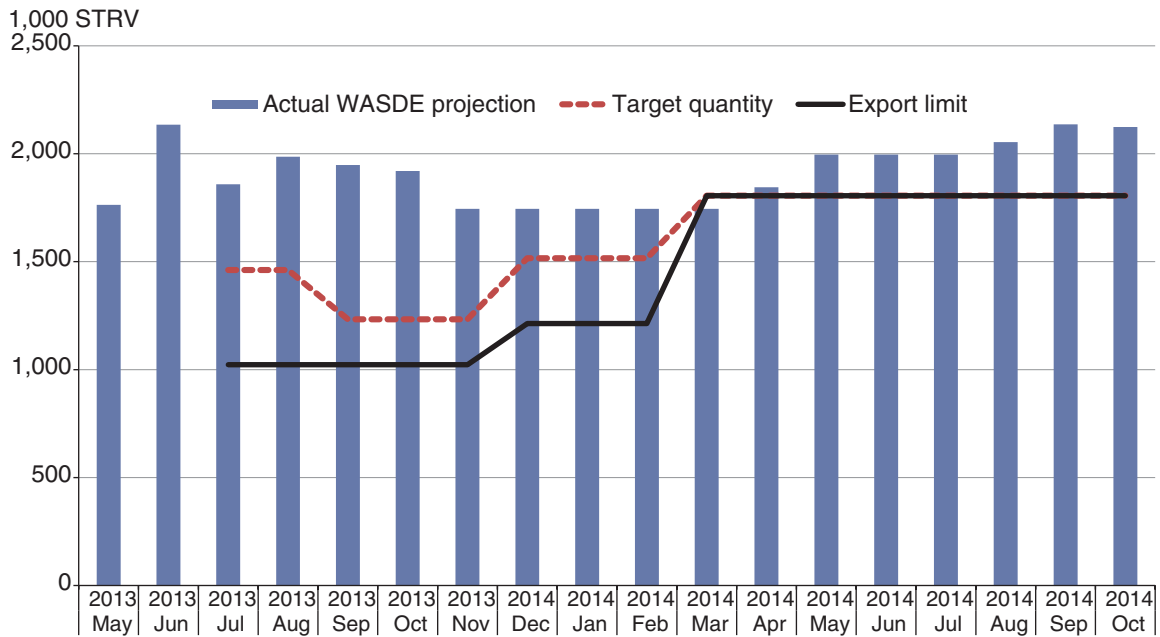
Hypothetical Export Limit scenario and actual WASDE projections of sugar imports from Mexico, FY 2013



STRV = Short tons, raw value. WASDE = World Agricultural Supply and Demand Estimates.
 Source: USDA, Economic Research Service calculations, using data from USDA/OCE/WAOB (2012-13).

Figure 10

Hypothetical Export Limit scenario and actual WASDE projections of sugar imports from Mexico, FY 2014



STRV = Short tons, raw value. WASDE = World Agricultural Supply and Demand Estimates.
 Source: USDA, Economic Research Service calculations, using data from USDA/OCE/WAOB (2013-14).

Legal Challenge Ensures Completion of AD and CVD Investigations

In an unprecedented development, a legal challenge to the suspension agreements led to the completion of the AD and CVD investigations, even though the agreements otherwise remained in full effect. On January 6, 2015, two U.S. refiners whose operations rely heavily on imported raw sugar—Imperial Sugar Company and AmCane Sugar LLC—petitioned the USDOC to resume the investigations. The USDOC granted their request and resumed the investigations on April 24, 2015 (USDOC/ITA, 2015d).

Final Determinations Feature Large AD and CVD Margins²¹

The AD and CVD investigations focused on the two producers/exporters that accounted for the largest volume of sugar imported from Mexico in 2013, the period covered by the investigation:

- (1) FEESA, the Government fund that owns and administers the remaining expropriated sugar mills in the Government's possession and was responsible for nine mills in 2013; and
- (2) Grupo GAM, an industrial group that includes the mills Tala, El Dorado, and Lázaro Cárdenas; the sugarcane producer ITLC Agrícola Central; and other affiliated companies of Grupo Azucarero Mexico.

Final determinations for the investigations were released on September 17, 2015 (see table 5), and on October 20, 2015, the USITC's six commissioners voted unanimously that "a U.S. industry is materially injured by reason of imports of sugar from Mexico that the [USDOC] has determined are subsidized and sold in the United States at less than fair value" (USITC, 2015a). Had the commissioners voted to the contrary, the suspension agreements would have been terminated, and the final duties determined by the investigations would not be applied.

In the CVD investigation, the USDOC determined that countervailable subsidies were being provided to Mexican producer/exporters of sugar via a number of programs and support systems. Because subsidies and supports received before 2013 had the potential to enhance the ability of Mexican producer/exporters to export sugar to the United States in 2013, the USDOC evaluated the discounted value of subsidies and supports received during the 18-year period ending that year. A period of this length was selected because the USDOC determined that the benefit from nonrecurring subsidies over the average lifespan of renewable physical assets used in sugar production lasts 18 years, pursuant to statute and guidelines from the Internal Revenue Service regarding the depreciation of property.

In the final determination, FEESA and Grupo GAM were assigned countervailable subsidy margins of 43.93 percent and 5.78 percent, respectively, while all other producer/exporters received a margin of 38.11 percent, the weighted average of the other two margins (see table 5). Table 7 provides an overview of the programs and support systems through which countervailable subsidies were provided and the subsidy corresponding to each, using information from the final determination. During the investigation, FEESA and Grupo GAM disputed that many of these programs constituted countervailable subsidies, and in the decision memorandum underlying its final determination,

²¹This section of the report summarizes the analysis underlying the findings from the AD and CVD investigations using information from the relevant *Federal Register* notices (USDOC/ITA, 2015a, 2015b, 2014a, 2014b, 2014c, 2014d) and unpublished decision memoranda regarding the preliminary findings (Marsh, 2015, 2014; Taverman, 2014).

the USDOC's International Trade Administration (ITA) provided a detailed explanation of the reasoning behind its decision.

As shown in table 7, the largest proportionate subsidy received by either FEESA or Grupo GAM is the forgiveness of debts owed by the nine FEESA mills to Financiera Nacional Azucarera, S.N.C. (FINA—National Sugar Finance). FINA was a government lending institution specific to the sugar industry and was in operation from 1953 until its liquidation in 2000. Because of the weighted-average technique used to assign countervailable duty margins to producers/exporters other than FEESA and Grupo GAM, these other producers/exporters were all assigned the same countervailable duty margin for the forgiveness of FINA debts, regardless of whether those firms had received such debt forgiveness.

In the AD investigation, the USDOC compared the export price and normal value of FEESA's and Grupo GAM's sugar sales in order to determine whether Mexican sales of sugar to the United States were made at less than fair value and then calculated dumping margins for these sales. The export price was defined as the cost of sales to unaffiliated purchasers in Mexico (for FEESA) and in the United States (for Grupo GAM). FEESA's unaffiliated purchasers sell to U.S. buyers with FEESA's knowledge. Where appropriate, adjustments from the starting price were made for billing adjustments (and also recovered costs, in the case of Grupo GAM). Where applicable, deductions were made to account for movement costs (e.g., foreign inland freight, port charges, export processing fees, international freight, U.S. inland freight, and U.S. duty). The normal value was defined as the value of FEESA's and Grupo GAM's sales in Mexico.

