



Sugar and Sweeteners Outlook

Michael McConnell, coordinator

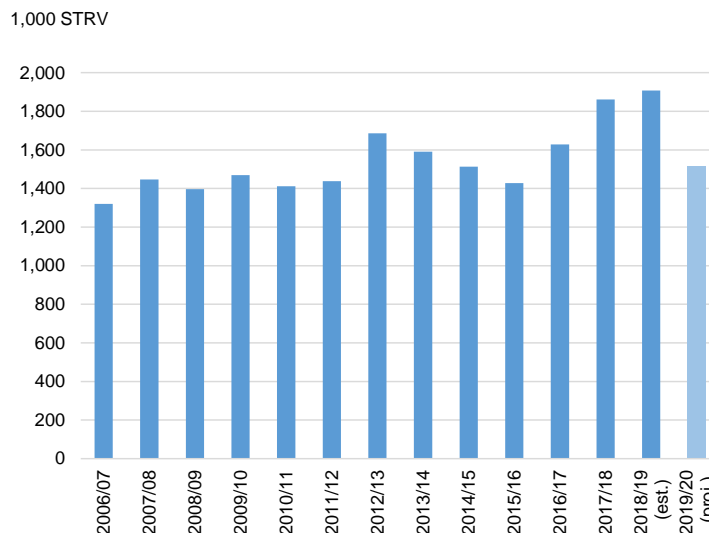
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Less Production in Louisiana Lowers U.S. Sugar Production Outlook for 2019/20

U.S. sugar production is lowered for 2019/20 in the January *World Agricultural Supply and Demand Estimates* (WASDE) due to a reduction in cane sugar production in Louisiana, more than offsetting an increase to beet sugar. Projected imports are raised, with more high-tier sugar expected to be imported due to high domestic prices. With no changes in projected use, ending stocks are lowered, resulting in a stocks-to-use ratio of 12.7 percent for the fiscal year.

The outlook for Mexico's sugar market in 2019/20 is largely unchanged from the December WASDE. Imports are raised slightly, with production, domestic deliveries, and exports all unchanged. Mexico's 2019/20 sugarcane harvest has gotten off to a slow start, but the production outlook remains unchanged—its peak harvest season is just getting underway, which should provide better insight into this year's crop potential.

Louisiana cane sugar production, 2006/07 to 2019/20



Source: USDA, Farm Service Agency; USDA, World Agricultural Outlook Board.

U.S. Domestic Outlook

Less Cane Sugar Production in Louisiana Lowers Domestic Outlook

The January *World Agricultural Supply and Use Estimate* (WASDE) projects domestic sugar production in 2019/20 at 8.158 million short tons, raw value (STRV)—a 123,000-STRV decrease from the previous month. If realized, this would be the lowest total domestic production total since 2010/11.

Table 1: U.S. sugar: supply and use, by fiscal year (Oct./Sept.), January 2020

Items	2017/18	2018/19	2019/20	2017/18	2018/19	2019/20
		(estimate)	(forecast)	(estimate)	(estimate)	(forecast)
	1,000 Short tons, raw value			1,000 Metric tons, raw value		
Beginning stocks	1,876	2,008	1,783	1,702	1,822	1,617
Total production	9,293	8,999	8,158	8,430	8,163	7,401
Beet sugar	5,279	4,939	4,444	4,789	4,480	4,032
Cane sugar	4,014	4,060	3,713	3,641	3,683	3,369
Florida	1,983	2,005	2,069	1,799	1,819	1,877
Louisiana	1,862	1,907	1,513	1,689	1,730	1,372
Texas	169	147	131	153	134	119
Hawaii	0	0	0	0	0	0
Total imports	3,277	3,070	3,881	2,973	2,785	3,521
Tariff-rate quota imports	1,663	1,541	1,604	1,509	1,398	1,455
Other program imports	326	438	350	296	397	318
Non-program imports	1,287	1,092	1,927	1,168	990	1,748
Mexico	1,223	1,000	1,827	1,110	908	1,657
High-duty	64	91	100	58	83	91
Total supply	14,445	14,077	13,821	13,105	12,770	12,538
Total exports	170	35	35	154	31	32
Miscellaneous	82	28	0	75	26	0
Deliveries for domestic use	12,185	12,231	12,230	11,054	11,096	11,095
Transfer to sugar-containing products for exports under re-export program	110	98	80	100	89	73
Transfer to polyhydric alcohol, feed, other alcohol	28	27	25	25	25	23
Commodity Credit Corporation (CCC) sale for ethanol, other	0	0	0	0	0	0
Deliveries for domestic food and beverage use	12,048	12,106	12,125	10,930	10,982	11,000
Total use	12,438	12,294	12,265	11,283	11,153	11,127
Ending stocks	2,008	1,783	1,556	1,822	1,617	1,412
Private	2,008	1,783	1,556	1,822	1,617	1,412
Commodity Credit Corporation (CCC)	0	0	0	0	0	0
Stocks-to-use ratio	16.14	14.50	12.69	16.14	14.50	12.69

Source: USDA, Economic Research Service, Sugar and Sweeteners Outlook.

