**Suspension Agreements and Antidumping/Countervailing Duties: US-Mexico Sugar
Markets and the Effects of Alternative Trade Policies**

Jarrett Whistance
University of Missouri
WhistanceJL@missouri.edu

Andrick Payen
University of Missouri
Apcq5@mail.missouri.edu

Wyatt Thompson
University of Missouri
ThompsonW@missouri.edu

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Introduction

Although many changes were made to US agriculture policy in the Agricultural Act of 2014 (the "Farm Bill"), at least one set of provisions, those related to sugar, remained unchanged. However, that does not imply the domestic sugar industry has faced static market conditions that preempt changes in government support. For much of 2014, the US Department of Commerce (DOC) investigated allegations that Mexican sugar was sold below cost, or "dumped," in the US market to the detriment of US sugar producers. In December of that year, an agreement was reached in which the US would suspend antidumping and countervailing duty investigations and Mexico would abide by certain limits on sugar exports to the US. This study takes a closer look at the suspension agreement and potential antidumping/countervailing duties in the context of the US-Mexico sugar market structure and uses a partial-equilibrium model to assess the potential quantitative effects through counterfactual analyses.

US markets and policies

In the US, sugar is produced from both sugar beets and sugarcane. Sugar beets are grown primarily in the upper Midwest and Great Plains states including Minnesota, North Dakota, Idaho, and Michigan. Unlike sugar beets, sugarcane requires the southern, more tropical climates found in Florida, Louisiana, the Texas Gulf coast, and Hawaii. Historically, total sugar production has been split almost evenly between sugarcane and sugar beets, with sugar beets supplying the greater share (Figure 1). Domestic sugar consumption has trended upward for the past twenty years as have total sugar imports and the share of domestic consumption that is met with imports have risen, although the latter two have been more sporadic in nature (Figure 2).

Policies to support the sugar industry in the US have evolved over many years. Currently in the US, the sugar industry is supported primarily by four mechanisms that work in concert not

only to support the industry but also to ensure there is no domestic taxpayer burden (Jurenas 2012). First, there are non-recourse loans available to sugar processors for both raw cane sugar and refined beet sugar. To prevent domestic sugar prices from falling below the forfeiture threshold, processors face limits on how much sugar they can sell into the domestic market. These allotment quantities (OAQs) are determined each year by USDA, must be at least 85% of the estimated domestic food use, and are allocated among sugar processors according to prior sales and processing capacity. In addition, there are import restrictions in the form of tariff-rate quotas (TRQs) that limit sugar imports to some extent beyond WTO requirements and prior trade agreements. Finally, if forfeitures do occur, there is a program that auctions surplus sugar as a feedstock to domestic biofuel producers or animal feeding operations.

In addition to favorable weather conditions that bolstered US sugar production in 2013, a surge in sugar imports from Mexico, which was granted unrestricted access under the North American Free Trade Agreement (NAFTA), led to a sharp decline in US sugar prices that year. Despite the US policies that were in place, sugar prices fell below the forfeiture threshold. Late that year, trade groups associated with the sugar industry filed a petition with the US Trade Commission and Department of Commerce asking them to investigate the nature of Mexican sugar exports to the US. It was their belief that Mexican sugar, had been sold below cost (i.e. "dumped") in the US market, thus giving Mexican sugar producers an unfair advantage and driving down US sugar prices. In early 2014, the DOC initiated their antidumping and countervailing duty investigations, and in August of that same year, released their preliminary findings that corroborated the dumping allegations. The DOC response was twofold. First, they initiated preliminary antidumping and countervailing duties equal to the marginal benefits Mexican producers gained from the dumping activities. Second, the DOC proposed an agreement

to suspend their investigations and remove the preliminary duties conditional on an agreement from Mexican officials to limit sugar exports to the US. Negotiations were held between officials from both countries, and a final version of the agreement was signed in December 2014.