In its final determination, the USDOC found that sugar from Mexico is being, or is likely to be, sold in the United States at less than fair value and announced dumping margins of 40.48 percent for FEESA, 42.14 percent for Grupo GAM, and 40.74 percent for other exporters and producers (see table 5). Again, the dumping margin assigned to other exporters and producers equaled the weighted average of the margins assigned to FEESA and Grupo GAM.

USITC concludes that U.S. industry is “materially injured”

At the beginning of the USITC's final report on these investigations, the commissioners of the USITC express their rationale for their determination of material injury (USITC, 2015a). Three elements of this explanation are summarized below. First, the commissioners stress the existence of a “causal nexus” linking sugar imports from Mexico to the decrease in U.S. sugar prices in 2013. They draw attention to the USITC's price analyses for six different sugar products, which reveal many instances where a sugar product imported from Mexico was sold at a lower price than the same product made in the United States. The commissioners also note that “a majority of producers, responding importers, and purchasers reported that the availability of subject imports in the United States had a material impact on the price of sugar in the U.S. market during the period of investigation” (USITC, 2015a: 29).

Second, the commissioners connect the decreases in U.S. sugar prices to a deterioration in some aspects of the U.S. industry's financial performance—specifically, declines in the value of the industry's domestic shipments and in its net sales. At the same time, the commissioners mention that several other aspects of the industry's financial performance, such as production and market share, actually improved in 2013.

Table 7

Mexican Government programs determined to be countervailable

Name of program	Purpose	Countvailable subsidy rate received by:	
		FEESA	Grupo GAM
		<i>Percent ad valorem</i>	
Grant programs			
1997 Export Subsidy Grants	To subsidize domestic sugar producers that exported surplus sugar	0.15	0.17
1998 Inventory Support Subsidy	To subsidize domestic sugar producers for storage of inventories with grants	0.02	0.00
2001 "Special Fund" Grants	To establish a mechanism to pay off the short-term liabilities of the expropriated FEESA mills and to ensure coverage of their operating expenses on an on-going basis	1.45	0.82
Annual Budget Grants	To cover the operating deficits and administrative expenditures of expropriated mills	3.32	0.41
Programa de Apoyo al Sector Agroindustrial de la Caña de Azúcar (PROINCAÑA--Support Program for the Sugarcane Agro-Industrial Sector)	To provide all sugar mills with grants to cover the purchase price of sugarcane for 2007/08 harvest year	0.26	0.15
Apoyos al Paquete Tecnológico a los Productores de Caña (Technological Support Package to Sugarcane Producers)	To provide a per-hectare payment to all sugarcane growers who harvested cane during 2012/13 harvest year	0.00	0.05
Debt forgiveness			
Forgiveness of FINA Debt	To forgive debt to Financiera Nacional Azucarera, S.N.C. (FINA--National Sugar Finance)	31.33	1.45
Forgiveness of CONAGUA Water Consumption Debt	To provide de facto forgiveness of debt owed to Comisión Nacional de Agua (CONAGUA--National Water Commission) for water consumption	3.56	0.00
Forgiveness of Social Security Payment Debts	To provide de facto forgiveness of debts owed to Instituto Mexicano de Seguridad Social (IMSS--Mexican Institute of Social Security)	3.48	0.00
Forgiveness of Additional Debts Pursuant to Settlement Agreement	To provide partial forgiveness of debts owed to Mexican authorities other than FINA	0.00	0.42
"Catch Up" Tax Liability Forgiveness	To forgive tax liabilities that were outstanding during 2013	0.36	0.33
Accelerated depreciation of renewable energy investments			
Renewable Energy Investments (2004 amendment to Income Tax Act)	To allow certain qualifying taxpayers to depreciate 100 percent of a qualifying renewable energy-related investment in a single exercise	0.00	1.98
Final margin (total)		43.93	5.78

Source: USDA, Economic Research Service, using Marsh (2015).

Third, the commissioners dismiss several alternative explanations of the price declines in the U.S. market, including the strong U.S. sugarcane and sugar beet crops of 2012/13. They assert that the U.S. sugar program effectively neutralizes the economic incentives that U.S. sugar producers would otherwise face to lower prices in response to an increase in domestic sugar crop production.

Their conclusion regarding the impact of the strong 2012/13 crops may be based on a misunderstanding that the allocations of the U.S. sugar program “limit the quantity of sugar that can enter the U.S. market for human consumption to only 85 percent of projected U.S. human consumption of sugar for any particular year” (USITC, 2015a: 30). Instead, the U.S. sugar program requires USDA to “strive to establish an overall allotment quantity that results in no forfeitures of sugar to [the Commodity Credit Corporation] under the Federal sugar loan program and assigns domestic producers *at least 85 percent* of the market share of domestic human consumption for the crop year” (USDA/FSA, 2014).

Suspension Agreements Affect Tradeoffs Between Sugar and HFCS

The suspension agreements provide a framework for determining the maximum volumes and minimum price levels of Mexican sugar exports to the United States. As a result, these agreements will influence the future supply of sugar in both countries—with the likely short-term effect of decreasing the supply of sugar in the United States and increasing the supply of sugar in Mexico. USDA’s long-term projections through 2025/26, for instance, offer a baseline scenario in which U.S. sugar imports from Mexico equal about 1.2 million metric tons (raw value) in 2025/26, compared with 1.6 million metric tons under an alternative scenario in which the suspension agreements are ended after 2020/21 as the result of a sunset investigation by the USDOC and USITC.²² Because changes in the supply of one product can also affect the demand for that product’s substitutes, it is important to consider how changes in the supply of sugar resulting from the suspension agreements will interact with ongoing trends in the demand for HFCS in the United States and Mexico.

Decreased availability of Mexican sugar may favor HFCS in the United States

Just as the liberalization of bilateral sweetener trade resulted in an increase in U.S. refined sugar imports from Mexico that displaced some HFCS consumption in the United States, the trade restrictions specified by the suspension agreements have the potential to exert a smaller effect in the opposite direction on refined sugar imports from Mexico and U.S. HFCS consumption. The positive effect of the suspension agreements on U.S. HFCS consumption is likely to be tempered, however, by the strong possibility that U.S. consumer preferences toward HFCS and sugar have shifted since bilateral sweetener trade was liberalized in 2008, with HFCS now being viewed as a less perfect substitute for sugar than it was in years past.

Prior to the commercial development of HFCS in the early 1970s, sugar was the dominant caloric sweetener in the U.S. market, accounting for about 85 percent of total U.S. deliveries of caloric sweeteners for food or beverage use (fig. 11). The emergence of HFCS as a commercially viable, low-cost alternative to sugar used in food processing displaced a large portion of sugar deliveries. Given its price advantage over sugar, HFCS deliveries steadily increased over the course of the final quarter of the 20th century, and HFCS captured a growing share of the U.S. caloric sweeteners market. HFCS deliveries reached their highest level—8.4 million metric tons (9.2 million short tons), dry value (refined basis)—in 2002, and HFCS’s share of the U.S. caloric sweeteners market peaked at 44 percent the following year.