Poor weather and harvesting conditions in Louisiana have dramatically reduced the outlook for cane sugar production for the current fiscal year. U.S. cane sugar production in 2019/20 is projected to be 3.713 million STRV, a 199,000-STRV reduction from the previous year. The reduction is entirely accounted for by lower production in Louisiana, now projected to produce 1.513 million STRV. The reduction is based on preliminary industry reports, with the harvest coming to a close in early January, as well as on early-season September 2020 production being in line with recent averages. The National Agricultural Statistics Service (NASS) also reduced its outlook for Louisiana sugarcane production in its January *Crop Production 2019*

Summary, lowering projected yields. Cane sugar production in Florida and Texas remains unchanged at 2.069 million STRV and 131,000 STRV, respectively. NASS slightly lowered its sugarcane yield forecasts for each State, but the changes did not merit a change to the cane sugar outlook.

Table 2: U.S. sugarcane and cane sugar production, by State, 2015/16 to 2019/20

	2015/16	2016/17	2017/18	2018/19	2019/20	Annual change Percent
Florida						
Sugarcane harvested for sugar (1,000 acres)	398	392	397	397	395	-0.5
Sugarcane yield (short tons per acre)	42.5	40.3	40.9	41.7	41.6	-0.2
Sugarcane production (1,000 short tons)	16,915	16,120	16,237	16,555	16,432	-0.7
Recovery rate (percent)	12.8	12.7	12.2	12.1	12.6	4.0
Sugar production (1,000 STRV)	2,173	2,055	1,983	2,005	2,069	3.2
Louisiana						
Sugarcane harvested for sugar (1,000 acres)	385	400	414	425	442	4.0
Sugarcane yield (short tons per acre)	29.6	28.8	32.5	35.3	28.5	-19.3
Sugarcane production (1,000 short tons)	11,396	11,520	13,455	15,003	12,597	-16.0
Recovery rate (percent)	12.5	14.2	13.8	12.5	12.0	-3.9
Sugar production (1,000 STRV)	1,428	1,632	1,862	1,875	1,513	-19.3
Texas						
Sugarcane harvested for sugar (1,000 acres)	35	38	41	38	32	-16.2
Sugarcane yield (short tons per acre)	31.4	37.0	36.8	36.6	36.3	-0.8
Sugarcane production (1,000 short tons)	1,105	1,395	1,490	1,376	1,143	-16.9
Recovery rate (percent)	10.5	9.9	11.3	10.7	11.5	7.1
Sugar production (1,000 STRV)	116	138	169	148	131	-11.0

Source: USDA, Farm Service Agency; USDA, National Agricultural Statistics Service.

The reduction in cane sugar production is slightly offset by the sugarbeet sector. Beet sugar production is raised 77,000-STRV from the December WASDE, totaling 4.444 million STRV. NASS lowered its reported sugarbeet production in the January *Crop Production 2019 Summary* report compared with its previous published forecast in the November *Crop Production* report, from 29.498 million short tons to 28.600 million short tons. The NASS figure was larger than the sugarbeet forecast used in the December WASDE, which was based on processors' reporting in the Farm Service Agency's (FSA) *Sweetener Market Data*. As a result, beet sugar production is raised in the January WASDE.

Table 3: Beet sugar production projection calculation, 2018/19 and 2019/20

	2015/16	2016/17	2017/18	2018/19	2019/20	2019/20	2019/20
					November	December	January
Sugarbeet production (1,000 short tons) 1/	35,371	36,881	35,325	33,282	29,498	28,051	28,600
Sugarbeet shrink	6.5%	8.3%	7.3%	5.2%	3.6%	4.0%	4.0%
Sugarbeet sliced (1,000 short tons)	33,066	33,834	32,742	31,561	28,422	26,928	27,456
Sugar extraction rate from slice	14.58%	13.72%	15.18%	14.77%	14.58%	14.58%	14.58%
Sugar from beets slice (1,000 STRV) 2/	4,820	4,643	4,970	4,660	4,144	3,926	4,003
Sugar from molasses (1,000 STRV) 2/	380	352	368	352	350	350	350
Crop-year sugar production (1,000 STRV) 2/	5,201	4,995	5,338	5,012	4,494	4,276	4,353
August-September sugar production (1,000 STRV)	688	606	715	655	580	582	582
August-September sugar production of subsequent crop (1,000 STRV)	606	715	655	582	633	633	633
Sugar from imported beets (1,000 STRV) 3/	--	--	--	--	40	40	40
Fiscal year sugar production (1,000 STRV)	5,119	5,103	5,279	4,939	4,588	4,367	4,444

Notes: 1/ USDA, National Agricultural Statistics Service for historical data; USDA WAOB for 2019/20 December estimate. 2/ August-July basis. 3/ Sugar from imported beets split out for projections only, included in total once full crop-year slice is recorded. Sugar from imported beets is incorporated into total production in historical data.

