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FY 2013 Sugar Outlook—A Method for Analyzing Excess Supply

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This chapter describes a stochastic modeling approach for quantitatively analyzing possible outcomes resulting from a higher than average U.S. sugar supply this fiscal year. The first two sections give policy and outlook background. The modeling approach is then described through a scenario that captures some of the characteristics of the current sugar situation. Although the scenario is hypothetical, it shows how more detailed analysis could be used to analyze policy outcomes for agricultural economists, both within and outside the U.S. Department of Agriculture (USDA).

Background: Sugar in the 2008 Farm Act

The 2008 Farm Act provides for the USDA to make loans available to processors of domestically grown sugarcane and domestic processors of sugarbeets at set loan-rate levels for fiscal years (FY) 2009-13. Loans are taken for a maximum term of 9 months and must be liquidated, along with interest charges and other expenses, by the end of the fiscal year in which the loan was made. The loans are nonrecourse. When a loan matures, the USDA's Commodity Credit Corporation (CCC) must accept sugar pledged as collateral as payment in full in lieu of cash repayment of the loan, at the discretion of the processor. The processor is not required to notify the USDA of the intention to forfeit the sugar under loan.

The loan rates for raw cane and beet sugar are set in the 2008 Farm Act. The FY 2013 loan rate for raw cane sugar is 18.75 cents per pound (lb), and the loan rate for refined beet sugar is 128.5 percent of the loan rate for raw cane sugar, or 24.09 cents per lb. Table A-1 shows loan rates for both raw cane and refined beet sugar for the regions where these products are processed, along with loan costs that must be repaid. If market sale prices are below these amounts at the time of loan repayment, then processors have the incentive to forfeiture the sugar pledged as collateral in repayment of the loan.

The 2008 Farm Act established the Feedstock Flexibility Program. This program operates to avoid sugar loan forfeitures by requiring the diversion of sugar from food use to ethanol production. On September 1 (1 month before the end of the marketing year), the Secretary of Agriculture announces the amount of sugar (if any) for the CCC to purchase and to be

Table A-1 -- Calculation of minimum sugar prices to avoid forfeiture for fiscal year 2013

Calculation of minimum raw sugar price to discourage forfeiture
If the borrower redeems the loan, would have to pay the following costs:

Item	State			
	Florida	Hawaii	Louisiana	Texas
	Cents per pound			
Regional loan rates	18.13	17.57	19.46	18.88
Transportation costs	2.66	2.95	1.06	1.47
Location discounts	0.00	0.27	0.25	0.43
Interest expense	0.15	0.15	0.16	0.16
Minimum price to avoid forfeiture	20.94	20.94	20.94	20.94

Calculation of minimum beet sugar price to discourage forfeiture
If the borrower redeems the loan, would have to pay the following costs:

Item	Region					
	Michigan	Minnesota and E. North Dakota	Colorado, Nebraska, & SE Wyoming	W. North Dakota, Montana, & NW Wyoming	Oregon & Idaho	California
	Cents per pound					
Regional loan rates	25.57	23.93	24.44	24.01	23.30	24.84
Cost of loan redemption and marketing:						
Interest expense	0.22	0.20	0.21	0.20	0.20	0.55
Cash Discount (2%)	0.53	0.49	0.50	0.49	0.48	0.52
Minimum price to avoid forfeiture	26.32	24.62	25.15	24.70	23.98	25.91

Source: USDA, Farm Service Agency, Dairy and Sweeteners Analysis Branch.

be made available for sale to ethanol producers. Raw, refined, and in-process sugars are eligible for purchase. Such sugar can be purchased from any marketer located in the United States. Sugar purchased from a sugarcane or sugarbeet processor is counted against that processor's marketing allotment.

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Background: FY 2013 Sugar Outlook

Table A-2 shows estimates from USDA's World Agricultural Supply and Demand Estimates (WASDE) of the U.S. sugar supply and use balance since FY 2008. FY 2013 stands out because of the high estimate of sugar supplies. This results from high beginning stocks, record beet sugar production, strong cane sugar production in Louisiana, and strong imports expected from Mexico. The ending-year sugar stocks-to-use ratio for FY 2013 is 19.3 percent, well above the corresponding ratios for the earlier years. Although there is no fixed rule, a stocks-to-use ratio above 18 percent generally merits attention to the possibility of sugar-loan forfeitures to the CCC in loan repayment.