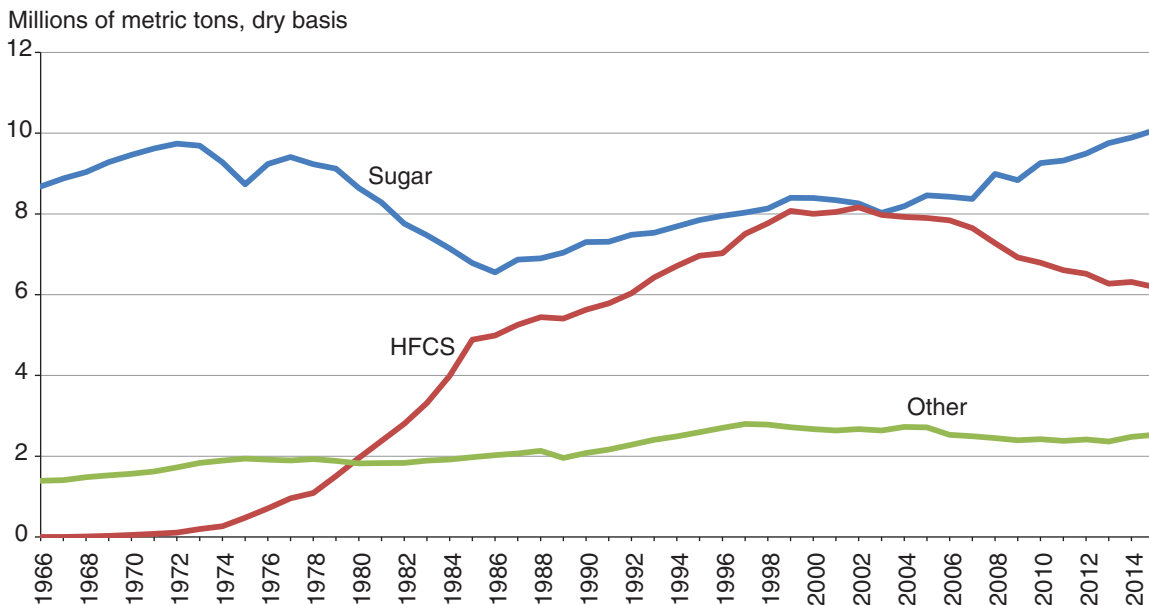
Although much of the research to date shows that the health effects of HFCS and sugar are quite similar, the possibility that sugar is somehow better than HFCS from a health standpoint has resonated with some consumers (Hendley, 2015; Thompson, 2015). In response, some food processors have switched from HFCS to sugar in the manufacture of their products and marketed their sugar-sweetened products as being distinct from competing products sweetened with HFCS.²³ In the

²²For details, see the March 2016 issue of ERS’s *Sugar and Sweetener Outlook* report (McConnell, 2016a).

²³A similar trend is underway regarding preferences for cane versus beet sugar, with some consumers viewing sugar from genetically modified (GM) sugar beets as somehow inferior to sugar from non-GM sugarcane, even if the sugars from the two sources are chemically indistinguishable. See the January 2016 issue of ERS’s *Sugar and Sweetener Outlook* report (McConnell, 2016b) for a discussion of this trend.

Figure 11

U.S. estimated deliveries of caloric sweeteners for domestic food and beverage use, by sweetener type



HFCS = high fructose corn syrup. Other includes honey, the corn-based sweeteners glucose syrup and dextrose, and edible syrups.

Source: USDA/ERS (2016c).

context of this “back to sugar” movement, HFCS’s share of the caloric sweeteners market decreased to 37 percent by 2014, and annual HFCS deliveries declined to 6.6 million metric tons (7.3 million dry tons) (fig. 11). Despite these trends, HFCS continues to dominate the calorically sweetened carbonated soft drink market due to its price advantage relative to sugar. By instituting limits on the quantity of Mexican sugar exports to the United States and creating minimum prices for such exports, the suspension agreements are likely to strengthen this price advantage.

Changes in dietary preferences pose several threats to sugar and HFCS producers alike via the market for noncalorically sweetened beverages. Noncaloric sweetened products have captured a significant share of the beverage market, although concerns also exist among some consumers about the long-term health implications associated with noncaloric sweeteners. Perhaps the most important health-related trend for the carbonated soft drink market that will affect sugar producers and corn refiners in the United States and Mexico is increased consumption of bottled water, which displaces both calorically and noncalorically sweetened beverages.

Increased availability of domestically produced sugar may weaken HFCS’s prospects in Mexico

With NAFTA’s liberalization of bilateral sweetener trade, HFCS has made inroads into the Mexican market. According to estimates from CONADESUCA, aggregate HFCS consumption in Mexico has fluctuated over the past several years, dropping from 1.57 million metric tons in FY 2013 to 1.37 million metric tons in FY 2014 and then rising to 1.44 million metric tons in FY 2015. Mexico’s annual domestic production of HFCS has equaled about 500,000 metric tons dry basis in recent years, meaning that imports supply about two-thirds of Mexican HFCS consumption. Although

some industry representatives report that production levels are near the industry's current maximum capacity (Flores and Harrison, 2015), Ingredion announced in January 2016 that it would expand its manufacturing plant dedicated to the production of HFCS, starches, glucoses, and adhesives in San Juan del Río, Querétaro (Watson, 2016).

Depreciation of the Mexican peso against the U.S. dollar (which makes HFCS imported from the United States less affordable) and efforts by the Mexican Government to discourage the consumption of sweetened soft drinks are placing downward pressure on Mexican HFCS consumption. In January 2014, the Mexican Government began to levy a sales tax of 1 peso per liter (about 7.6 U.S. cents per liter) on calorically sweetened beverages. This tax, which discourages the consumption of both sugar and HFCS, is intended to encourage healthier dietary choices, as well as raise government revenue. In a study on consumer expenditures on beverages in 53 Mexican cities, Colchero et al. (2016) find that the tax lowered expenditures in 2014 on beverages subject to the tax by an average of 6 percent, compared with pre-tax trends, and that the effects of the tax were felt even more strongly by low-income households. However, U.S. estimates indicate that human consumption of sugar in Mexico saw a subsequent year-to-year increase in FY 2015—climbing from 4.2 million to 4.6 million metric tons (USDA/FAS, 2016b), and HFCS consumption in Mexico also appears to have increased, as was mentioned above.

Could an Expansion of Mexico's Ethanol Industry Change the Outlook?

Some argue that use of sugarcane-based ethanol to oxygenate gasoline in Mexico and extend the country's petroleum supply has the potential to stimulate sugarcane demand in Mexico. Methyl tertiary butyl ether (MTBE) is currently used to oxygenate gasoline consumed in Mexico. A switch from MTBE to sugarcane-based ethanol—along the lines of what occurred in the United States during the first decade of the 21st century when ethanol (predominantly corn-based) was substituted for MTBE in gasoline—would have far-reaching implications for the Mexican sugarcane sector.

In 2013, Mexico consumed about 44 billion liters of gasoline (USDOE/EIA, 2015). If 10 percent of this amount were obtained from sugarcane-based ethanol, roughly 650,000 hectares of sugarcane would be required each year for use as an ethanol feedstock.²⁴ By comparison, Mexico harvested about 784,000 hectares of sugarcane in 2013/14 (see table 3) and exported about 2-3 percent of its total sugar production, with the vast majority of these exports going to the United States. Thus, the creation of a sizable sugarcane-based ethanol sector in Mexico would greatly increase Mexican demand for sugarcane, thereby placing upward pressure on prices and motivating a supply response by Mexican growers. Given the amount of sugarcane that would be required to produce that much ethanol and the relatively small share of Mexican sugar production that is currently exported to the United States, the economic effects of a Mexican ethanol boom would probably be much larger than the impact of the suspension agreements.²⁵

Elements of the Mexican sugar milling industry claim that ethanol production from sugarcane is economically feasible. Mexico's biofuels law seeks to promote ethanol production from various agricultural commodities, but up until 2015, little progress was made in Mexico toward the construction of a viable production capacity for anhydrous ethanol or a corresponding distribution network. PEMEX (Petróleos Mexicanos), the state-controlled Mexican fuel monopoly, had called for bids for the production of ethanol in 2012. However, PEMEX rejected the bids tendered, which fell in the range of \$1.03-\$1.05 per liter, well above PEMEX's target price of 66-68 cents per liter. Currently, world petroleum prices are at very low levels, making it that much harder for sugarcane-based ethanol produced in Mexico to compete on a price basis with Mexican petroleum. In 2015, however, PEMEX announced that it had awarded four 10-year purchase contracts for 32 million gallons of anhydrous ethanol. The contracts were awarded to two tequila distilleries, an engineering company, and a biofuels firm, but not to any sugar mills. These four facilities will utilize sugarcane from Veracruz and sorghum from Tamaulipas as their feedstocks (Schill, 2015).