Source: USDA, Economic Research Service and World Agricultural Outlook Board.

The 2019/20 sugarbeet crop was eventful from beginning to end, with weather conditions delaying planting progress, affecting growing conditions, delaying harvesting progress, and resulting in large amounts of unharvested acres. The *Crop Production 2019 Summary* slightly increased the national planted area to 1.132 million acres (1,400-acre increase from the previous forecast) and the harvested area to 979,000 acres (8,000-acre increase from the

previous forecast). As a result, unharvested area declined to about 14,000 acres, less than forecast in November, but still the largest amount since the beginning of the 21st century. The estimate for the national sugarbeet yield was lowered by NASS, however, from 30.4 tons per acre to 29.2. This would be the lowest yield since 2014/15.

Table 4: Sugarbeet production, 2015/16 to 2019/20, January 2020

State	2016/17	2017/18	2018/19	2019/20		Monthly change	Annual change percent
				November (for.)	January (est.)		
				<i>1,000 short tons</i>			
Minnesota	12,510	12,515	10,486	8,878	8,400	-478	-19.9
North Dakota	6,252	6,445	5,731	4,187	4,420	233	-22.9
Idaho	7,038	6,507	6,602	6,640	6,435	-205	-2.5
Michigan	4,589	3,604	4,307	4,046	4,147	101	-3.7
Nebraska	1,411	1,437	1,407	1,212	1,069	-143	-24.0
Montana	1,586	1,396	1,319	1,323	1,153	-170	-12.6
Wyoming	951	891	946	857	679	-178	-28.2
Colorado	927	1,035	831	816	749	-67	-9.9
Oregon	428	334	366	381	377	-4	3.0
Washington	91	87	87	96	91	-5	4.6
U.S. Total	36,920	35,317	33,282	29,498	28,600	-898	-14.1

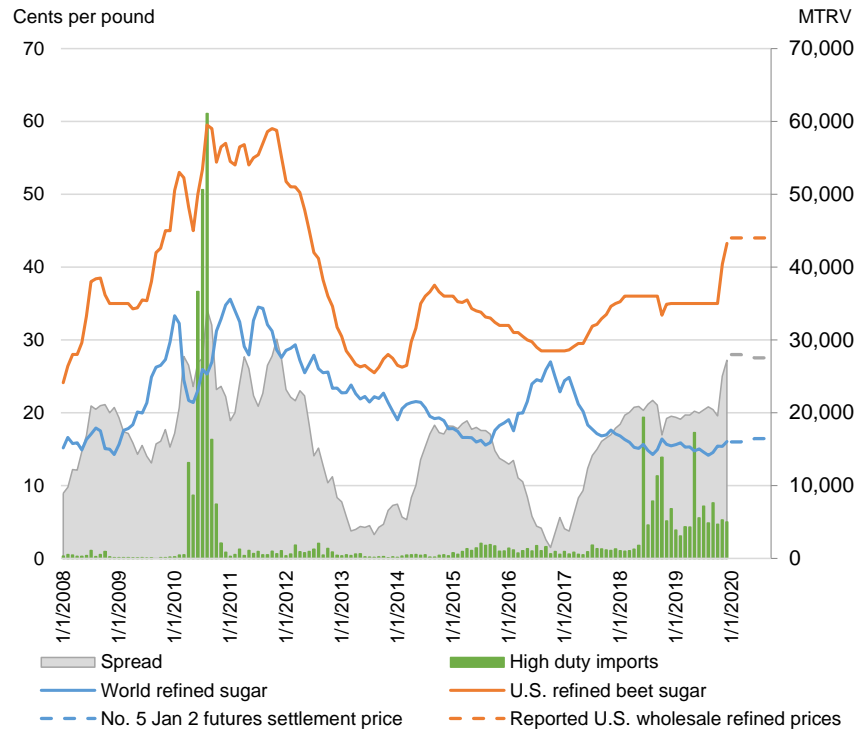
Source: USDA, National Agricultural Statistics Service.

High Domestic Prices Expected To Result in Increased High-Tier Imports

The reduced outlook for domestic sugar production is expected to lead to a substantial year-over-year increase in imports. Compared with the previous month's projection, lower imports from free-trade agreements (FTAs) are more than offset by increased imports from high-tier imports. Sugar imports in 2019/20 are projected to total 3.881 million STRV—20,000-STRV higher than the December WASDE. Imports under quota programs are lowered 10,000 STRV, as reported entries from for the completed 2019 calendar year were lower than previous expectations, particularly under the Panama, CAFTA/DR, and Colombia FTAs.

