SUGAR POLICY OPTIONS AND CONSEQUENCES

A Study Prepared for the American Farm Bureau Federation[1]

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Executive Summary

The US sugar program faces a challenging future. The extension of duty-free access for imports from Mexico in 2008 under the North American Free Trade Agreement seems likely to undermine the ability of the program to operate on a "no-cost" basis to US taxpayers. On the assumption that the current dispute with Mexico over the treatment of High-Fructose Corn Sweetener (HFCS) is resolved by that time, it seems likely that the use of HFCS in the Mexican beverage industry will expand considerably and that much of the sugar thereby displaced will seek a market in the United States. Under those conditions, marketing allotments could not be utilized under current legislation and prices would likely fall to the loan rate. The government would probably accumulate significant stocks of sugar.

The replacement of the current sugar program by one similar to that used for other major US crops, seems likely to solve the problem of stock accumulation. It also seems that such a program could more easily accommodate any effects of further trade liberalization under a new WTO agreement or future bilateral trade agreements. An analysis of recent proposals suggests that a WTO agreement is unlikely to impose significant adjustment pressures on the US sugar market, beyond those that will be created by NAFTA. The adoption of a standard program would, however, make it easier for the United States to meet its commitments under a new WTO agreement, particularly in terms of reductions in the limits on trade-distorting amber-box support.

The replacement of the current sugar program by a standard commodity program would increase the costs of the program for US taxpayers, but would also lower costs for US sugar users. Given reasonable assumptions about possible program parameters, the principal program cost would likely be through direct payments, rather than through counter-cyclical or loan-deficiency payments. The costs could be lower than the estimates presented in this report, due to limitations on payments to individual producers.

Introduction

Sugar figured early in the history of the United States. One of the first acts of the newly-created Congress in 1789 was to impose a tariff on imported sugar in order to raise revenue for the new republic. In 1842, the tariff structure was modified to provide protection to the domestic sugar refining industry and to promote the domestic production of sugar. A federal price support program for sugar, the Jones-Costigan Act, was enacted in 1934. With the exception of two brief periods during the 1970s and early 1980s, the United States has continued to operate a price support program for sugar (see Box 1 for a brief history). The current sugar program, introduced under the Farm Security and Rural Investment Act of 2002, uses import controls and marketing allotments and allows for certain other measures (payment-in-kind provisions) to try to ensure that the government does not accumulate stocks at the price support (loan rate). The current program is supposed to operate at no net cost to the US taxpayer.

Considerable uncertainty exists about the long-run viability of the US sugar program, not least because of the commitment by the United States under the North American Free Trade Agreement (NAFTA) to allow duty-free imports of sugar from Mexico beginning in 2008. Combined with a commitment under the Uruguay Round Agreement of the General Agreement on Tariffs and Trade (GATT) to maintain a minimum level of imports from other suppliers, the NAFTA provisions seem likely to lead to increased sugar imports with resulting downward pressure on US sugar prices. If the effect is sufficiently large, it might be impossible to continue to operate a program of the existing type on a no-cost basis. There is also the possibility that imports might increase as a result of other preferential or free trade agreements that may be adopted by the United States, or through the eventual conclusion of the Doha Round of international trade negotiations currently underway at the World Trade Organization (WTO).

In this study, we assess the potential implications of increased levels of imports for a future US government program for sugar. We begin by examining the potential impact on the current program of an increase in sugar imports from Mexico under the NAFTA agreement. We contrast the effects to the situation in which the current sugar program is replaced by a price and income support program of the type currently used for other major crops in the United States. Finally, we evaluate the effect of potential new international trade commitments resulting from a Doha WTO Agreement.

The Analysis Conducted

In this study we evaluate three policy scenarios for sugar:

1. the continuation of the existing US sugar program currently in operation under the 2002 Farm Security and Rural Investment Act – we shall refer to this as the **baseline scenario**;
2. replacement of the current US sugar policy by a program equivalent to that used for other major crops (wheat, feed grains, upland cotton, rice

and oilseeds) but in the absence of any changes in trade policies in the United States or other countries, beyond those already agreed – we term this the **standard program scenario**; and

3. replacement of the current policy by a standard program but with further liberalization of international trade (in particular, an increase in the sugar tariff-rate quota [TRQ] and reduction in over-quota tariffs) under the assumption that a new agreement on agriculture is concluded as a result of the current round of negotiations in the World Trade Organization – we term this the **trade liberalization scenario**.