²⁴The estimate of 650,000 hectares is based on an assumed sugarcane yield of 68 metric tons per hectare and the further assumption that each hectare of sugarcane yields about 6,800 liters of ethanol.

²⁵U.S. ethanol producers are interested in exporting to Mexico, as is evidenced by a U.S. trade mission to Mexico by industry representatives in May 2016 (USDA/OC, 2016). Under NAFTA, ethanol from Canada and the United States may enter Mexico duty-free. To qualify for duty-free treatment, U.S. ethanol must be certified as not having benefitted from the U.S. Sugar Reexport Program (México, Secretaría de Economía, 2016b).

While the development of an economically viable sugarcane-ethanol industry is a stated objective of the Mexican Government, and there are provisions within the biofuels law to establish it as such, the possibility of accomplishing this goal is currently constrained due to the lack of an adequate infrastructure for distributing the product. Some sugar mills have the capacity to produce ethanol for biofuels, and a few mills have made limited attempts to sell their ethanol directly to the public by allowing buyers to top off fuel tanks that are already partially filled with gasoline, thus creating an ad hoc gasoline-ethanol blend (Flores, 2014a). Energy reforms passed in 2013 and 2014 may help Mexico to establish a production and distribution capacity for its nascent biofuels industry. In 2016, PEMEX will relinquish its position as monopolist with respect to retail gasoline and diesel sales (Seelke et al., 2015); in 2017, non-PEMEX gas stations will be allowed to sell imported fuel in Mexico; and the following year, the prices of gasoline and diesel will no longer be set by the Government.

Conclusion

Trade liberalization under NAFTA integrated the U.S. and Mexican sweetener markets. While market integration led to large increases in U.S. sugar imports from Mexico and Mexican HFCS imports from the United States, it did not initially place much pressure on U.S. sugar producers, as rising sugar imports from Mexico, often in the form of sugar imported for direct consumption, primarily displaced HFCS produced in the United States. An increase in Mexican sugarcane area coupled with higher-than-average sugar crop yields in both countries in 2012/13 sharpened the competition between the U.S. and Mexican sugar sectors and provided the economic impetus for the U.S. AD and CVD investigations concerning sugar imports from Mexico. Mexico's remaining state-owned sugar mills played a minor role in the area expansion.

The agreements that suspended these investigations institute new quantity and price restrictions on Mexican sugar exports to the U.S. While the U.S. sugar program features domestic marketing allotments for sugarcane and sugar beet growers, Mexico's domestic sugar policies lack similar supply controls. Thus, the suspension agreements have the effect of addressing this policy difference by creating controls on the supply of Mexican sugar in the U.S. market, although they still provide Mexican sugar exporters with much greater access to the U.S. market than existed before NAFTA and may not constrain trade under certain market conditions. On those occasions when the new trade restrictions are binding, members of the U.S. industry who are more reliant on sugar imports from Mexico are likely to be adversely affected. Subsequent to the implementation of the suspension agreements, some U.S. refiners complained that the restrictions instituted by the agreements do not let in sufficient quantities of raw sugar from Mexico, and the U.S. Department of Commerce increased the Export Limit for FY 2016, in response to a written notification from USDA.

If the suspension agreements remain in place, they are likely to lessen the integration of the U.S. and Mexican sweetener sectors and have market effects that extend beyond Mexican sugar exports to the United States. By limiting the price and quantity of these exports, the suspension agreements have the potential to bolster the price competitiveness of HFCS to U.S. sweetener buyers and to increase the availability of sugar to Mexican buyers—including both traditional customers in the food and beverage sectors and potential new buyers in the ethanol fuel sector, should one emerge in Mexico in the near future. If the suspension agreements should be terminated, then the final duties of the AD and CVD investigation will be invoked; these duties are potentially prohibitive to the importation of Mexican sugar.

Under U.S. law, any suspension agreement governing an AD or CVD investigation must be reviewed periodically—not less than roughly every 5 years—to determine whether the termination of the suspended investigation would likely lead to the continuation of dumping or counter-vailable subsidization and of material injury. If one of these reviews concludes that such actions are not likely to resume, then the suspension agreement and its associated restrictions will be terminated. However, a suspension agreement can also be succeeded by another suspension agreement, as illustrated by the case of the U.S. AD investigation of tomato imports from Mexico. The first agreement suspending that investigation was instituted in 1996; the current suspension agreement took effect in 2013. In any case, the period of unrestricted U.S.-Mexico sugar trade that began in 2008 with the implementation of NAFTA's provisions for sweetener trade has drawn to a close, at least for the moment.

References

Website addresses are current as of July 14, 2016, unless otherwise indicated.

- Banco de México. 2016. "Exchange rates and auctions historical information: CF373 – Daily U.S. dollar-MXN exchange rate historical series." Spreadsheet. www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?accion=consultarCuadro&idCuadro=CF373§or=6&locales=en.
- Barrera, Adriana. 2016. "U.S. cane refiners seeking to rework Mexico sugar pact: Mexico lobby." Reuters News Service. April 6. www.reuters.com/article/us-usa-sugar-mexico-idUSKCN0X407G.
- _____. 2015. "UPDATE 2-Mexico sells four state sugar mills, five remain unsold." Reuters. June 12. www.reuters.com/article/2015/06/12/mexico-sugar-idUSL1N0YY1LE20150612.
- Bray, George A., and Samara Joy Nielsen, and Barry M. Popkin. 2004. "Consumption of high-fructose corn syrup in beverages may play a role in the epidemic of obesity." *The American Journal of Clinical Nutrition* 79(4): 537-43. <http://ajcn.nutrition.org/content/79/4/537.full>.
- Chiang, Alpha C. 1967. *Fundamental Methods of Mathematical Economics*. New York: McGraw-Hill Book Company.
- Cobos, René. 2009. "The Maquila Handbook: Quick Tips for Understanding Mexico's IMMEX Program." *IndustryWeek*. May 13. www.industryweek.com/articles/the_maquila_handbook_quick_tips_for_understanding_mexicos_immex_program_19139.aspx.
- Colchero, M. Arantxa, Barry M. Popkin, Juan A. Rivera, and Shu Wen Ng. 2016. "Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study." *The BMJ* (formerly the *British Medical Journal*), January 5. www.bmj.com/content/352/bmj.h6704.
- Flores, Dulce. 2016. "Mexico Puts Last Two State-Owned Sugar Mills Up for Sale." U.S. Department of Agriculture, Foreign Agricultural Service, Global Agricultural Information Network (GAIN) Report No. 6026. June 13. http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Mexico%20Puts%20Last%20Two%20State-Owned%20Sugar%20Mills%20Up%20for%20Sale_Mexico_Mexico_6-13-2016.pdf.
- _____. 2014a. *Mexico Sugar Semi-annual: Sugar Production and Trade Seen Slightly Lower*. U.S. Department of Agriculture, Foreign Agricultural Service, Global Agricultural Information Network (GAIN) Report No. MX 4067. September 30. http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Sugar%20Semi-annual_Mexico%20City_Mexico_9-30-2014.pdf.
- _____. 2014b. *Mexico Sugar Annual: Sugar Production Forecast Slightly Higher, Exports Down on Lower Overall Supply*. U.S. Department of Agriculture, Foreign Agricultural Service, Global Agricultural Information Network (GAIN) Report No. MX 4032. April 15. http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Sugar%20Annual_Mexico%20City_Mexico_4-15-2014.pdf.