Table A-2 -- U.S. sugar: supply and use, by fiscal year

Items	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Beginning stocks	1,799	1,664	1,534	1,498	1,378	1,985
Total production	8,152	7,531	7,963	7,831	8,488	9,220
Beet sugar	4,721	4,214	4,575	4,659	4,900	5,300
Cane sugar	3,431	3,317	3,387	3,172	3,588	3,920
Florida	1,645	1,577	1,646	1,433	1,828	1,890
Louisiana	1,446	1,397	1,469	1,411	1,438	1,700
Texas	158	152	112	146	150	150
Hawaii	182	192	161	182	172	180
Puerto Rico	0	0	0			
Total imports	2,620	3,082	3,320	3,738	3,632	2,827
Tariff-rate quota imports	1,354	1,370	1,854	1,721	1,883	1,204
Other program Imports	565	308	448	291	664	225
Non-program imports	701	1,404	1,017	1,726	1,085	1,398
Mexico	694	1,402	807	1,708	1,071	1,388
Total supply	12,571	12,277	12,817	13,067	13,498	14,032
Total exports	203	136	211	248	269	175
Quota-exempt for reexport	203	136	211	248	269	175
Other exports						
CCC disposal, for export						
Miscellaneous	0	0	-45	19	-69	0
CCC disposal, for domestic non food use	0	0	0	0	0	0
Refining loss adjustment	0	0	0	0	0	0
Statistical adjustment	0	0	-45	19	-69	0
Deliveries for domestic use	10,704	10,607	11,152	11,422	11,313	11,590
Transfer to sugar-containing products for exports under reexport program	141	120	201	196	140	180
Transfer to polyhydric alcohol, feed	61	46	35	33	33	30
Deliveries for domestic food and beverage use 1/	10,501	10,441	10,917	11,193	11,141	11,380
Total use	10,907	10,743	11,319	11,689	11,513	11,765
Ending stocks	1,664	1,534	1,498	1,378	1,985	2,267
Stocks-to-use ratio	15.26	14.28	13.24	11.79	17.24	19.27

1/For FY 2008-09, combines Sweetener Market Data (SMD) deliveries for domestic human use, SMD miscellaneous uses, and the difference between SMD imports and WASDE imports.

Source: USDA, WAOB, WASDE; ERS, *Sugar and Sweetener Outlook* .

Compounding the outlook are world sugar prices estimated at 18.3 cents per lb in February 2013, down about 30 percent from a year earlier. Prior to FY 2013, world prices were above minimum forfeiture prices, which made the possibility of forfeiture seem remote. The outlook for the remainder of the fiscal year is for steady to lower world prices, probably averaging less than 18 cents per lb.

Figure A-1 shows weekly FY 2013 U.S. raw sugar and refined beet sugar prices through the end of February, along with the corresponding minimum prices to avoid forfeiture. The raw sugar price is below the minimum at the end of the month, while the refined beet sugar price is approaching it.

Outline of the Modeling Procedure

The procedure starts with a review of the supply-use situation in Mexico to derive a framework for projecting sugar exports into the U.S. sugar market. The U.S. sugar supply-use balance incorporates these inflows into its own described supply-use framework. In both countries, a range of values is specified around current projections from the February WASDE. For a basic set of variables, there are hypothesized upper and lower bounds. The WASDE projections are interpreted as the most likely estimates for the end of the fiscal year, but these estimates could vary between the bounds.

An important element of the approach is an estimated inverse relationship between ending stocks-to-use and the raw sugar price. A minimum price-to-avoid forfeiture implies a maximum privately owned stocks-to-use ratio. A positive difference between a total stocks ratio and a privately held ratio implies a fraction of total stocks potentially forfeitable to the CCC.

In the framework, sugar that is otherwise projected to be forfeited is assumed to be purchased by the CCC at the minimum raw sugar price-to-avoid-forfeiture. The framework currently does not distinguish between raw cane and refined beet sugar, although this distinction is likely to be important. As per the 2008 Farm Act, the CCC sells its sugar to ethanol producers at a price these producers are willing to pay. The difference between the CCC acquisition price and the sale price is a unit outlay. The framework uses an estimate of the unit outlay to calculate a range of CCC expenditure amounts to comply with the disposition of the excess sugar supply.