The terms of the suspension agreement restrict Mexican exports of sugar to the US to a level determined by estimated US sugar needs. According to the agreement, "US needs" for this purpose are defined as the difference between 113.5 percent of total US use and estimated US supply consisting of beginning stocks, production and imports from all countries excluding Mexico (McConnel and Riche 2015). The Mexican export limits are set initially to be 70 percent of the US needs calculation based on information available when the July WASDE is released. Those limits are effective October 1. In subsequent quarters of the fiscal year, that limit may be revised upward to 80 percent of the calculation based on the December WASDE or 100 percent of the calculation from the March WASDE (International Trade Administration 2014). Additional restrictions include export price floors of $0.26/lb. for refined sugar and $0.2225/lb. for raw sugar from Mexico and restrictions pertaining to timing and patterns of shipments from Mexico (McConnel and Riche 2015).

The market effects of the US sugar program have received considerable attention in the literature (Beghin and Elobeid 2015; Beghin et al. 2003; Leu, Schmitz, and Knutson 1987; Lewis 2014). One thread focuses primarily on the welfare cost while another thread looks at policy impacts with a particular emphasis on the NAFTA context (Abler et al. 2008; Knutson, Westhoff, and Sherwell 2010). The welfare cost studies relied on partial equilibrium frameworks and assessed the impacts on producer and consumer welfare by removing or reforming the features of the sugar program that were in effect at the time of the analysis. The models used in many of these studies are earlier versions of the one used here, as discussed later. In each case,

the authors found that, while the sugar program supports domestic producers and increases producer surplus, the trade distortions that occur reduce consumer surplus to a larger extent and result in net costs to society (i.e. "deadweight" losses).

The full implementation of NAFTA created an interesting twist in how the US sugar program worked. With NAFTA in effect, Mexico gained unrestricted access to the US market. In absence of those restrictions, sugar exports from Mexico to the US had the potential to increase rapidly and seriously undermine the viability of the US program supports (Abler et al. 2008). 2013 was not the first time sugar imports from Mexico were blamed for driving down US sugar prices and causing loan program forfeitures (Beghin et al. 2003). However, market factors in the US and abroad kept those potential consequences of NAFTA in check to some extent (Knutson, Westhoff, and Sherwell 2010).

Mexican markets and policies

Sugar production in Mexico is derived entirely from sugarcane. The largest share of sugar production occurs in the state of Veracruz, with the states of San Luis Potosi and Jalisco typically rounding out the top three. Domestic production and consumption have both trended upward in recent years (Figure 3). While sugar imports have remained fairly flat and contribute only a small share to total supply, sugar exports from Mexico have grown rapidly. The growth in exports, particularly those to the US, coincide with full implementation of NAFTA.

The sugar mill industry in Mexico has had a tumultuous past that includes several rounds of government intervention and restructuring. For a detailed discussion of the Mexican sugar industry and its history of government intervention, see Singelmann (2003) and Campos and Oviedo (2014), but a summary of the evolution suffices to establish the context of the present study. In the late 1970s, market conditions were such that a vast majority of sugar mills filed for

bankruptcy. The government at that time chose to step in and expropriate the troubled mills. During the following decade, the government had difficulty keeping the mills profitable so officials made the decision to re-privatize the industry. By 1992, all the mills were back under private ownership, though they were in financial trouble again by the early 2000s. The government intervened and expropriated 27 mills in 2001. Since then, the government has re-sold nearly all of those mills back to private firms. Other sugar-related policies in Mexico include the Law of Sustainable Development for Sugarcane that, among other items, specifies how much sugarcane growers are paid relative to the standard sugar reference price and when they might receive additional payments (Flores and Hernandez 2015).

Sugar policies of the US and Mexico can be compared using standardized support estimates of the transfers caused by agricultural policies (Organization for Economic Co-operation and Development 2014). These data indicate that the US and Mexico both provide support to domestic sugar producers relative to world prices and both rely on trade measures as one key element of that support. According to the OECD, the share of producer transfers in gross farm receipts relating to sugar averaged 17% in Mexico for 2004-13, varying between 0% and 37%. US agricultural policy accounted for 30% of gross sugar receipts and ranged from 6% to 55% during this same period. In both cases, the OECD's decomposition of support suggests that the vast majority of this support was caused by border measures, such as tariffs, that raise domestic prices rather than by direct payments to producers.