- _____. 2013. *Mexico Sugar Semi-Annual. Production & Exports for MY 2013/14 Estimated Slightly Lower than MY 2012/13*. U.S. Department of Agriculture, Foreign Agricultural Service, Global Agricultural Information Network (GAIN) Report No. MX 3072. September 24. http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Sugar%20Semi-annual_Mexico%20City_Mexico_9-24-2013.pdf.
- _____. 2012a. *Mexico Sugar Annual: Production and Exports Forecast to Rise Next Year*. U.S. Department of Agriculture, Foreign Agricultural Service, Global Agricultural Information Network (GAIN) Report No. MX 2019. April 10. http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Sugar%20Annual_Mexico%20City_Mexico_4-10-2012.pdf.
- _____. 2012b. *Mexico Takes Steps to Privatize State-Owned Sugar Mills*. U.S. Department of Agriculture, Foreign Agricultural Service, Global Agricultural Information Network (GAIN) Report No. MX 2057. August 1. http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Mexico%20Takes%20Steps%20to%20Privatize%20State-Owned%20Sugar%20Mills_Mexico_Mexico_8-1-2012.pdf.
- _____. 2008. *Mexico Sugar: Modifications to the Mexican Sugar Re-Export Program (IMMEX)*. U.S. Department of Agriculture, Foreign Agricultural Service, Global Agricultural Information Network (GAIN) Report No. MX 8035. May 19. <http://apps.fas.usda.gov/gain-files/200805/146294719.pdf> (accessed September 29, 2015).
- Flores, Dulce, Mark Ford, and Carlos A. Gonzalez. 2010. *Mexico Sugar Annual: Mexican Sweeteners Production Expected to Increase*. U.S. Department of Agriculture, Foreign Agricultural Service, Global Agricultural Information Network (GAIN) Report No. MX 0023. April 15. http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Sugar%20Annual_Mexico%20City_Mexico_4-14-2010.pdf.
- Flores, Dulce, and Tim Harrison. 2015. *Mexico Sugar Semi-annual*. U.S. Department of Agriculture, Foreign Agricultural Service, Global Agricultural Information Network (GAIN) Report No. MX 5041. October 9. http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Sugar%20Semi-annual_Mexico%20City_Mexico_10-9-2015.pdf.
- Flores, Dulce, and Alicia Hernandez. 2015. *Mexico Sugar Annual Report*. U.S. Department of Agriculture, Foreign Agricultural Service, Global Agricultural Information Network (GAIN) Report No. MX 5017. April 16. http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Sugar%20Annual_Mexico%20City_Mexico_4-16-2015.pdf.
- García Chavas, Luis Ramiro, Thomas H. Spreen, and Gretchen Greene, 2002. "Structural Reform and Implications for Mexico's Sweetener Market." In Andrew Schmitz, Thomas H. Spreen, William A. Messina, Jr., and Charles B. Moss (eds.), *Sugar and Related Sweetener Markets: International Perspectives* (Oxon, United Kingdom: CABI Publishing): 81-100.
- Gudoshnikov, Sergey, Linday Jolly, and Donald Spence. 2004. *The World Sugar Market*. Cambridge, England, and Boca Raton, Florida: Woodhead Publishing Limited and CRC Press LLC.
- The Hagstrom Report. 2015. "Sweetener Users Association praises ITC examination of Mexico agreements." 2015 News Archive. January 26. www.hagstromreport.com/2015news_files/2015_0126_sweetener-users-association-praises-itc-examination-mexico-agreements.html.

- Haley, Stephen. 2013. *Sugar and Sweetener Outlook*. U.S. Department of Agriculture, Economic Research Service, Outlook Report No. SSS-M-297. May 16. www.ers.usda.gov/media/1106886/sssm297.pdf.
- _____. 2011. *Sugar and Sweetener Outlook*. U.S. Department of Agriculture, Economic Research Service, Outlook Report No. SSS-M-270. February 14. <http://usda.mannlib.cornell.edu/usda/ers/SSS//2010s/2011/SSS-02-14-2011.pdf>.
- _____. 2006. *Sugar and Sweetener Outlook*. U.S. Department of Agriculture, Economic Research Service, Outlook Report No. SSS-247. September 28. <http://usda.mannlib.cornell.edu/usda/ers/SSS/2000s/2006/SSS-09-28-2006.pdf>.
- Haley, Stephen, and David Kelch. 2008. *Sugar and Sweetener Outlook*. Outlook Report No. SSS-251. January 29. <http://usda.mannlib.cornell.edu/usda/ers/SSS//2000s/2008/SSS-01-29-2008.pdf>.
- Haley, Stephen, and Michael McConnell. 2010a. *Sugar and Sweetener Outlook*. Outlook Report No. SSS-M-268. December 14. <http://usda.mannlib.cornell.edu/usda/ers/SSS//2010s/2010/SSS-12-14-2010.pdf>.
- _____. 2010b. *Sugar and Sweetener Outlook*. Outlook Report No. SSS-M-266. October 13. <http://usda.mannlib.cornell.edu/usda/ers/SSS//2010s/2010/SSS-10-13-2010.pdf>.
- Haley, Stephen, and Nydia Suarez. 1999. "U.S.-Mexico Sweetener Trade Mired in Dispute." U.S. Department of Agriculture, Economic Research Service, *Agricultural Outlook* (September): 17-20. <http://pdic.tamu.edu/pdicdata/pdfs/ao264g.pdf>.
- Haley, Stephen, José Toasa, and Andy Jerardo. 2008. *Sugar and Sweetener Outlook*. Outlook Report No. SSS-M-253. September 30. <http://usda.mannlib.cornell.edu/usda/ers/SSS//2000s/2008/SSS-09-30-2008.pdf>.
- Hendley, Joyce. 2015. "The 13 Biggest Nutrition and Food Myths Busted." *EatingWell*. www.eatingwell.com/nutrition_health/nutrition_news_information/the_13_biggest_nutrition_and_food_myths_busted.
- Hernandez, Gabriel, and Dulce Flores. 2011. *Mexico Sugar Semi-Annual: September Update*. U.S. Department of Agriculture, Foreign Agricultural Service, Global Agricultural Information Network (GAIN) Report No. MX 1075. October 5. http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Sugar%20Semi-annual_Mexico%20City_Mexico_10-5-2011.pdf.
- Herrera Moreno, Adriana. 2013. "Mexican Sugar Policy." Presentation delivered to the 2013 USDA Agricultural Outlook Forum, Arlington, Virginia, February 22. www.usda.gov/oce/forum/past_speeches/2013_Speeches/Herrera.pdf (accessed July 1, 2016).
- Hughes, Krista. 2015. "UPDATE 1-U.S. sugar refiners challenge deal over Mexico imports." Reuters. February 19. www.reuters.com/article/2015/02/19/usa-sugar-mexico-idUSL1N0VT2GS20150219 (accessed July 31, 2015).
- IHS Markit. 2016. *Global Trade Atlas*. www.gtis.com/english/GTIS_GTA.html.