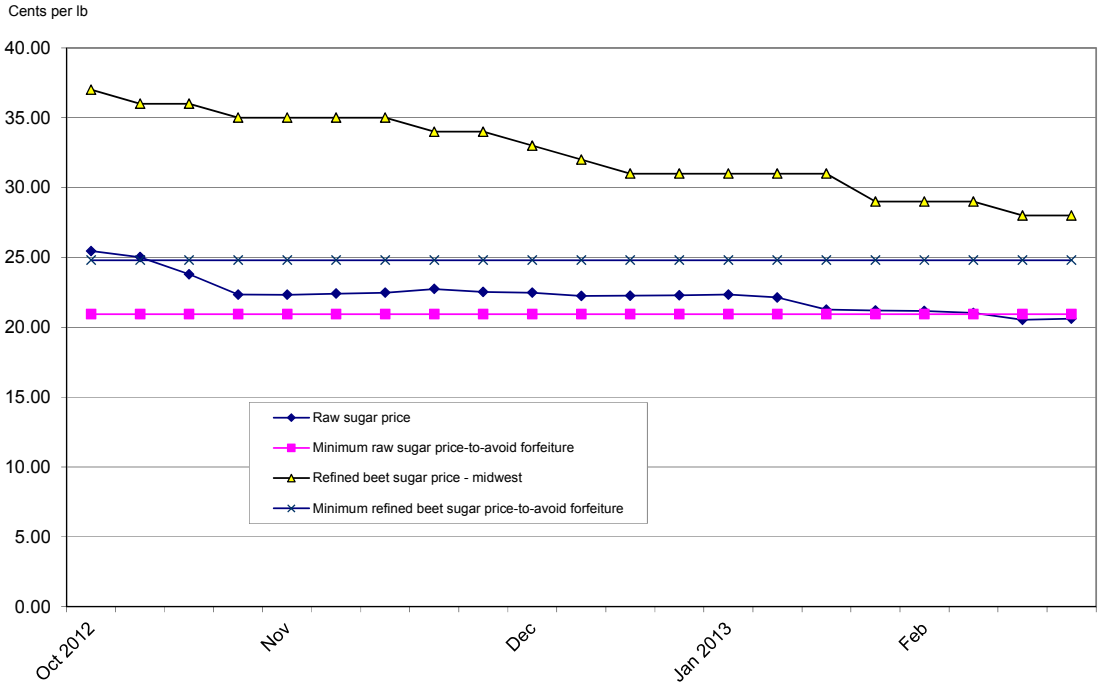
Analytical Framework – Imminent Forfeitures

Table A-3 shows framework equations for Mexico and the United States. Variables that are coded red are those whose values can range between lower and upper bounds, with the WASDE values being most likely. Probabilities that certain values will be realized are obtained from what is called a triangular probability density function, illustrated below. (Triangular probability distributions are used often in business decision making, particularly in simulations, where there is limited sample data.)

Value ranges for the Mexican variables are shown in table A-4. For production, the most likely production estimate is 5.668 million metric tons (mt). Many observers outside USDA expect a higher final production level, and few expect a lower value. In the framework, a lower bound 100,000 mt less than the WASDE projection is specified. The upper bound is specified at 5.968 million mt – 300,000 mt higher. Although the most likely outcome (the mode) is the WASDE value, the mean of the distribution is the average of mode, the upper bound, and the lower bound; i.e,. 5.735 million mt. (In the case where upper and lower bounds are equidistant from the most likely value, the mean and the mode are the same.)

The corresponding triangular probability distribution of Mexican sugar production is illustrated in figure A-2. Simulated values fall along the edge of the distribution. The area of the triangle is used to measure the probability of the outcome for a particular value. (Note that total area is equal to one.) In the figure, 5 percent of the triangle area is to the left of 5.613 million mt – meaning that there is a 5-percent chance that production will be no greater than 5.613 million mt. On the other side of the figure, a vertical line at 5.891 million mt cuts 95 percent of the triangle's

Figure A-1
U.S. sugar prices, Oct. 2012-Feb. 2013, and minimum prices-to-avoid forfeiture



Source: Intercontinental No. 16, nearby futures average, Milling and Baking News, and USDA, FSA, Dairy and Sweeteners Analysis Branch.

Table A-3 -- Scenario analysis framework

Stochastic variables coded red:

Mexico

Supply = Beginning stocks + Production + Imports

Total deliveries = Deliveries for human consumption + Deliveries for sugar-containing exports

Ending stocks = [Stocks-to-human consumption deliveries ratio]*Deliveries for human consumption

Total exports = Supply - [Total deliveries + Ending stocks]

Exports to United States = Total exports - 10,000 metric tons

United States

Total production = Beet sugar production + Cane sugar production [Florida+Louisiana+Texas+Hawaii]

Imports from Mexico (short tons, raw value) = Mexico exports to the United States *conversion factor

Non-program imports = Imports from Mexico + High-tier tariff imports

Total imports = Tariff-rate quota imports + Other program imports + Non-program imports

Supply = Beginning stocks + Production + Total imports

Total deliveries = Deliveries for human consumption + Deliveries for product re-export + Miscellaneous deliveries

Total use = Exports + Total deliveries

Ending stocks = Supply - Total use

Ending stocks-to-use ratio = 100*Ending stocks/Total use

Maximum private stocks-to-use ratio = [Minimum price to avoid forfeiture -29.194]/(-0.456)

Private stocks-to-use ratio = [IF raw sugar price ≥ minimum price to avoid forfeiture, then Ending stocks-to-use ratio, else maximum private stocks-to-use ratio]

CCC-owned stocks = [Ending stocks-to-use ratio -- Private stocks-to-use ratio] *Ending stocks