Our analysis of these scenarios is based on two linked economic models – one for the US agricultural sector and one for the international sugar market. These models generate key variables, such as prices and quantities, for sugar and other commodities on a year-by-year basis for the United States given assumptions about macroeconomic and policy variables. The US model captures the interaction between the corn and sugar sub-sectors (through High-Fructose Corn Sweetener - HFCS). The international sugar market model reflects trade and domestic policies for sugar in key importing and exporting countries and permits us to capture the effects of changes in these policies on international trade volumes and prices, as well as any feedback effects on the US sugar market. The analysis is conducted for the period 2004/05 – 2014/15 (federal fiscal years 2005 – 2015). The principal tables in our report summarize the results using averages for 2008 – 2015.

Many assumptions are required in order to project the future evolution of the US sugar market. We have drawn upon the advice of a number of knowledgeable individuals in the business and academic communities to create a plausible set of assumptions as to how markets might evolve. We recognize that alternative assumptions are possible, and that year-to-year variation in weather and other conditions could result in outcomes that are significantly different from those presented in our report. We have not attempted to assign probabilities to the values that we present or to indicate the range of potential variation. Our results should be interpreted as projections of plausible futures for the sugar market, rather than forecasts.

In what follows, we shall focus on some of the key assumptions in our analysis and the results that we obtain. Further details on the assumptions underlying each scenario are contained in Appendix A.

Continuation of the Existing Sugar Program – The Baseline Scenario

In the baseline scenario, we assume that the current US sugar program continues to operate through 2015.[3] The cane sugar loan rate is maintained at 18 cents per pound (raw value) and the beet sugar loan rate is at 22.9 cents per pound (refined value). Sugar yields and consumption trends are assumed to develop in line with recent trends. Beet yields are projected to rise from roughly

[3] The years used in the study are October-September unless otherwise indicated.

22 tons per acre in FY 2006 to just over 23 tons in FY 2015 (Figure 1) and sugar recovery rates from just under 16 percent to close to 17 percent (Figure 2). Cane yields over the same period are projected to increase from around 35 tons to over 37 tons per acre, with a slight increase in the recovery rate (from 12.4 to 12.7 percent). Total US sugar and sweetener consumption does not change significantly, because of relative insensitivity to changes in prices and consumer incomes, implying a modest decline in per capita consumption (Figure 3).

In preparing the baseline, a key issue that must be addressed is the likely future trading relationship in sugar and related products between the United States and Mexico (see Box 2 for the recent history of this relationship). We assume that the current dispute over HFCS will be resolved and that the Mexican tax on beverages containing HFCS is eliminated in 2007-08. From that year onwards Mexico has duty-free access for its sugar to the US market. The United States has duty free access for HFCS to the Mexican market, but Mexico's own production of HFCS can also be expected to expand. The resolution of the dispute over HFCS could have a significant impact on its use in the Mexican beverage industry, on Mexico's production of HFCS and its imports of the product from the United States. The displacement of sugar by HFCS in Mexican beverage production would likely lead to increased sugar shipments to the United States. To examine the potential implications of this, we use two variants of our baseline scenario:

1. Limited displacement of sugar in Mexican beverage production, with a consequent modest increase in shipments of Mexican sugar to the United States. Under this assumption, annual duty-free imports of sugar by the United States from NAFTA partners average 218 thousand short tons (raw basis) for 2008-15.[4] We refer to this scenario as the Low Import Baseline.
2. Substantial displacement of sugar by domestically-produced and imported HFCS in Mexican beverage production with a resulting significant expansion in US imports of sugar from Mexico. Under this assumption, US duty-free imports from NAFTA partners average 1.355 million tons per year over the period. We refer to this scenario as the High Import Baseline.