- Instituto Nacional de Estadística y Geografía (INEGI). 2009. “Cuadro 10: Unidades de Producción con Cultivos Perennes Según Superficie Plantada, en Producción y Volumen Cosechado o Plantación y Entidad y Municipio.” *Estados Unidos Mexicanos. Censo Agropecuario 2007, VII Censo Agrícola, Ganadero y Forestal*. Aguascalientes, Aguascalientes. www3.inegi.org.mx/sistemas/tabuladosbasicos/default.aspx?c=17177&s=est (accessed July 1, 2016).
- Marsh, Christian. 2015. *Issues and Decision Memorandum for the Final Affirmative Determination in the Countervailing Duty Investigation of Sugar from Mexico: To Ronald K. Lorentzen, Acting Assistant Secretary for Enforcement and Compliance*. U.S. Department of Commerce, International Trade Administration. September 16. <http://enforcement.trade.gov/frn/summary/mexico/2015-24195-1.pdf>.
- _____. 2014. *Decision Memorandum for the Preliminary Determination in the Antidumping Duty Investigation of Sugar from Mexico: To Paul Piquado, Assistant Secretary for Enforcement and Compliance*. U.S. Department of Commerce, International Trade Administration. October 24. <http://enforcement.trade.gov/frn/summary/mexico/2014-26077-1.pdf>.
- McAvoy, Audrey. 2016. “Hawaii’s Last Sugar Plantation to Stop Growing Sugar.” Associated Press, January 7. http://hosted.ap.org/dynamic/stories/U/US_LAST_SUGAR_PLANTATION?SITE=AP&SECTION=HOME&TEMPLATE=DEFAULT (accessed January 11, 2016).
- McConnell, Michael. 2016a. *Sugar and Sweetener Outlook*. Outlook Report No. SSS-M-331. March 15. <http://usda.mannlib.cornell.edu/usda/ers/SSS//2010s/2016/SSS-03-15-2016.pdf>.
- _____. 2016b. *Sugar and Sweetener Outlook*. Outlook Report No. SSS-M-329. January 19. <http://usda.mannlib.cornell.edu/usda/ers/SSS//2010s/2016/SSS-01-19-2016.pdf>.
- McMinimy, Mark A. 2015. *U.S. Sugar Program Fundamentals*. Congressional Research Service Report No. R43998. April 22. <http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R43998.pdf>.
- México, Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca, y Alimentación, Comité Nacional para el Desarrollo Sustentable de la Caña de Azúcar (SAGARPA/CONADESUCA). 2016. *Sistema INFOCAÑA*. Machine readable database. <http://www.campomexicano.gob.mx/azcf/entrada/menu.php>.
- _____. 2015. “Metodología para determinar el precio de referencia del azúcar base estándar para el pago de la caña de azúcar.” October 26. www.cndsca.gob.mx/politica%20comercial/Metodologia%20Vigente%20de%20Precio%20de%20Referencia.pdf.
- México, Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca, y Alimentación, Servicio de Información Agroalimentaria y Pesquera (SAGARPA/SIAP). 2015. “Anuario Estadístico de la Producción Agrícola: Cierre de la Producción Agrícola por Cultivo.” Statistical database. www.siap.gob.mx/cierre-de-la-produccion-agricola-por-cultivo/.
- México, Secretaría de Economía. 2016a. “DECRETO por el que se modifica el diverso para el Fomento de la Industria Manufacturera, Maquiladora y de Servicios de Exportación.” *Diario Oficial de la Federación*, January 6. www.dof.gob.mx/nota_detalle.php?codigo=5422211&fecha=06/01/2016.

- _____. 2016b. *Sistema de Información Arancelaria Via Internet (SIAVI 4)*. Machine readable database. <http://187.191.71.239/>.
- _____. 2016c. *Sistema Nacional de Información e Integración de Mercados (SNIIM)*. July 1. Machine readable database. www.economia-sniim.gob.mx/Sniim-anANT/e_AzuMesSINredond.asp (accessed July 1, 2016).
- _____. 2015. “Manufacturing, Maquila and Export Services Industry.” Webpage. www.economia.gob.mx/industry/foreign-trade-instruments/immex (accessed September 29, 2015).
- Orden, David. 2007. “Feasibility of Farm Program Buyouts: Is it a Possibility for U.S. Sugar.” In Karen M. Huff, Karl D. Meilke, Ronald D. Knutson, Rene F. Ochoa, and James Rude (eds.), *Achieving NAFTA Plus: Proceedings from the Third North American Agri-food Market Integration Consortium (NAAMIC)* (Texas A&M University, University of Guelph, and Inter-American Institute for Cooperation on Agriculture-Mexico): 147-161. <http://naamic.tamu.edu/calgary/orden.pdf>.
- Organization of American States (OAS). 2015. Foreign Trade Information System (SICE—Sistema de Información sobre Comercio Exterior). www.sice.oas.org/default_e.asp.
- Prentice, Chris. 2016. “CORRECTED-U.S. sugar liquefiers transform sweetener market as prices rally.” Reuters, May 12. www.reuters.com/article/usa-sugar-idUSL2N1821F9.
- Schill, Susan R. 2015. “Pemex awards 10-year contracts for domestic ethanol in Mexico.” *Ethanol Producer Magazine*. April 8. www.ethanolproducer.com/articles/12110/pemex-awards-10-year-contracts-for-domestic-ethanol-in-mexico.
- Seelke, Claire Ribando, Michael Ratner, M. Angeles Villarreal, and Phillip Brown. 2015. *Mexico’s Oil and Gas Sector: Background, Reform Efforts, and Implications for the United States*. Congressional Research Service Report, September 28. <https://www.fas.org/sgp/crs/row/R43313.pdf>.
- Sentiés-Herrera, Héctor Emmanuel, Fernando Carlos Gómez-Merino, Apolonio Valdez-Balero, Hilda Victoria Silva-Rojas, and Libia Iris Trejo-Téllez. 2014. “The Agro-Industrial Sugarcane System in Mexico: Current Status, Challenges and Opportunities.” *Journal of Agricultural Science* 6(4): 26-54. www.ccsenet.org/journal/index.php/jas/article/viewFile/32797/19960 (accessed June 3, 2016).
- Suarez, Nydia. 1997. “Origin of the U.S. Sugar Import Tariff-Rate Quota Shares.” U.S. Department of Agriculture, Economic Research Service, *Sugar and Sweetener Outlook*, Outlook Report No. SSS-221. September.
- Taverman, Gary. 2014. *Decision Memorandum for the Preliminary Determination in the Countervailing Duty Investigation of Sugar from Mexico: To Paul Piquado, Assistant Secretary for Enforcement and Compliance*. U.S. Department of Commerce, International Trade Administration. August 25. <http://enforcement.trade.gov/frn/summary/mexico/2014-20834-1.pdf>.
- Thompson, Dennis. 2015. “Sugar vs. high-fructose corn syrup: Is one sweetener worse for your health?” HealthDay, June 22. www.cbsnews.com/news/sugar-high-fructose-corn-syrup-worse-for-your-health/.