High-tier imports, which enter out-of-quota with higher duty rates, are raised 30,000 STRV to total 100,000 STRV projected for the year. The increased total is due to the current heightened pace reported through December by the Foreign Agricultural Service (FAS), as well as the current price differential between the world refined sugar prices in the futures market and the current spot price reported by Milling and Baking. Since mid-November, when the challenging sugarbeet harvest conditions began to impact the market, the differential between the domestic and world refined sugar prices has been large enough to allow imported sugar to become less expensive than domestic sugar for most regions of the country, even with the full duty rates and cost of additional freight applied.

Figure 1
U.S. and World refined sugar prices, monthly, January 2008 to September 2020



Source: USDA, Economic Research Service.

Projected Total Use Unchanged, Stocks Lowered for 2019/20

No changes are made to projected sugar use for 2019/20, with total use projected at 12.230 million STRV. Domestic deliveries for food and beverage use are projected at 12.125 million STRV, also unchanged from the previous month, representing a 0.2-percent increase from 2018/19 totals. Through the first 2 months of the fiscal year, food and beverage deliveries were 0.2 percent lower than the same period the previous year.

Table 4: Food and beverage deliveries, 2014/15 to 2019/20, October through November

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	Annual change
	<i>1,000 STRV</i>						<i>Percent</i>
Beet sugar processors	856	731	886	989	886	904	2.0
Cane sugar refiners	1,088	1,098	1,095	1,044	1,122	1,079	-3.8
Total reporters	1,944	1,829	1,981	2,033	2,008	1,982	-1.3
Nonreporter, direct consump	30	32	127	84	178	199	11.9
Total deliveries	1,973	1,861	2,108	2,116	2,186	2,182	-0.2
Final fiscal year deliveries 1/	11,921	11,881	12,102	12,048	12,106	12,125	0.2

1/ Latest WASDE estimate for 2019/20

Source: USDA, Farm Service Agency.

Ending stocks are projected to be 1.556 million STRV, a 100,000-STRV reduction from the previous month due to the lower supply outlook. If realized, that would result in a 12.7 percent stocks-to-use ratio, which would reflect the tightest market since 2010/11.

Mexico Outlook

Mexico Outlook Largely Unchanged, Harvest Off to Slow Start

Mexico is projected to have 7.029 million metric tons, actual value (MT) of sugar for 2019/20, a slight 4,000-MT increase from the December report. The only change from the previous month is a 4,000-MT increase in expected imports for consumption.

Table 5: Mexico sugar supply and use, 2017/18 - 2018/19 and projected 2019/20, January 2020

Items	2017/18	2018/19 (estimate)	2019/20 (forecast)
1,000 metric tons, actual weight			
Beginning stocks	1,002	1,395	1,169
Production	6,010	6,426	5,772
Imports	220	85	89
Imports for consumption	132	22	24
Imports for sugar-containing product exports, IMMEX 1/, other	88	63	65
Total supply	7,232	7,905	7,029
Disappearance			
Human consumption	4,228	4,092	4,057
For sugar-containing product exports (IMMEX)	482	460	435
Other deliveries and end-of-year statistical adjustment	29	-20	0
Total	4,739	4,532	4,492
Exports	1,099	2,204	1,603
Exports to the United States & Puerto Rico	1,047	856	1,563
Exports to other countries	52	1,348	40
Total use	5,838	6,737	6,095
Ending stocks	1,395	1,169	934
1,000 metric tons, raw value			
Beginning stocks	1,062	1,478	1,239
Production	6,370	6,811	6,118
Imports	234	90	94
Imports for consumption	140	23	25
Imports for sugar-containing product exports (IMMEX)	93	67	69
Total supply	7,666	8,380	7,451
Disappearance			
Human consumption	4,482	4,337	4,300
For sugar-containing product exports (IMMEX)	510	488	461
Other deliveries and end-of-year statistical adjustment	31	-21	0
Total	5,023	4,804	4,761
Exports	1,165	2,337	1,700
Exports to the United States & Puerto Rico	1,110	908	1,657
Exports to other countries	55	1,429	42
Total use	6,188	7,141	6,461
Ending stocks	1,478	1,239	990
Stocks-to-human consumption (percent)	33.0	28.6	23.0
Stocks-to-use (percent)	23.9	17.3	15.3
High-fructose corn syrup (HFCS) consumption (dry weight)	1,593	1,528	1,520

1/ IMMEX = Industria Manufacturera, Maquiladora y de Servicios de Exportación.