The two variants have significantly different implications for the US sugar market. The first two columns of Tables 1-5 contain the average values of relevant variables for 2008-2015 for these two scenarios. Column 5 shows the comparative change in each variable (high import value minus low import value). With modest imports from Mexico the New York (NY) spot price for raw sugar averages over 20 cents per pound (Table 1). Domestic production is largely constrained by marketing allotments and CCC stocks are modest. With high

[4] We assume that there are no significant changes in imports of sugar-containing products from Canada in the baseline. We do not consider the possibility that imports of sugar into Mexico from Central American suppliers could also lead to the displacement of Mexican sugar to the US market. Changes in either of these factors could put further downward pressure on US sugar prices.

imports from Mexico the raw sugar price declines to less than 19 cents per pound. US sugar production declines by 3.5 percent on average in response to the lower prices, but CCC stocks increase to an average of over 1 million tons (Table 1). The adjustments in production on a state-by-state basis are given in Table 2 for beets and in Table 3 for cane. In line with the conditions of the current sugar program, marketing allotments are suspended and the result is a build-up of government stocks. The magnitude of the price decline is limited by an assumption that the Secretary of Agriculture would use a Payment-in-Kind (PIK) program to limit market oversupply.

As a result of these developments, government program costs for sugar rise from an average of $8 million per year under the low import scenario to $175 million under the high import scenario (Table 5). Lower sugar prices result in a modest displacement of HFCS and this leads to slightly higher counter-cyclical payments for corn. With those expenditures included, total government program costs increase to an average of $187 million per year.

A significant increase in imports of sugar from Mexico associated with duty-free access under NAFTA, when combined with a major displacement of sugar by HFCS in the Mexican beverage industry, would make it unlikely that the existing US sugar program could continue to be operated on a “no-cost” basis. As noted above we assume that the Secretary of Agriculture exercises the option of operating a PIK program in order to control the buildup of government stocks, but this does not solve the problem (see Appendix A). It seems unlikely that such a program could be sustained at a high level over the long term due to the uneven effects of a program on the beet and cane components of the industry, and its costs.

Replacement of the Current Sugar Program by a Standard Commodity Program – the Standard Program Scenario

In this scenario we assume that the current sugar program is replaced by one in which the loan rates for beet and cane sugar are reduced, producers are paid a fixed direct payment per ton based on fixed areas and yields, and a target price is established that is used to determine counter-cyclical payments if season-average prices for raw sugar fall below the target price. Other aspects of sugar policy, in particular the level of the TRQ and sugar tariffs, are unchanged under this scenario.

It is difficult to determine what the program parameters would be. Following discussions with a number of individuals who are knowledgeable about the sugar industry, we chose the parameters in Table 6 as a set of reasonable working assumptions about the characteristics of the alternative program.

Again we examine two scenarios that correspond to our baseline scenarios. Column 3 of Tables 1-5 gives the values derived under the assumption of low sugar imports from Mexico; Column 4 contains the values under the high import

assumption. Columns 6 and 7 of the tables contain the differences in values when each of the two scenarios is compared to its corresponding baseline.

There are several important features to note:

1. The NY spot price of sugar falls by roughly 10 percent from each of the respective baseline prices. Under the high Mexican imports scenario the spot price averages less than 17 cents per pound (Table 1).
2. US sugar production is higher with the standard program in operation, even under the assumption of a substantial increase in the sugar coming from Mexico (Table 1). There are no marketing allotments (or PIK) to constrain domestic production and many producers find it profitable to produce at prices which are still relatively high in comparison to those that prevail on international markets.
3. Sugar consumption (domestic deliveries) increases by roughly 350-400 thousand tons compared to the equivalent baseline results. Slightly higher consumption is stimulated by the reduction in sugar prices and there is some substitution for HFCS; the domestic use of HFCS falls by roughly 230-250 thousand tons. Despite this, the reduction in HFCS use and prices has only a small effect on corn prices.
4. The government does not accumulate stocks because of the marketing loan provisions and because prices generally remain above the now lower loan rates (Table 1). However, the total cost of the sugar program rises, primarily because of expenditures on direct payments, which average $463 million per year.[5] Because we assume that imports of sugar would rise sharply after 2007/08 in the high import scenario, some counter-cyclical (CCP) and loan deficiency (LDP) payments are triggered by lower prices in the early years, but US sugar prices then recover to find a new equilibrium just above the loan rate. Averaged over the entire period these payments amount to roughly $60 million per year. There is also an increase in corn CCPs due to the impact of lower sugar prices on corn prices. Under the high import scenario, the standard program increases corn CCP expenditures by an average of $17 million per year.