- Trostle, Ronald, Daniel Marti, Stacey Rosen, and Paul Westcott. 2011. *Why Have Food Commodity Prices Risen Again?* U.S. Department of Agriculture, Economic Research Service, Outlook Report No. WRS-1103, June. www.ers.usda.gov/media/126752/wrs1103.pdf.
- U.S. Department of Agriculture, Economic Research Service (USDA/ERS). 2016a. "Agricultural Baseline Projections." Webpage. www.ers.usda.gov/topics/farm-economy/agricultural-baseline-projections/readings.aspx.
- _____. 2016b. *Agricultural Exchange Rate Data Set*. April 18. www.ers.usda.gov/data-products/agricultural-exchange-rate-data-set.aspx.
- _____. 2016c. *Sugar and Sweetener Yearbook Tables*. January 4. www.ers.usda.gov/data-products/sugar-and-sweeteners-yearbook-tables.aspx.
- _____. 2015a. "Sugar & Sweeteners: Background." Webpage. June 3. www.ers.usda.gov/topics/crops/sugar-sweeteners/background.aspx#hfcs.
- _____. 2015b. "Sugar & Sweeteners: Policy." Webpage. November 5. www.ers.usda.gov/topics/crops/sugar-sweeteners/policy.aspx.
- _____. 1975-2016d. *Sugar and Sweetener Outlook*. Various issues. <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1386>.
- U.S. Department of Agriculture, Farm Service Agency (USDA/FSA). 2014. *2014 Farm Bill Fact Sheet: Sugar Loan Program, Sugar Marketing Allotments and Feedstock Flexibility Program*. November. https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/EPAS/PDF/sugar_fact_sheet_112014.pdf.
- U.S. Department of Agriculture, Foreign Agricultural Service (USDA/FAS). 2016a. *Global Agricultural Trade System*. Interactive database. www.fas.usda.gov/gats.
- _____. 2016b. *Production, Supply, and Distribution Online*. Interactive database. www.fas.usda.gov/psdonline.
- U.S. Department of Agriculture, National Agricultural Statistics Service (USDA/NASS). 2016. *Quick Stats 2.0*. Statistical database. <http://quickstats.nass.usda.gov/>.
- U.S. Department of Agriculture, Office of Communications (USDA/OC). 2016. "Agriculture Acting Deputy Secretary Scuse Leads USDA Clean Energy Mission to Mexico." News Release No. 0128.16, May 23. www.usda.gov/wps/portal/usda/usdahome?contentid=2016/05/0128.xml&contentidonly=true.
- U.S. Department of Agriculture, Office of the Chief Economist, World Agricultural Outlook Board (USDA/OCE/WAOB). 2007. *USDA Agricultural Projections to 2016*. Long-term Projections Report No. OCE-2007-1, February. <https://wayback.archive-it.org/5923/20120419103158/http://www.ers.usda.gov/publications/oce071/>.
- U.S. Department of Commerce, Bureau of the Census. 2013. *International Data Base*. December 19. www.census.gov/population/international/data/idb/informationGateway.php.

- U.S. Department of Commerce, International Trade Administration (USDOC/ITA). 2015a. "Sugar From Mexico: Final Affirmative Countervailing Duty Determination." *Federal Register* 80(184, September 23): 57337-57339. <https://www.gpo.gov/fdsys/pkg/FR-2015-09-23/pdf/2015-24195.pdf>.
- _____. 2015b. "Sugar From Mexico: Final Determination of Sales at Less Than Fair Value." *Federal Register* 80(184, September 23): 57341-57343. <https://www.gpo.gov/fdsys/pkg/FR-2015-09-23/pdf/2015-24189.pdf>.
- _____. 2015c. "FACT SHEET: Commerce Finds Dumping and Countervailable Subsidization of Imports of Sugar from Mexico." September 15. <http://enforcement.trade.gov/download/factsheets/factsheet-mexico-sugar-ad-cvd-final-091715.pdf> (accessed September 21, 2015).
- _____. 2015d. "Sugar From Mexico: Continuation of Antidumping and Countervailing Duty Investigations." *Federal Register* 80(85, May 4): 25278-25280. www.gpo.gov/fdsys/pkg/FR-2015-05-04/pdf/2015-10253.pdf.
- _____. 2014a. "Sugar From Mexico: Initiation of Countervailing Duty Investigation." *Federal Register* 79(79, April 24): 22790-22793.
- _____. 2014b. "Sugar From Mexico: Initiation of Antidumping Duty Investigation." *Federal Register* 79(79, April 24): 22795-22800.
- _____. 2014c. "Sugar From Mexico: Preliminary Affirmative Countervailing Determination and Alignment of Final Countervailing Duty Determination With Final Antidumping Duty Determination." *Federal Register* 79(79, September 2): 51956-58. www.gpo.gov/fdsys/pkg/FR-2014-09-02/pdf/2014-20834.pdf.
- _____. 2014d. "Sugar From Mexico: Preliminary Determination of Sales at Less Than Fair Value and Postponement of Final Determination." *Federal Register* 79(212, November 3): 65189-91. <https://federalregister.gov/a/2014-26077>.
- _____. 2014e. "Agreement Suspending the Antidumping Duty Investigation on Sugar From Mexico." December 19. <http://enforcement.trade.gov/agreements/sugar-mexico/AD-Agreement.pdf>.
- _____. 2014f. "Agreement Suspending the Countervailing Duty Investigation on Sugar from Mexico." December 19. <http://enforcement.trade.gov/agreements/sugar-mexico/CVD-Agreement.pdf>.
- _____. 2014g. "Sugar From Mexico: Suspension of Antidumping Investigation." *Federal Register* 79(248, December 29): 78039-44.
- _____. 2014h. "Sugar From Mexico: Suspension of Countervailing Duty Investigation." *Federal Register* 79(248, December 29): 78044-51.
- U.S. Department of Energy, Energy Information Administration. 2015. "International Energy Statistics: Petroleum: Consumption: Motor Gasoline." Machine readable database. <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=5&pid=62&aid=2&cid=regions&syid=2010&eyid=2014&unit=TBDP>

- U.S. International Trade Commission (USITC). 2015a. *Sugar From Mexico: Investigation Nos. 701-TA-513 and 731-TA-1249 (Final)*. Publication 4577. November. https://www.usitc.gov/publications/701_731/pub4577.pdf.
- _____. 2015b. “Sugar from Mexico Injures U.S. Industry, Says USITC.” News Release No. 15-098. October 20. www.usitc.gov/press_room/news_release/2015/er102011513.htm.
- _____. 2015c. “USITC Determines That Injurious Effect of Imports of Sugar from Mexico is Eliminated by Commerce Suspension Agreements.” News release 15-023. March 19. www.usitc.gov/press_room/news_release/2015/er031911436.htm.
- Wagner, Owen C. 2007. *Impetus, Options and Consequences for Sugar Policy Reform in the United States*. Master of Science thesis, Agriculture and Applied Economics, Virginia Tech University, May 9. http://scholar.lib.vt.edu/theses/available/etd-11122007-160917/unrestricted/Owen_Wagner_Thesis_ETD.pdf.
- Watson, Elaine. 2016. “Ingredion Invests \$30m Into Expanding Production Capabilities in Mexico.” *FoodNavigator-USA.com*, January 15. <http://www.foodnavigator-usa.com/Suppliers2/Ingredion-invests-30m-into-expanding-production-in-Mexico>.
- White & Case, LLP. 2015. *Sugar from Mexico, Inv. Nos. 701-TA-513 and 731-TA-1249 (Final) – Petition for Review of Suspension Agreements to Eliminate the Injurious Effect of Subject Imports*. Public Document, Filed with the Office of the Secretary, U.S. International Trade Commission, Docket Number 3049, January 8. <https://www.crowell.com/files/Imperial-Sugar-Petition-to-ITC.pdf>.
- World Trade Organization (WTO). 2015a. “Antidumping: Technical Information.” Webpage. https://www.wto.org/english/tratop_e/adp_e/adp_info_e.htm#value.
- _____. 2015b. “Current Situation of Schedules of WTO Members: Mexico.” Webpage. https://www.wto.org/english/tratop_e/schedules_e/goods_schedules_table_e.htm.
- Zahniser, Steven. 2007. *NAFTA at 13: Implementation Nears Completion*. U.S. Department of Agriculture, Economic Research Service, Outlook Report No. WRS-07-01, March. www.ers.usda.gov/media/198746/wrs0701_1_.pdf.
- Zahniser, Steven, and Andrew Roe. 2011. *NAFTA at 17: Full Implementation Leads to Increased Trade and Integration*. U.S. Department of Agriculture, Economic Research Service, Outlook Report No. WRS-11-01, March. www.ers.usda.gov/media/129506/wrs1101.pdf.