The OECD estimates are not all-inclusive, and could omit any implications associated with concentration of the industry. Although proving market structure does not fall within the scope of the present exercise, some observers might question if the role of the government in the sugar refining industry could have caused a non-competitive context. For example, if

government appropriation of sugar mills and continued involvement, albeit at a smaller scale, has influenced the decision making of refiners and caused them to act in ways that differ from the standard representation of competing firms, then past studies might overlook a key conditioning factor. Indeed, Mexico exports sugar to the US even though some data suggest that sugar prices are higher in Mexico than in the US. The assumption of a competitive market context might not be appropriate.

We explore this hypothetical possibility. Without testing for market structure, we assume two different market contexts in which the US-Mexico trade agreement could exist. In one case, we assume the standard competitive market environment in which trade is driven strictly by relative prices. In the second case, we assume an alternative market structure in which the refining sector allocates sugar to export or domestic markets to increase domestic producer returns, within some political limits. This latter case, then, implies that relative prices of US and Mexico markets alone do not drive trade, but instead that there are additional considerations as the hypothetical allocation problem takes into account the potential that shorting the more inelastic domestic market will increase average returns to Mexico sugar producers. By introducing two hypothetical market contexts, our assessment of the US-Mexico trade agreement is more robust than past studies of sugar policy, at least as regards this one element of the problem.

Method

The starting point for this analysis is a baseline set of crop, livestock, and bioenergy partial-equilibrium models developed and maintained by the Food and Agricultural Policy Research Institute at the University of Missouri (FAPRI-MU). There exists within that system a structural model of US and Mexican sugar markets that estimates supply and demand in both

regions and solves for the respective equilibrium raw sugar prices. The FAPRI-MU baseline, as a whole, generates projections of key supply, demand, and price variables for the 2014/15 to 2024/25 marketing years assuming current policies are in place (Westhoff et al. 2015). The baseline currently accounts for the US-Mexico suspension agreement but, for the purposes of this study, additional modifications were necessary to investigate the impacts of alternative policy and market structure scenarios. Data for this analysis were acquired primarily from the Economic Research Service (ERS) and Foreign Agriculture Service (FAS) branches of the USDA.[1]

As noted earlier, our aim in this study is to look at alternative policy scenarios under two different market structure assumptions. The FAPRI-MU baseline assumes a competitive market structure in both the US and Mexican sugar industries. As a counterpoint, there are studies that have discussed the possibility that government control of sugar mills in Mexico might allow for some level of non-competitive, or price-discriminating, behavior (Aguilar-Rivera et al. 2012; Calzado 2011). To that end, we developed an alternative model specification that assumed Mexican sugar producers at the mill level could identify two separate demand curves for their output: an inelastic domestic demand and a more elastic demand coming from the US. Moreover, the alternative specification allows mill producers to engage in price discrimination and increase their own returns by diverting more sugar to the elastic market and driving up prices in the inelastic domestic market. The hypothetical non-competitive case is not represented as a strict programming or maximization problem. Instead, assuming that there are numerous factors that could drive the allocation problem, possibly including some political or other limits on the price domestic consumers pay relative to other prices, we represent the allocation problem using (a) the gap between US and Mexico sugar prices and (b) indicators of domestic demand in Mexico.

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[1] For model documentation, please contact Jarrett Whistance, corresponding author, at WhistanceJL@missouri.edu

For the sake of comparison, this non-competitive baseline was calibrated to return market projections very similar to the competitive baseline.

In both baselines, the US-Mexico suspension agreement is assumed to be in effect and only marginally binding. In other words, Mexico reaches the export limit in early years of the projection period but falls slightly below it in later years. We have two alternative policy scenarios for each baseline:

i) *No suspension agreement, no antidumping/countervailing duties*

ii) *No suspension agreement, antidumping/countervailing duties in effect*

In the first case, we assume neither the suspension agreement nor the preliminary tariffs initiated by the DOC go into effect. In the latter, we still assume the suspension agreement is absent, but we impose the preliminary tariffs.