Source: USDA, *World Agricultural Supply and Demand Estimates* and

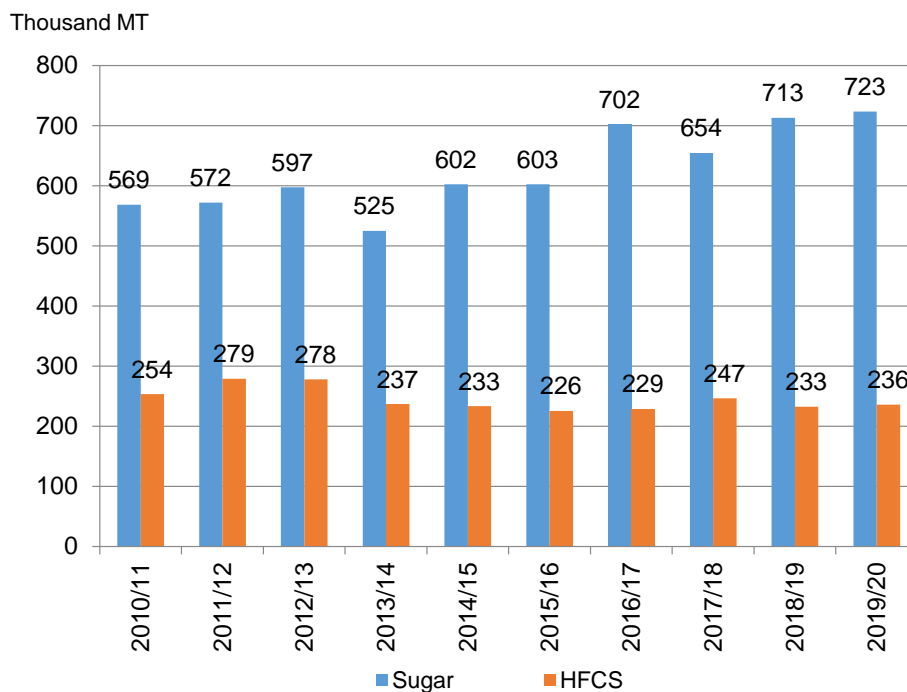
Economic Research Service, *Sugar and Sweeteners Outlook*; Conadesuca.

Mexico is projected to produce 5.772 million MT of sugar in 2019/20, unchanged from the previous month, but a 10.2-percent decrease from 2018/19. The substantial year-over-year decline is due to drought conditions throughout much of Mexico’s sugarcane-growing regions that have lowered the yield expectations for this year’s crop. The sugar-producing region along the Gulf of Mexico has seen particularly severe drought conditions over the past several months. This region accounts for much of the exports shipped to the United States, particularly raw sugar shipped to U.S. refineries. Through January 4, Mexico sugarcane mills had harvested about 102,000 hectares of sugarcane compared with 139,000 hectares the previous year—27 percent behind the previous year’s pace. The current pace of the harvest suggests that there may be downward pressure on the current production forecast. Part of the reason for the slow pace is the late start for many of the country’s mills—some of which were delayed by several weeks. The upcoming weeks, typically when the country begins its peak harvest season, should provide insightful information about the potential of drought-impacted crop.

Mexico Domestic Deliveries and Export Projections Unchanged from Previous Month’s Forecast

Deliveries for domestic consumption in 2019/20 are unchanged from the previous month’s report, totaling 4.057 million MT. Likewise, domestic deliveries of high-fructose corn syrup (HFCS) are also unchanged from the previous month at 1.520 million MT. Through the first two months of the fiscal year, deliveries of both sugar and HFCS are higher than the same period the previous year—each 1.5 percent higher than the 2018/19 totals over the same time period. Historically, the first few months of the fiscal year do not reveal significant trends that can be extrapolated out to the full fiscal year, however.

Figure 2
Mexican sweetener consumption October to November, 2010/11 to 2019/20



Source: Conadesuca.

Exports also remain unchanged from the December report, totaling 1.603 million MT. This includes 1.563 million MT expected to be shipped to the United States and the remaining 40,000 MT to be shipped to other countries. With the increase in U.S. Needs calculated by the U.S. Department of Commerce from the December 2019 WASDE, exports to the United States are expected to be substantially larger than in 2018/19. Mexico is expected to fulfill the current U.S. Needs volume for 2019/20. Given the potential for reduced supplies in Mexico, as well as increased U.S. Needs, constrained availability of sugar for export could become an issue for the current fiscal year. Whether, and to what degree, that becomes an issue will be determined by changes to the outlook for both countries in the coming weeks and months.

Special Article: Trends in U.S. Deliveries

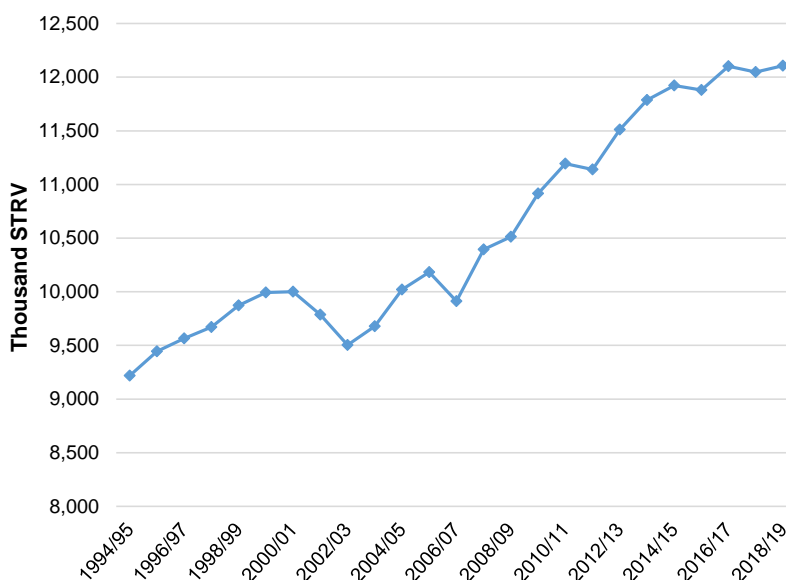
Lower Growth in U.S. Sugar Deliveries: Separating the Signal from the Noise