Appendix A: Detailed explanation of how the Export Limits of the Countervailing Duty Suspension Agreement are calculated using the hypothetical example of FY 2014

To understand more fully how the Export Limits are calculated, we use FY 2014 (October 1, 2013, to September 30, 2014) as a hypothetical example. FY 2014 was the last fiscal year completed prior to the signing of the suspension agreements in December 2014. The relevant projections for the calculations come from the *WASDE* reports published in July 2013, September 2013, December 2013, and March 2014 (USDA/OCE/WAOB, 2013-14) and are presented in appendix table 1.

Initial Export Limit, July 2013. To determine the initial Target Quantity of U.S. Needs and Export Limit for FY 2014, we use the *WASDE* projections issued in July 2013. Based on the formula for calculating U.S. Needs as specified by the ADSA, we obtain the following result:

$$\begin{aligned} \text{U.S. Needs} &= (\text{Total Use} * 1.135) - \text{Beginning Stocks} - \text{Production} - \text{TRQ Imports} - \text{Other} \\ &\quad \text{Program Imports} - (\text{Footnote 5 for "other high tier"} + \text{"other"}) \\ &= (11,965 * 1.135) - 2,219 - 8,643 - 1,122 - 125 - 10 \\ &= 1,461.275 \text{ thousand STRV.} \end{aligned}$$

Multiplying this quantity by 70 percent indicates that the Export Limit for FY 2014 initially would have been set at 1,022.893 thousand STRV, had the ADSA been in effect at the time. Multiplying this Export Limit by 30 percent indicates that Mexico would have been allowed to export not more than 306.868 thousand STRV of sugar to the United States during the period from October 1 through December 31, 2013. In actuality, Mexico exported 595.02 thousand STRV of sugar to the United States during this period (table 61 in USDA/ERS, 2016c).

Revised Export Limit, September 2013. The Target Quantity and Export Limit for the fiscal year are reevaluated for the first time in September in order to determine if the Export Limit should be increased. For these calculations, we use estimates from the September 2013 *WASDE* and obtain the following result:

$$\begin{aligned} \text{U.S. Needs} &= (11,985 * 1.135) - 2,215 - 8,703 - 1,332 - 110 - 10 \\ &= 1,232.975 \text{ thousand STRV.} \end{aligned}$$

Multiplying this quantity by 70 percent indicates a possible new Export Limit for FY 2014 of 863.083 thousand STRV. However, given that this quantity is less than the Export Limit calculated using the July 2013 *WASDE*, the Export Limit calculated in July 2013 is not revised.

Revised Export Limit, December 2013. The Target Quantity and Export Limit for the fiscal year are reevaluated a second time in December in order to determine if the Export Limit should be increased. Applying data from the December 2013 *WASDE* to the U.S. Needs formula, we obtain the following result:

$$\begin{aligned} \text{U.S. Needs} &= (12,241 * 1.135) - 2,154 - 8,878 - 1,319 - 110 - 10 \\ &= 1,422.535 \text{ thousand STRV.} \end{aligned}$$

Multiplying this quantity by 80 percent indicates a possible new Export Limit for FY 2014 of 1138.028 thousand STRV. Since this quantity is greater than the Export Limit of 1022.893 thousand STRV that was determined using the July 2013 *WASDE*, the Export Limit for FY 2014 is revised upward to the new level of 1,138.028 thousand STRV. Multiplying the new Export Limit by 55 percent indicates that Mexico would have been allowed to export not more than 625.915 thousand STRV of sugar to the United States during the period October 1, 2013, through March 31, 2014, had the ADSA been in effect at that time. In actuality, Mexico exported 1,173.36 thousand STRV of sugar to the United States during this period (table 61 in USDA/ERS, 2016c).

Revised Export Limit, March 2014. The Target Quantity and Export Limit for FY 2014 are reevaluated for the third and final time in March to determine if the Export Limit should be increased. Using the March 2014 *WASDE* projections and the U.S. Needs formula presented previously, we obtain the following result for the Target Quantity:

$$\begin{aligned} \text{U.S. Needs} &= (12,376 * 1.135) - 2,160 - 8,715 - 1,319 - 110 - 10 \\ &= 1,732.760 \text{ thousand STRV.} \end{aligned}$$

Multiplying this quantity by 100 percent indicates a possible new Export Limit for FY 2014 of 1,732.760 thousand STRV. Since this quantity is greater than the Export Limit of 1138.028 thousand STRV that was calculated using the December 2013 *WASDE*, the Export Limit for FY 2014 is revised upward to 1,732.760 thousand STRV. In actuality, Mexico exported 2,123.94 thousand STRV of sugar to the United States in FY 2014—391.18 STRV (18 percent) more than Mexico would have been allowed to export had the ADSA been in effect (table 61 in USDA/ERS, 2016c).

Hypothetical target quantities of U.S. needs and export limits for FY 2014

	WASDE - Various estimates		
	U.S. sugar supply and use ¹		
	2013/14 projection July-13	2013/14 projection Sept.-13	2013/14 projection Dec.-13
Beginning stocks	2,219	2,215	2,154
Production ²	8,643	8,703	8,878
Beet sugar	4,890	4,950	5,025
Cane sugar	3,753	3,753	3,853
Florida	1,833	1,833	1,833
Hawaii	180	180	180
Louisiana	1,600	1,600	1,700
Texas	140	140	140
Imports	3,116	3,400	3,184
Tariff rate quota ³	1,122	1,332	1,319
Other program ⁴	125	110	110
Other ⁵	1,869	1,958	1,755
Mexico	1,859	1,948	1,745
Total supply	13,978	14,318	14,216
Exports	200	200	250
Deliveries	11,765	11,785	11,991
Food ⁶	11,580	11,600	11,490
Other ⁷	185	185	501
Miscellaneous	0	0	0
Total use	11,965	11,985	12,241
Ending stocks	2,013	2,333	1,975
Stocks-to-use ratio	16.8	19.5	16.1
Target U.S. needs	1,461.275	1,232.975	1,422.535
Export limit	1,022.893	1,022.893	1,138.028
Allowable exports, 10/1 to 12/31	306.868	306.868	341.408
Allowable exports, 10/1 to 3/31	562.591	562.591	625.915

¹Fiscal years beginning Oct 1. Historical data are from FSA "Sweetener Market Data" (SMD). ²Production projections for 2013/14 are based on Crop Production and processor projections where appropriate. ³For 2013/14, WTO TRQ shortfall see respective WASDE publication. ⁴Includes sugar under the re-export and polyhydric alcohol programs. ⁵For 2013/14, other high-tier (10) and other (0). ⁶Combines SMD deliveries for domestic human food use and SMD miscellaneous uses. ⁷Transfers to sugar-containing products for re-export, and for nonedible alcohol, feed, and ethanol.