Results and Discussion

In both baselines, sugar production and consumption in the US grow moderately over the projection period while sugar imports remain mostly flat. Raw sugar prices in the US are projected to remain just over $0.26/lb., which is well above the loan rates for both cane and beet sugar. The policies that are in place achieve their dual purposes of supporting the domestic sugar industry while avoiding a taxpayer burden. In Mexico, there is similar growth in sugar production and domestic use. However, the effect of the suspension agreement is that sugar exports to the US fall sharply from the levels seen in recent years.

Competitive market structure scenarios

The results of these two scenarios highlight the importance of the degree to which the suspension agreement is binding. The agreement is only marginally binding in the baseline, so the impact of removing the policy is very small under a competitive market assumption. If the

competitive equilibrium level of Mexican sugar exports to the US does not push hard against the export limits outlined in the suspension agreement, then removing the agreement, and assuming there are not any antidumping/countervailing duties to take its place, would imply only very slight increases in exports to the US, on average. Most of the period average effects in this case are vanishingly small (Table 1).

Unlike a quantity restriction, a tariff is binding at all quantities. When the antidumping/countervailing duties are imposed, more pronounced market effects are observed. Sugar exports from Mexico to the US fall, on average, by 0.3 million short tons relative to the baseline. This negative shift in US supply leads to higher raw sugar prices in the US and an increase in domestic sugar production and an offsetting decrease in domestic demand. In Mexico, fewer exports implies there is more sugar available in the domestic market. Domestic sugar prices decrease, leading sugar production and consumption in Mexico to adjust accordingly.

Non-competitive market scenarios

In the non-competitive baseline (Table 2), the suspension agreement is binding to a degree similar to that of the competitive baseline. However, the assumed non-competitive behavior leads to a quite different set of market results when the agreement is no longer in effect and there are no antidumping/countervailing duties. Without the export limits in place, the assumed non-competitive response is to engage in further price discrimination. Mexico exports much more sugar to the US (i.e. the more elastic market), which leads to a more pronounced negative shift in Mexico's domestically available supply. Domestic sugar prices rise sharply in the face of inelastic domestic demand as does gross revenue. In the US, the raw sugar price falls by $0.016/lb., on average. Perhaps more importantly, the price falls low enough in the early

years of the projection period that loan forfeitures could occur, given these assumptions. Lower profitability implies less domestic sugar production, but there is an offsetting increase in domestic demand.

Relative to the non-competitive baseline, the antidumping/countervailing duties do not penalize Mexican sugar exports to the extent that exports to the US decrease in total. Sugar exports are much lower relative to the non-competitive, no policy case, but the non-competitive market response is still strong enough to imply a slight increase in exports relative to the baseline. Sugar prices and gross revenue in Mexico rise, but not as sharply as before. Raw sugar prices fall slightly in the US and lead to small changes in domestic production and demand. In the early years of the projection period, the raw sugar price is just low enough that some loan forfeitures might occur.

In the non-competitive scenarios, the year-by-year effects tell an interesting story as well. The non-competitive market assumption as implemented in this study applies only at the mill-level of the Mexican sugar supply chain. It might be conceivable that millers and cane-growers in a given region interact in such a way that sugarcane production is also involved in some sense. In this study, because we assume millers do not have any influence over sugarcane production, cane-growers in Mexico respond to the sharp increase in domestic sugar price early on by increasing production – a competitive market response. By bringing more land into sugarcane production initially, there is a lasting effect on sugarcane production for the rest of the projection period. This production response tempers the effect of assumed price-discriminating behavior at the mill-level, and domestic prices fall rapidly from their initial spike before leveling out at a more moderate level relative to the baseline. These results could be different under alternative assumptions about production response to changing market conditions and, in particular, any

extension of the hypothetical assumption about non-competitive market structure to the sugarcane deliveries to refineries.