Implications of a Doha Round WTO Trade Agreement – the Trade Liberalization Scenario

In this scenario we examine the potential implications for US sugar of a new agreement under the current round of WTO negotiations. These negotiations were launched in Doha, Qatar in November 2001 and are ongoing. It has proved difficult to finalize the agricultural provisions of an agreement. The then chairman of the WTO's agriculture committee, Stuart Harbinson, prepared some fairly

[5] These numbers do not reflect payment limitations, which could reduce the cost of the program from that reported here. It is difficult to determine the extent to which payments would be reduced. Appendix B presents some rough estimates based on the assumption that payment limitations would be binding. Under that assumption, expenditures on direct payments would fall from $463 million to $224 million per year. Actual expenditures would likely be somewhere between these two values.

detailed draft modalities for agriculture in March 2003[6], but these proposals were not accepted. A less-detailed framework for the modalities was concluded in Geneva on August 1, 2004.[7] The framework has far less detail than the Harbinson proposal and its potential impact is difficult to examine quantitatively. For this reason we have chosen to base our assessment on the Harbinson proposal. The final package of reforms may well turn out to be more modest than our assumptions, which are detailed in Appendix A.

It is virtually certain that a new WTO agricultural agreement will embody provisions on:

1. increased market access, achieved primarily through reductions in tariffs and increases in TRQ quantities
2. reductions in export subsidies
3. reductions in the amount of the most trade-distorting forms of domestic support – "amber-box" measures – with possible limitations on other forms of support, particularly "blue-box" measures.

The market access provisions of a new agreement are of the greatest potential significance for the US sugar program. As we have demonstrated earlier, the current program would already be under stress if there were to be a significant increase in the volume of sugar imports from Mexico. An increase in access to the US market accorded to other countries, for example, by increasing the TRQ for sugar or reducing over-quota tariffs could lead to additional pressure on the program by stimulating a further build up in government stocks. In terms of the type of new sugar program analyzed earlier, the principal issue would seem to be whether the market access provisions under an agreement would cause domestic sugar prices to fall significantly. If that happened, government expenditures on counter-cyclical payments and loan deficiency payments would be considerably larger than the figures reported in Table 5.

In examining the potential implications of a WTO agreement, an additional factor that must be taken into account is the likely impact on international trade and prices of anticipated changes in the sugar program in the European Union (EU). The EU is under pressure to reform its sugar program for two main reasons. First, the legality of the program has been challenged successfully in the WTO by several sugar exporting countries (Brazil, Australia and Thailand). Second, the EU has agreed to provide duty-free access to its sugar market for the least-developed countries by July 2009 under its Everything But Arms (EBA) initiative. In the light of these developments, the European Commission has published

[6] WTO. *Negotiations on Agriculture: First Draft of Modalities for the Further Commitments*. TN/AG/W/1/Rev.1. March 18, 2003. http://www.wto.org/english/tratop_e/agric_e/mod_tnagw1r1_e.pdf.

[7] WTO. *Doha Work Programme: Decision Adopted by the General Council on 1 August 2004*. WT/L/579. August 2, 2004. http://www.epe.be/stic-europe/techassist/docs/ddadraft_31jul04_e.pdf.

proposals for the reform of the policy.[8] These may turn out to be more ambitious than the final package of reforms agreed by EU Ministers, but we have used them as the basis for our own analysis.

In conducting our analysis we assume that:

1. the EU reforms its Common Market Organization (CMO) for sugar beginning in 2006, phasing out its export subsidies.[9] The EU reduces both its support price and production quota for sugar (see Appendix A for details)
2. the Doha round of trade negotiations is concluded by 2007 and the new agreement is implemented beginning in 2008.

These changes have an impact on world sugar markets but no effect on the US market. The reduction in EU sugar production and exports associated with the reform of its sugar policy, plus some changes in other countries, lead to a modest increase in world sugar prices (Figure 4). The Caribbean FOB Price of sugar averages over 4 percent higher for the period than the baseline (without a WTO agreement). Most of the increase in sugar exports stimulated by the agreement is picked up by Brazil and Australia.