Since the beginning of the 21st century, the long-term drivers for growth in U.S. sugar deliveries have been:

- Declining per capita total caloric sweetener consumption since 1999
- Refined sugar obtaining an increased share of the caloric sweeteners market, primarily at the expense of corn sweeteners like HFCS, since the mid-2000s, and
- Increased availability of refined sugar since the implementation of NAFTA's sweetener provisions in 2008 increased sugar imports from Mexico.

Deliveries for food and beverage use increased at an annual rate of 1.7 percent between FY2005 and FY2015, significantly stronger than the 0.8-percent annual growth between FY1995 and FY2005. The past few years have seen the growth in food and beverage deliveries stall, however. The average annual growth rate between FY2015 and FY2019 has been just 0.4 percent. An important question concerning the market's recent change in trend has been: Is this a gradual flattening of the factors behind the period of strong growth? Or has there been a structural change in the market, similar to what occurred around the time of NAFTA's implementation for the sugar market?

Figure 3
U.S. sugar deliveries for food and beverage use, fiscal year, 1994/95 to 2018/19

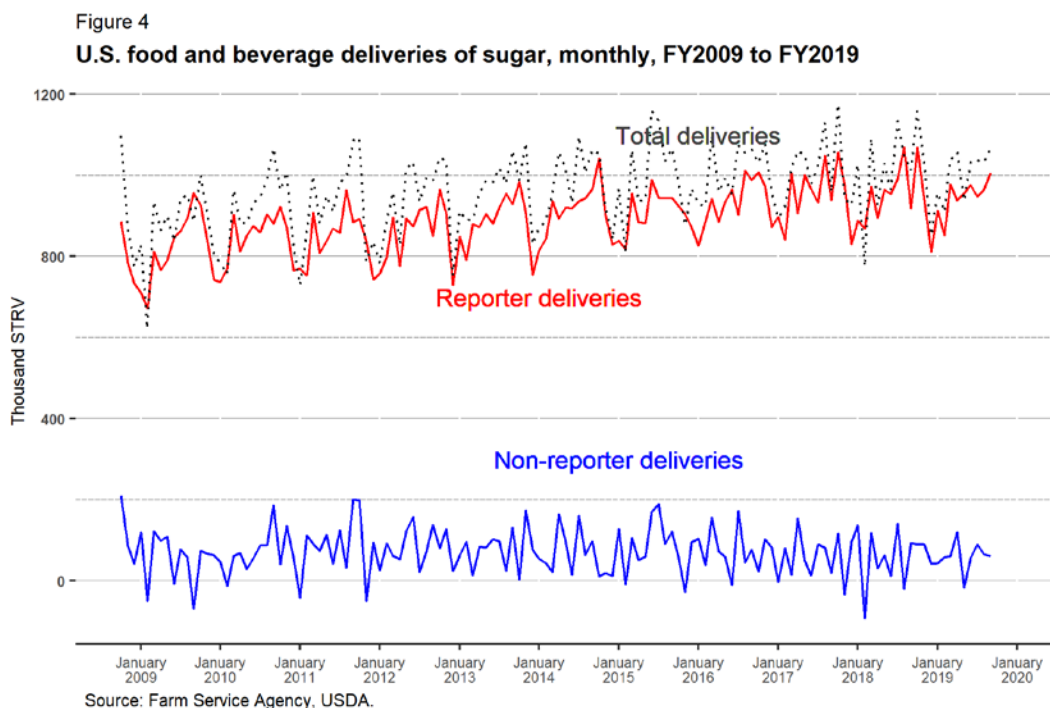


Source: USDA, Farm Service Agency.