Conclusion

The effects of the US-Mexico suspension agreement depend on an array of market factors in addition to underlying model assumptions. The key assumption explored here is the distinction between the impacts of various trade regimes in a mostly competitive market context or a hypothetical non-competitive market context. In both the competitive and non-competitive baselines, the suspension agreement was only marginally binding over the 2014/15-2024/25 projection period, but this circumstance is at least partly due to initial calibration. Removing the export limit outlined in the agreement has little effect under the competitive market assumption, given this context. A competitive equilibrium in the presence of a marginally binding quantity restriction is unlikely to change much in the absence of said restriction. Under the non-competitive assumption, the ability of Mexican sugar mill operators to engage in price discrimination is limited to some extent by the export restriction. Removing the restriction allows millers to send additional sugar to the more elastic US market while reducing the supply of sugar to the inelastic domestic market. Although the price they receive for sugar exports decreases, the increase in the domestic price is more than enough to increase their revenue relative to the baseline.

Although the antidumping/countervailing duties are binding at every quantity, their effects are not immune from market structure assumptions. In both structures, Mexican mill operators respond rationally to the lower export price they receive by cutting back exports to the US relative to a no tariff scenario. The difference is that, in the non-competitive case, there is still a motivation to send some additional exports to the US in spite of the even lower price they

receive in the export market. In this case, the effect of the antidumping/countervailing duties is not enough to overcome the ability of millers to increase their gross revenue by engaging in price discrimination.

There are caveats to this analysis as it relates to the non-competitive market structure assumption. We are not aware of any clear evidence of non-competitive behavior occurring in the Mexican sugar industry. While there have been such claims in previous literature, we do not make that claim in this study. In addition, data limitations make it difficult to draw strong conclusions in the non-competitive case. Even if a reader has reason to believe the sugar sector in Mexico to be non-competitive, the representation used here will not align exactly with the reader's understanding of how this arrangement works. Although further work is needed to refine how that behavior is represented in the model, the current representation provides for an interesting side-case to the competitive market structure assumption and is one that helps shed light on the impacts of the current sugar program and suspension agreement framework. In particular, results explored here suggest that the effect of different trade regimes might vary depending on market condition, and future scholarly studies might be more useful if they allow for this possibility or if they can test for the presence of non-competitive behavior.

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Table 1. Impacts of suspension agreement and antidumping/countervailing duties under competitive market structure assumption.

US Sugar Supply and Utilization

FY 2015-2024 Average, Changes relative to Base	Baseline	No suspension agreement, no AD/CV duties	No suspension agreement, AD/CV duties in effect
Sugar supply	(Millions short tons, raw value)		
Production	9.1	0.0	0.1
Beginning stocks	1.7	0.0	0.0
Imports	3.6	0.0	-0.3
Tariff-rate quota	1.4	0.0	0.0
Duty-free NAFTA	0.0	0.0	0.0
Other TRQ	1.4	0.0	0.0
Other program	0.4	0.0	0.0
High-tier and other	1.9	0.0	-0.3
Mexico	1.9	0.0	-0.3
Sugar disappearance	12.8	0.0	-0.1
Domestic deliveries	12.5	0.0	-0.1
Exports	0.3	0.0	0.0
Sugar ending stocks	1.7	0.0	0
Prices	(Cents per pound)		
N.Y. spot raw sugar	26.09	-0.06	0.63
Refined beet sugar	34.59	-0.09	0.87
Retail refined sugar	56.24	-0.12	1.03

Mexico Sugar Supply and Utilization

FY 2015-2024 Average, Changes relative to Base	Baseline	No suspension agreement, no AD/CV duties	No suspension agreement, AD/CV duties in effect
Sugar Supply	(Millions metric tons)		
Sugar production	6.9	0.0	-0.1
Beginning stocks	1.1	0.0	0.0
Sugar imports	0.2	0.0	0.0
Sugar disappereance	7.1	0.0	-0.2
Sugar domestic deliveries	5.1	0.0	0.1
Sugar exports	2.0	0.0	-0.3
(Exports to U.S.)	1.7	0.0	-0.3
(Other exports)	0.3	0.0	0.0
Sugar ending stocks	1.1	0.0	0.0
Prices	(Pesos per 50 kilograms)		
Standard sugar price	432	1	-54
Raw sugar price	422	0	-45
Refined sugar price	520	1	-57
	(billion pesos)		
Revenue	58	0	-7

Table 2. Impacts of suspension agreement and antidumping/countervailing duties under non-competitive market structure assumption.