CCC-outlay for sale to ethanol producers = CCC-owned stocks*Unit outlay

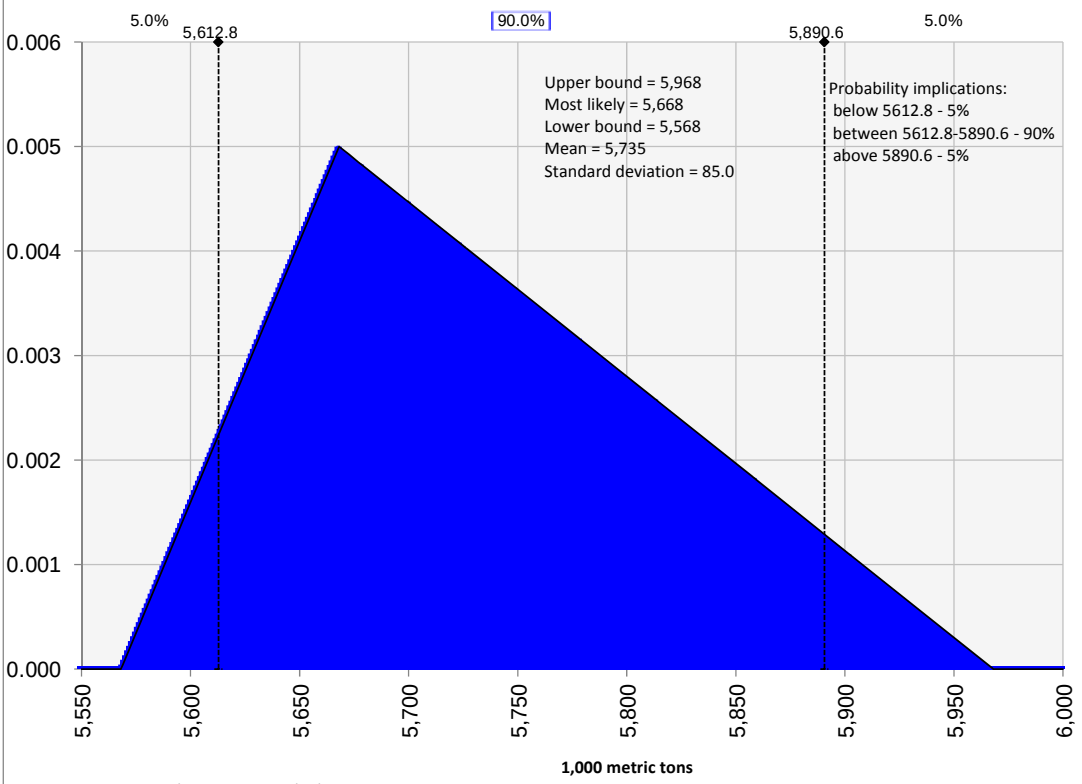
Source: ERS, *Sugar and Sweetener Outlook* .

Table A-4 -- Mexico: 2012/13 sugar production and supply- base and stochastic properties for analysis

Supply/Use components Stochastic components coded red	Base	Low-range adjustment	High-range adjustment	Statistical mean
		1,000 metric tons, raw value		
Beginning stocks	958	958	958	958
Production	5,668	5,568	5,968	5,735
Imports	112	112	112	112
Imports for consumption	23	23	23	23
Imports for sugar-containing product exports (IMMEX) 1/	90	90	90	90
Total supply	6,738	6,638	7,038	6,805
Disappearance				
Human consumption	4,200	4,100	4,300	4,200
For sugar-containing product exports (IMMEX)	340	320	360	340
Miscellaneous				
Total	4,540	4,420	4,660	4,540
Exports (residual)	1,198	903	1,798	1,301
Exports to the United States & Puerto Rico	1,188	893	1,788	1,291
Exports to other countries	10	10	10	10
Total use	5,738	5,323	6,458	5,841
Ending stocks	1,000	820	1075	963
Stocks-to-consumption ratio (percent)	23.81	20.00	25.00	22.94

1/ IMMEX = Industria Manufacturera, Maquiladora y de Servicios de Exportación.
Source: ERS, *Sugar and Sweeteners Outlook*.

Figure A-2
Triangle probability distribution: example of Mexico sugar production



Source: ERS, *Sugar and Sweetener Outlook*.

area to its left – meaning that there is 95-percent probability that production will not be greater than 5.891 million mt. In between, there is a 90-percent probability that production will be between 5.613 million and 5.891 million mt.

Mexican deliveries for human consumption are specified to vary 100,000 mt above and below 4.200 million mt. The range for the ending stocks-to-human consumption ratio is between 20.0 and 25.0 percent, with 23.8 percent the most likely. In the framework, exports are residually calculated as the difference between total supply and the sum of total deliveries and ending stocks. Exports to the United States are equal to total exports less 10,000 mt that Mexico is assumed to export to third countries.