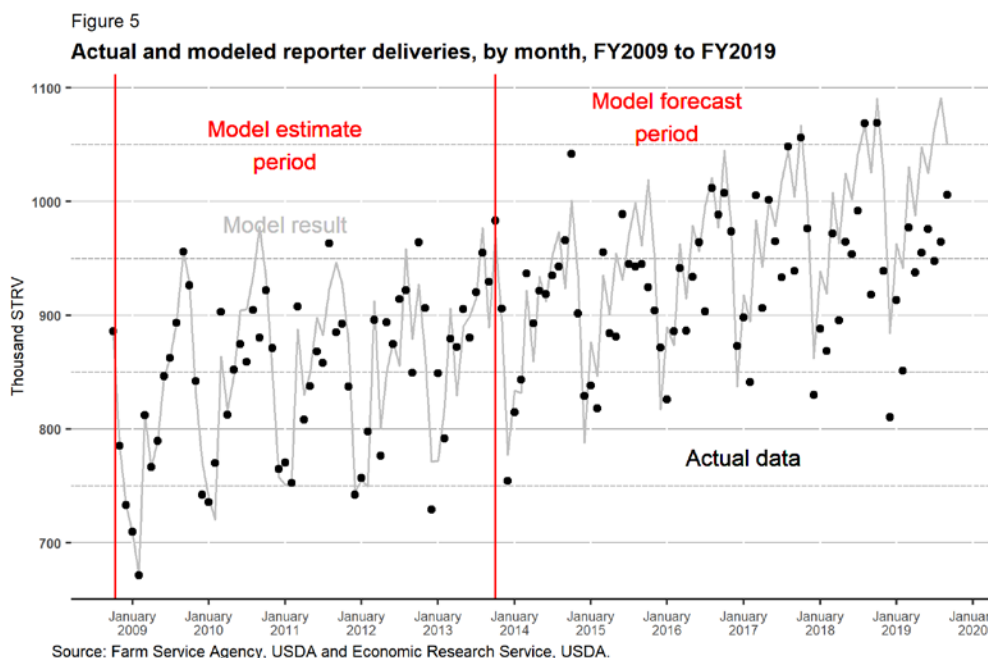
The U.S. sugar market has had significantly lower growth in deliveries, but it has also experienced a number of policy-related market shocks that created more variability in the data measuring U.S. sugar deliveries. These include: the antidumping/countervailing duty (AD/CVD) case against sugar imported from Mexico in 2014; the subsequent Suspension Agreements incorporated in 2015 and renegotiated in 2017; the deliberation and implementation of federally mandated biotechnology labelling laws in 2016; and the FDA’s implementing of new regulations requiring additional disclosure of sugar content on nutrition labels beginning in 2016. These events complicate the analysis, since it is difficult to determine whether monthly, quarterly, or annual changes are the result of underlying, long-term factors or a response to short-term market events. A better understanding of what is driving the changes in deliveries would help to improve forecasts in both the short term and long term. In fact, the following analysis was included in the ICEC’s discussion for recent WASDE publications, as well as in the most recent *Long-term Projections* report released in November 2019.

The analysis is made up of several steps. The first step is to use a univariate time-series forecasting technique—specifically an Autoregressive Integrated Moving Average (ARIMA) model—to estimate sugar deliveries from one time period. The second step is to “forecast” the subsequent period. The final step is to evaluate the residuals—or differences between the estimate and the actual results—to determine if any patterns developed; in other words, to simulate a forecast to create a baseline for comparison and see how well that forecast performs against the actual market data.

The ARIMA model used for this analysis only includes monthly deliveries from cane sugar refineries and beet sugar processors that report deliveries directly to the USDA’s sugar program, as published in the SMD. Nonreporter deliveries, made up of imports of sugar used for direct consumption, make up less than 10 percent of annual food and beverage deliveries. They contribute a disproportionate amount of the variability in the monthly data due to market forces, as well as the way nonreporter data is collected, which relies on combining information from distinct reporting systems.



An ARIMA model was chosen to provide the estimated baseline because it can capture relationships in trends and seasonal patterns, particularly pertinent to this case since sugar deliveries in the United States are not sensitive to changes in price or income. The model estimated reporter deliveries from FY2009 to FY2013.¹ The beginning of the estimation period corresponds to the first full fiscal year after the implementation of NAFTA, and the end corresponds to the last year before the first major market shock: the 2014 AD/CVD investigations. From FY2014 to FY2019, the estimated model is projected forward to create the baseline “forecast” on which the actual deliveries data is compared.



Evidence of Structural Change in U.S. Sugar Market Since FY2018

An initial glance at Figure 5 shows that the model estimate holds up at the beginning of the forecast period but the reported data begins to diverge toward the end. This is more pronounced in the monthly residuals, shown in Figure 6. If the residual pattern from FY2010 to FY2013 looks similar to the pattern in FY2014 to FY2019, then it would be reasonable to assume that the underlying factors affecting the market in each period have been unchanged. Differences in residual patterns, however, suggest the potential that a structural break occurred.

¹ The specification of the ARIMA model used is nonseasonal parts (1, 1, 3) and seasonal parts (1, 1, 0), based on a 12-month seasonal frequency.