US Sugar Supply and Utilization

FY 2015-2024 Average, Changes relative to Base	Baseline	No suspension agreement, no AD/CV duties	No suspension agreement, AD/CV duties in effect
Sugar supply	(Millions short tons, raw value)		
Production	9.1	0.0	0.0
Beginning stocks	1.7	0.0	0.0
Imports	3.6	0.7	0.1
Tariff-rate quota	1.4	0.0	0.0
Duty-free NAFTA	0.0	0.0	0.0
Other TRQ	1.4	0.0	0.0
Other program	0.4	0.0	0.0
High-tier and other	1.8	0.7	0.1
Mexico	1.8	0.7	0.1
Sugar disappearance	12.7	0.4	0.1
Domestic deliveries	12.5	0.4	0.1
Exports	0.3	0.0	0.0
Sugar ending stocks	1.7	0.0	0.0
Prices	(Cents per pound)		
N.Y. spot raw sugar	26.12	-1.58	-0.50
Refined beet sugar	34.63	-2.20	-0.69
Retail refined sugar	56.27	-2.96	-0.98

Mexico Sugar Supply and Utilization

| FY 2015-2024 Average, Changes relative to Base	Baseline	No suspension agreement, no AD/CV duties	No suspension agreement, AD/CV duties in effect
Sugar Supply	(Millions metric tons)		
Sugar production	6.9	0.3	0.0
Beginning stocks	1.1	0.0	0.0
Sugar imports	0.2	0.1	0.0
Sugar disappereance	7.1	0.5	0.1
Sugar domestic deliveries	5.1	-0.1	0.0
Sugar exports	2.0	0.6	0.1
(Exports to U.S.)	1.7	0.6	0.1
(Other exports)	0.3	0.0	0.0
Sugar ending stocks	1.1	0.0	0.0
Prices	(Pesos per 50 kilograms)		
Standard sugar price	431	79	7
Raw sugar price	422	42	2
Refined sugar price	520	83	8
	(billion pesos)		
Revenue	58	9	1