In the US market, a new agreement is not calculated to lead to any additional changes. The US TRQ already exceeds the assumed requirement that the TRQ equal at least 8 percent of domestic consumption, hence it would be unchanged under the Harbinson proposal. Given the world prices that we project, the reduced out-of-quota tariff would still remain prohibitive. There are no additional effects of the agreement on Mexico that could have implications for the United States.[10]

While there seem unlikely to be any direct implications of a new WTO agreement for the US sugar market, there are some indirect implications. The change in the sugar program to a standard program would provide a significant credit in reduced trade-distorting amber box support. Table 7 shows the Aggregate Measure of Support (AMS) for US sugar from 1995-2001 (the most recent data

[8] Commission of the European Communities. *Accomplishing a Sustainable Agricultural Model for Europe through the Reformed CAP – Sugar Sector Reform.* COM(2004) 499 final. July 14, 2004. http://europa.eu.int/comm/agriculture/capreform/sugarprop_en.pdf.

[9] The current CMO expires in June 2006. Its renewal would provide an opportunity for changes to be made in the EU sugar program.

[10] We do not consider any spillover effects on other commodities, e.g., corn, which could be created by a new Agreement, but the impacts of such effects on sugar are likely to be small. Similarly the modest increase in world prices could have an impact on US sugar exports and on US imports of sugar-containing products, but any such effects are likely to be extremely small. It should be noted, however, that in order for a final WTO agreement to be acceptable to other countries, there may be a requirement to provide some additional access for imports of all products, including sugar. If that were the case, there would be additional downward pressure on US sugar prices.

available). For the last three years, the AMS averaged over $1.1 billion per year. Providing that US counter-cyclical payments were classified as a blue-box measure, and direct payments continued to be classified as a green-box measure, the switch to a standard commodity program would yield an AMS "credit" of over $1 billion per year, since only the modest loan-deficiency payments (an estimated average of $23 million per year in Table 5) would fall under the amber-box, as measured by government outlays.[11] A credit of this magnitude could be important in helping the United States meet its obligations for an overall reduction in agricultural support under a new WTO agreement.

Conclusions

Our analysis indicates that the extension of duty-free access for imports from Mexico in 2008 under the North American Free Trade Agreement seems likely to undermine the ability of the US sugar program to operate on a "no-cost" basis to US taxpayers. On the assumption that the current dispute with Mexico over the treatment of High-Fructose Corn Sweetener (HFCS) is resolved by that time, it seems likely that the use of HFCS in the Mexican beverage industry will expand considerably and that much of the sugar thereby displaced will seek a market in the United States. Under those conditions, marketing allotments could not be utilized under current legislation and prices would likely fall to the loan rate. The government would probably accumulate significant stocks of sugar.

The replacement of the current sugar program by one similar to that used for other major US crops, seems likely to solve the problem of stock accumulation. It also seems that such a program could more easily accommodate any effects of further trade liberalization under a new WTO agreement or future bilateral trade agreements. An analysis of recent proposals suggests that a WTO agreement is unlikely to impose significant adjustment pressures on the US sugar market, beyond those that will be created by NAFTA. The adoption of a standard program would, however, make it easier for the United States to meet its commitments under a new WTO agreement, particularly in terms of meeting commitments on reductions in trade-distorting amber-box support.

The replacement of the current sugar program by a standard commodity program would increase the costs of the program for US taxpayers, but would also lower costs for US sugar users. Given reasonable assumptions about possible program parameters, the principal program cost would likely be through direct payments, rather than through counter-cyclical or loan-deficiency payments. Those costs could be lower than the maximum estimated in this report, due to limitations on payments to individual producers.

[11] It should be noted that the current sugar AMS is computed using the difference between administered and reference prices that do not reflect current or actual market price support, market conditions, or the production eligible for support.

Box 1: A Brief History of US Sugar Policy

After the passage of the Jones-Costigan Act in 1934, which relied upon domestic production and import quotas to support the producer price of sugar, a series of sugar acts with similar characteristics continued in force until December 31, 1974 when record world sugar prices prompted the removal of domestic production restrictions on sugar. High sugar prices did not last. A price support program was instituted in 1977. The Food and Agriculture Act of 1977 created a non-recourse loan program. Sugar processors who agreed to pay sugar producers fixed minimum prices could obtain a loan from the government using sugar as collateral. They could subsequently repay the loan plus interest if market prices were sufficiently high, or forfeit the sugar to the Commodity Credit Corporation (CCC). In order to reduce the risk that the government would accumulate large stocks, a "market price objective" was established; import duties and fees were applied to regulate the volume of imports and to support domestic market prices. In 1981 a system of country-by-country quotas was introduced to provide greater control over sugar imports.