Figure 6

Reporter deliveries, deviation from forecast, 90 percent confidence interval, by month, FY2010 to 2019

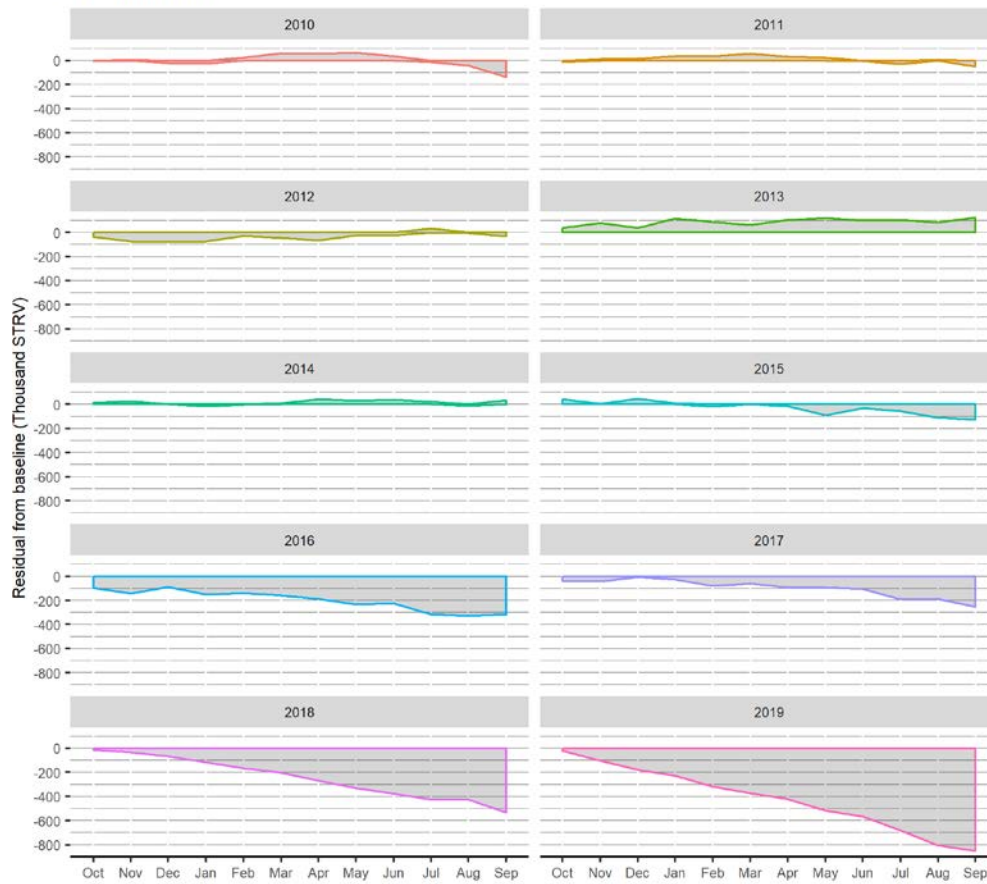


There are three important patterns to note between the estimation period and the forecast period. First, beginning in FY2015, the scale of the residuals becomes bigger. This suggests that the market events during this period created additional volatility in the deliveries market. From FY2015 to FY2017, the cumulative annual residuals were also negative, but not to a statistically significant degree, and the pattern of alternating positive and negative residuals is still present. This could suggest that market uncertainties slowed the rate of deliveries or that there was a gradual slowing of the growth drivers for sugar deliveries.

Second, the residuals are also almost exclusively negative beginning in FY2018. This strongly suggests that the estimated model is no longer a valid representation of the market as the data diverges further and further from the modeled result—or, more simply, that a structural break occurred in the market. Indications of the break begin to show by late FY2017, as that is when actual data begins to diverge away from the model results without any evidence of a corresponding “correction.” This is better illustrated in Figure 7, which shows the cumulative residual for each fiscal year. By FY2018, the divergence between the model and the actual data is clear and statistically significant.

Figure 7

Reporter deliveries, deviation from forecast, cumulative annually, by month, FY2010 to 2019



Source: Economic Research Service, USDA.

The final pattern to recognize is that the residuals tend to get larger as the year progresses, particularly in FY2018 and FY2019. This suggests that there has been a change in the seasonal patterns of deliveries in the U.S. market, as the months in the second-half of the fiscal year deviated further from the model estimate than the early months. This has been evident in the evolution of WASDE forecasts for domestic deliveries over the past several years, as early months often suggest relatively stronger demand, only to have forecasts revised later in the year when reported deliveries from the summer months come in below expectations.

The important take-away from this analysis is stronger evidence that the U.S. sugar market may have experienced a structural change beginning around FY2018, similar in significance to the change that occurred around the 2008 NAFTA sweetener provision implementation. Overall, the model results show strong evidence that the recent flattening of U.S. sugar delivery growth is not simply a continuation of a longer trend. While policy-related market shocks increased the variability of deliveries data for several years, it isn't until FY2018 that the market displays a clear departure from the drivers established between FY2009 and FY2013. Finally, in addition to a change in the rate of growth, there has been a change in the seasonal patterns for the scale and timing of peaks and troughs for deliveries within the fiscal year.

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