Figure 1. US sugar production by feedstock.
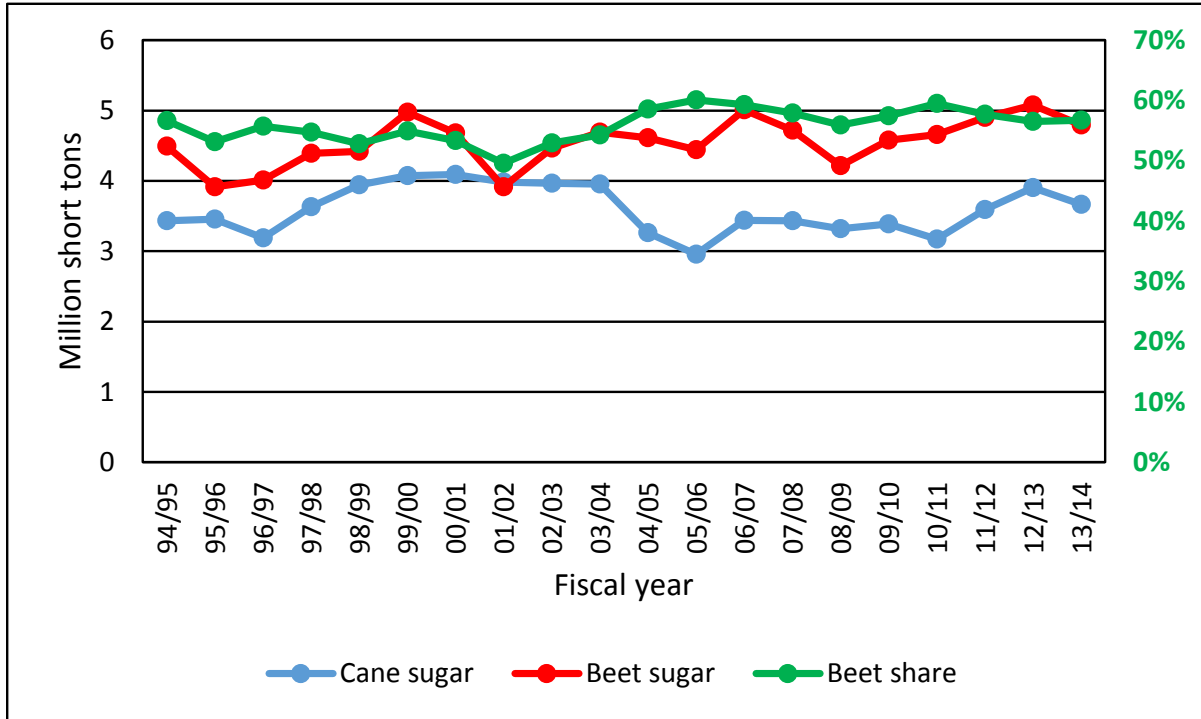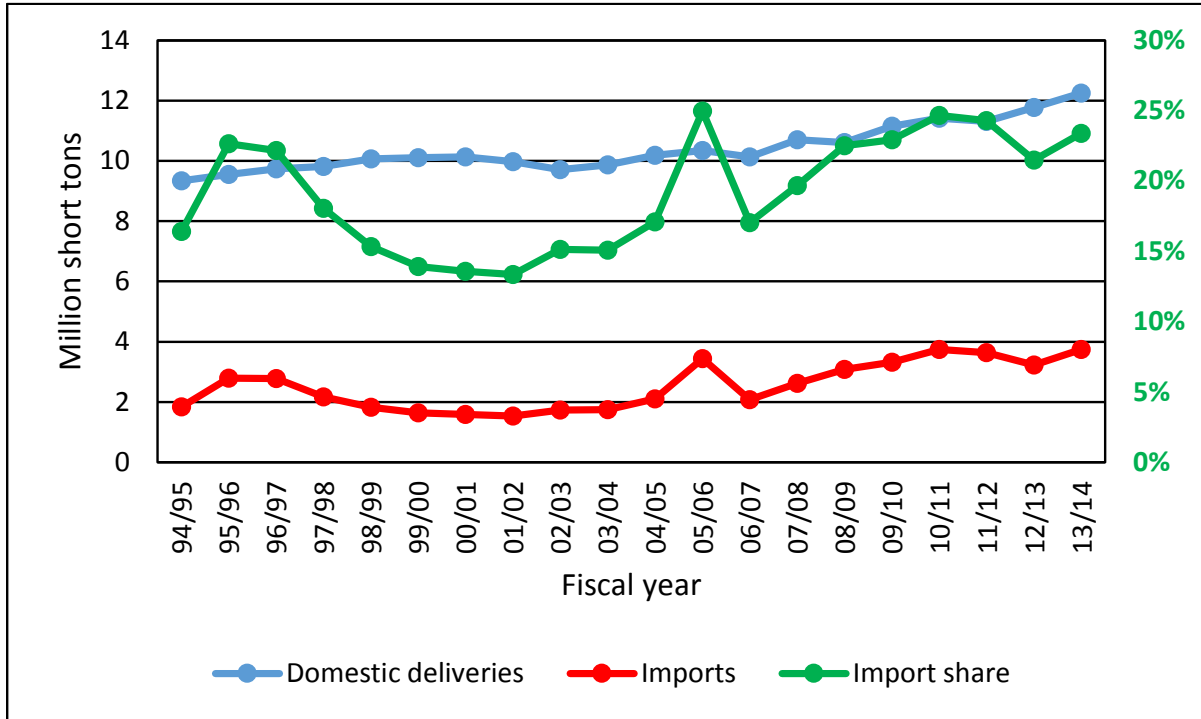
Figure 2. US sugar demand and imports.

Figure 3. Mexico sugar production, demand, and exports.