Table A-5 shows value ranges for the U.S. supply-use variables. Beet sugar production projections range between 5.100 and 5.500 million short tons, raw value (STRV), with 5.300 million STRV the most likely to be realized. The other red-coded variables have similar interpretations. As with the Mexican ranges, the lower and upper bounds are specified by the ERS Sugar and Outlook as reasonable departures from WASDE projections. (In other words, deviations from WASDE values do not derive from any consensus within USDA. This underlines the limited, hypothetical nature of this modeling approach.)

Ending stocks are the difference between total supply and total use. Table A-6 shows an estimated relationship between the third-quarter raw sugar price and the ending fiscal year stocks-to-use ratio. This equation can be used to map model values of the stocks-to-use ratio into a corresponding raw sugar price. The equation's standard error is used to provide a value that fits the price into a normally distributed probability function.

A raw sugar price above the minimum price-to-avoid forfeiture indicates that there are no implied forfeitures to the CCC or need for the CCC to purchase sugar for resale to ethanol producers. If the raw sugar price is at or below the minimum, then forfeitures are imminent.

The equation from table A-6 is used to map the minimum price into a maximum stocks-to-use ratio for private sugar stock holdings. Table A-5 shows this value at 18.11 percent, with 1 standard deviation below at 17.89 percent and above at 18.33 percent. A positive difference between the total and private stocks-to-use is multiplied by total ending stocks to yield the amount of sugar that is highly probable to be forfeited.

Analytical Framework – Resale to Ethanol Producers

As mentioned, the CCC is assumed to purchase sugar that would otherwise be forfeited at the minimum price-to-avoid forfeiture. This sugar is intended for resale to ethanol producers at a price that makes ethanol producers indifferent to using sugar relative to other feedstocks, primarily corn.

Table A-7 shows a threefold method adopted from the FSA's Dairy and Sweeteners Analysis Branch to derive a unit outlay amount. The first step is to calculate equivalent amounts of raw cane sugar and corn needed to produce the same amount of ethanol. One gallon of ethanol can be produced from 14.771 lb of raw sugar or 20.3636 pounds of corn. The corn-to-sugar ratio is 1.3786.

The second step uses raw sugar and corn price projections corresponding to the forfeiture period to compare feedstock purchase costs for the ethanol producer. A projected corn price of $5.40 per bushel from USDA long-term projections is adjusted by subtracting out Dried Distillers Grains (DDG) and corn oil byproduct credits and then converting to a dollar per pound basis that compares to the purchase cost of a pound of sugar to produce the same amount of ethanol. The sugar cost is 20.94 cents and the corn cost is 9.31 cents – the difference is 11.63 cents.

The third step adds in a further amount that is needed to motivate ethanol producers to switch to sugar. This is compensation for additional costs likely to be incurred by using sugar in place of corn, estimated at 40 percent of the net corn costs, or 3.72 cents per lb. A possible offset, used in this analysis, is the advantage of raw cane sugar in in qualifying as an advanced-fuel ethanol source relative to corn as a conventional source. As computed, this would provide a raw sugar cost advantage of 1.69 cents per pound. (It is important to note that beet sugar does not yet qualify for the advanced-fuel source designation but may qualify by September 2013.)

Table A-5 -- U.S. 2012/13 sugar production and supply--base and stochastic properties for analysis

Supply/Use components Stochastic components coded red	Base	Low-range adjustment	High-range adjustment	Statistical mean
			1,000 short tons, raw value	
Beginning stocks	1,985	1,985	1,985	1,985
Total production	9,220	8,910	9,500	9,210
Beet sugar	5,300	5,100	5,500	5,300
Cane sugar	3,920	3,810	4,000	3,910
Florida	1,890	1,850	1,930	1,890
Louisiana	1,700	1,650	1,710	1,687
Texas	150	140	170	153
Hawaii	180	170	190	180
Total imports	2,827	2,373	3,639	2,960
Tariff-rate quota imports	1,204	1,104	1,304	1,204
Other program Imports	225	215	235	225
Non-program imports	1,398	1,054	2,100	1,531
Mexico	1,388	1,044	2,090	1,521
Total supply	14,032	13,267	15,123	14,155
Total exports	175	165	200	180
Miscellaneous	0			
Deliveries for domestic use	11,590	11,368	11,712	11,577
Transfer to sugar-containing products for export under reexport program	180	160	200	200
Transfer to polyhydric alcohol, feed	30	28	32	30
Deliveries for domestic food and beverage use	11,380	11,180	11,480	11,347
Total use	11,765	11,533	11,912	11,757
Ending stocks	2,267	1,734	3,211	2,398
Stocks-to-use ratio	19.27	15.04	26.96	20.40
Minimum price to avoid forfeiture	20.94	20.84	21.04	20.94
Maximum private stocks-to-use	18.11	18.33	17.89	18.11

Source: ERS, *Sugar and Sweeteners Outlook*.

Table A-6 -- Estimated relationship between third-quarter average U.S. raw sugar price and ending stocks-to-use and the third-quarter world raw sugar price

Dependent Variable: PRICE_3Q 1/
Method: Least Squares
Date: 02/20/13 Time: 09:12
Sample: 1982 2012
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic
Constant	29.194	1.479	19.739
D2009 2/	3.355	1.182	2.839
D2010TO2012*(WP_3QFY) 3/ 4/	0.497	0.031	16.154
STKSUSE 5/	-0.456	0.089	-5.111
R-squared	0.933	Mean dependent var	23.090
Adjusted R-squared	0.926	S.D. dependent var	4.205
S.E. of regression	1.146	Akaike info criterion	3.230
Sum squared residual	35.438	Schwarz criterion	3.415
Log likelihood	-46.061	Hannan-Quinn criter.	3.290
F-statistic	125.700	Durbin-Watson stat	1.725
Prob(F-statistic)	0.000		

1/ Intercontinental Exchange (ICE) no.14/16 nearby futures averaged over July-September.
2/ Indicator variable whose value equals 1 in 2009 and 0 all other years.
3/ D2010TO2012 is an indicator variable whose value equals 1 in 2010, 2011, and 2012 and 0 in all other years. U.S. raw sugar price is hypothesized as receiving support from the world price in this period.
4/ WP_3Q is ICE no. 11 nearby futures averaged over July-September.
5/ Ending fiscal year sugar stocks divided by sugar use.
Source: ERS, *Sugar and Sweeteners Outlook*.

Table A-7 -- Calculation of CCC energy title outlay

	Raw sugar		Corn	
Technical Relationships: How much of each feedstock to produce equivalent amount of ethanol				
Gallons of ethanol produced per unit of feedstock 1/				
ton (sugar)	135.4	A1		
bushel (corn)			2.75	A2
pound	0.0677	B1=A1/2000	0.0491	B2=A2/56
Pounds of feedstock to produce 1 gallon ethanol	14.7710	C1=1/B1	20.3636	C2=1/B2
Ratio of corn-to-sugar to produce same amount of ethanol	1.3786	D=C2/C1		
Pricing relationships and feedstock cost comparison				
Projected dollar corn price per bushel 2/			5.40	
- byproduct credit for DDG and corn oil			1.62	
Net			3.78	E2
Dollar price per pound 3/	0.2094	F1	0.0675	F2=E2/56
Feedstock cost per pound to produce 0.0677 gallon of ethanol	0.2094	G1=F1	0.0931	G2=F2*D
Difference in unit cost = implied pre-adjustment unit outlay	0.1163	H=G1-G2		
Adjustments to implied outlay				
Projected unit outlay to compensate for additional costs of using sugar in corn-based ethanol plant 4/	0.0372	I		
RIN analysis 5/ 6/				
Estimated value of advanced fuel RIN per gallon	0.40	J1	0.15	J2
Estimated value of conventional fuel RIN per gallon Value per 0.0677 gal of ethanol	0.0271	K1=J1*B1	0.0102	K2=J2*B2*D
Net RIN advantage of sugar	0.0169	L=K1-K2		
Adjusted unit outlay per pound of raw sugar	0.1366	M=H+I-L		

1/ USDA, Office of the Chief Economist, *The Economic Feasibility of Ethanol Production from Sugar in the United States, July 2006*.
2/ USDA, Agricultural Long-term Projections to 2022.
3/ USDA, FSA, Dairy and Sweeteners Analysis Branch - minimum price to avoid forfeiture.
4/ USDA, FSA, Dairy and Sweeteners Analysis Branch - 40 percent of net corn cost
5/ For RIN analysis, see: McPhail, Lihong, Paul Westcott, Heather Lutman. *The Renewable Identification Number (RIN) System and U.S. Biofuel Mandates. USDA-ERS, BIO-3, Nov. 2011*.
6/ Values reported to FSA's Dairy and Sweeteners Analysis Branch.
Source: ERS, *Sugar and Sweeteners Outlook*.

The final adjusted unit outlay is calculated at 13.66 cents per lb. This is multiplied by the amount of sugar that the CCC purchases at 20.94 cents per lb to derive the hypothetical total cost. This produces a probability distribution of CCC outlay expenditure.

Experimental Outlay Implications

Simulation results are shown in table A-8. These results derive from the assumptions made and described earlier; a change in assumptions due to additional knowledge changes the forecast.

Imports from Mexico are projected to vary between 1.14 million and 1.92 million but with a 50-percent probability of 1.51 million STRV. The standard deviation of 128,000 STRV implies about a 66-percent chance of imports in the range of 1.381 million to 1.638 million STRV, an interval that contains the WASDE projection of 1.388 million STRV.

Ending stocks vary between a low of 1.76 million and high of 3.07 million STRV but with a mean value of 2.41 million STRV. CCC purchases vary between zero and an (unlikely) maximum of 959,000 STRV. The mean value is 247,300 STRV, with a large standard deviation of 195,000 STRV. In terms of CCC outlay expenditure, the average result is $66.2 million.

The graphical presentation in figure A-3 produces a better interpretation of the results, especially for CCC costs. This is a bimodal distribution with the "most likely" outcome between zero and $ 5 million, but it does not seem particularly useful. Disaggregated analysis suggests a 23.1-percent probability of zero expenditure. The probability of expenditure greater than zero but at or below $65 million is 26.1 percent. The probability of expenditure over $65 is 50.9 percent. Other ranges can be reported. The most important feature is the asymmetrical nature of the distribution.

Figure A-4 shows the sensitivity of the expenditure estimates to changes in the red-coded supply-use components in Mexico (table A-4) and the United States (table A-5). The results are ordered from the largest to smallest effects for the supply-use components. To correct for scale effects, results show the change in outlays when there is a positive 1-standard deviation change in the supply-use component.

The strongest effect on outlays is attributable to sugar production in Mexico. An increase of 84,980 mt can increase average outlay by $21.4 million. The raw sugar price is the next important influence, given all other values, but with effects in the opposite direction. The framework could conceivably be modified to gauge the implications of a positive change in the world raw sugar price through its effect on the domestic price. The next influences on outlays are aggregate beet sugar production and so on, as indicated in the chart.

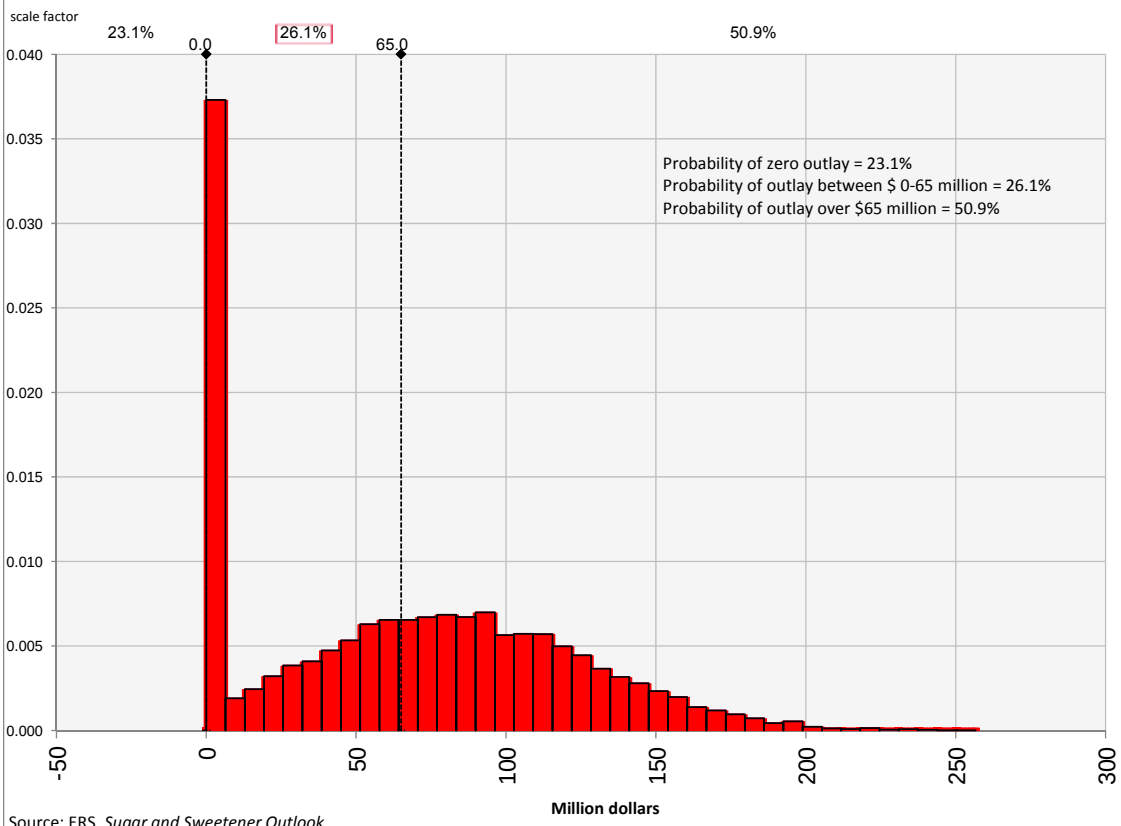
This chapter has described an application of stochastic analysis in simple form to estimating CCC outlays for the sale of sugar to ethanol producers. It integrates WASDE assumptions, along with reasonable departures, in producing a range of probabilities for outlays. Combining this approach with more supply-use and policy detail has the potential to improve USDA performance in U.S. sugar program management.

Table A-8 -- Target output results for analysis

Variable	Minimum value	Maximum value	Mean	Standard deviation
	1,000 short tons, raw value			
Imports from Mexico	1,142.4	1,921.8	1,509.2	128.3
Ending stocks	1,763.9	3,073.4	2,406.2	171.0
Privately held stocks	1,763.9	2,731.6	2,158.9	96.3
Stocks owned by CCC 1/	0.0	959.0	247.3	195.0
	Millions of dollars			
Energy title unit outlay for sale to ethanol producers	0	256.69	66.2	52.18

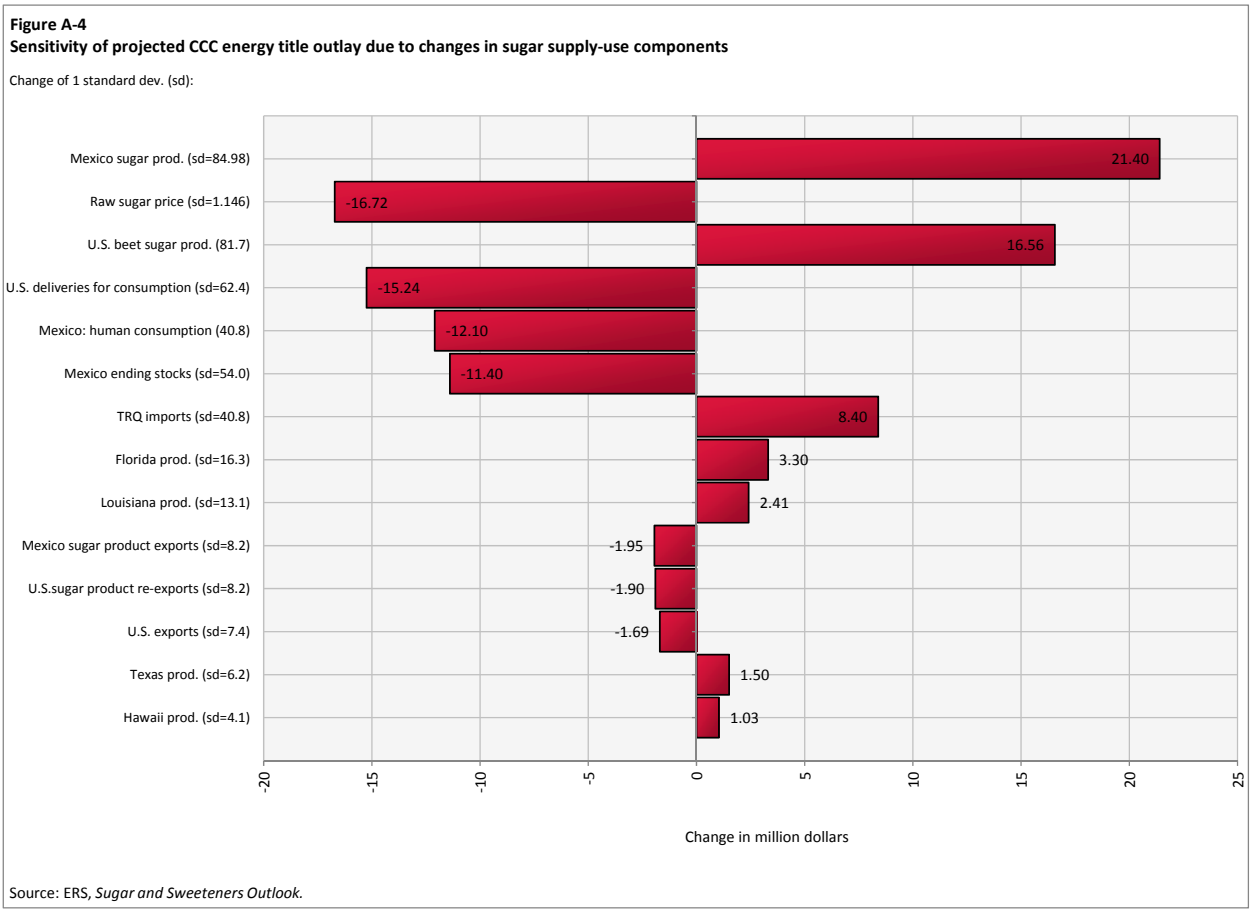
1/ CCC = USDA's Commodity Credit Corporation.
Source: ERS, *Sugar and Sweeteners Outlook*.

Figure A-3
Probability distribution of projected CCC energy title outlay



Source: ERS, *Sugar and Sweetener Outlook*.

Figure A-4
Sensitivity of projected CCC energy title outlay due to changes in sugar supply-use components



Source: ERS, *Sugar and Sweeteners Outlook.*