With the exception of the brief periods when world market prices were high, a series of sugar programs has provided price support through a loan rate system and embodied controls on imports. The Food Security Act of 1985 introduced the requirement that the program should be operated a "no cost" to the federal government – in other words that total domestic supply should be regulated to ensure that the government did not accumulate stocks of sugar. In addition to the existing controls over imports, the 1990 Farm Act provided for the use of marketing controls on domestic sugar in the event that imports were projected to fall below a minimum level of 1.25 million short tons, raw value. Under the Uruguay Round Agreement of the General Agreement on Tariffs and Trade in 1994, the United States agreed to import a minimum quantity of 1.256 million tons of raw and refined sugar each marketing year (October – September). Included in this amount is 24,251 tons of refined sugar.

The 1996 Food and Agricultural Improvement and Reform Act (FAIR) converted the method of import control to a tariff rate quota (TRQ). The loan rate system was modified such that loans were non-recourse if the TRQ was set at 1.5 million tons or greater and recourse if the TRQ was less than that amount. (The recourse provision means that the CCC can demand repayment of the loan at maturity, regardless of the market price of sugar.) The marketing controls on domestic sugar and the no-cost requirement were both eliminated. However, a number of additional charges were introduced. Penalties were imposed for the forfeiture of sugar to the CCC (one cent per pound for cane sugar and 1.07 cents per pound for beet sugar). The interest rate charged on loans was set at one percentage point about the CCC's cost of borrowing. There were also marketing assessments (a percentage of the raw sugar loan rate) paid by processors to help cover program costs.

The current sugar program under the Farm Security and Rural Investment Act of 2002 established loan rates to processors of 18 cents per pound for cane sugar and 22.9 cents per pound for refined beet sugar. Loans are non-recourse and may be taken for a maximum term of 9 months. The marketing assessments, forfeiture penalty, and the interest rate premium on loans were all eliminated. The legislation allows for a payment-in-kind program, which had been originally offered for sugar in 2000 and 2001. When such a program is in operation, producers can forgo planting or harvesting sugar in exchange for CCC sugar inventory. The no-cost provision was reinstated. In order to achieve this, marketing allotments were reinstated but can only be applied when imports for domestic consumption are less than 1.532 million short tons.

Box 2: The North American Free Trade Agreement (NAFTA) and the US Sugar Market

NAFTA – a treaty to establish a free trade area between Canada, Mexico and the United States – went into effect on January 1, 1994. The provisions relating to trade in sugar with Mexico have significant implications for the US sugar market.

NAFTA allowed for a 15-year transition period for exports of Mexican sugar to the United States. The original provisions provided that during the first six years, duty-free access was provided for 7,258 metric tons of raw cane sugar. Additional quantities could be exported to the United States if Mexico had a net production surplus, defined as domestic sugar production minus consumption, over a two year period. Beginning in year 7, the maximum duty-free access was to be 150,000 metric tons and would increase by 10 percent in each subsequent year. In order to obtain Congressional approval for NAFTA the Mexican and U.S. governments exchanged "side-letters" that modified some of these provisions. The key change was that Mexico would only be considered a net-surplus producer if its sugar production exceeded domestic consumption of both sugar and HFCS and that duty-free access of up to a maximum of 250,000 tons would be provided from 2001-07 on that basis. There was subsequent difference of opinion between the two governments on the validity and interpretation of the side-letter provisions, but these provisions have been applied by the United States. For the future, the more important provision of the NAFTA agreement is that tariffs on Mexican sugar, which are being gradually reduced over the transition period, will be eliminated by calendar year 2008. At that time, Mexico will no longer be subject to the surplus producer condition.

In addition to the conditions attached to sugar there has been an ongoing dispute with Mexico on imports of HFCS from the United States. NAFTA called for unlimited access of the product to the Mexican market and the progressive reduction of the tariff from 15 percent in 1994 to zero in 2004. There has been a series of disputes with Mexico over imports of HFCS. The Mexican government imposed anti-dumping duties on imports of HFCS from the United States in 1998. These were subsequently challenged through the WTO and through the NAFTA dispute-settlement process. In January 2002, the Mexican Congress imposed a 20 percent tax on soft drinks containing HFCS. This was denounced by U.S. producers of HFCS as a violation of NAFTA. On July 6, 2004 the WTO agreed to a request by the United States to establish a dispute settlement panel on the tax measure.

Figure 1. Baseline Beet and Cane Yields

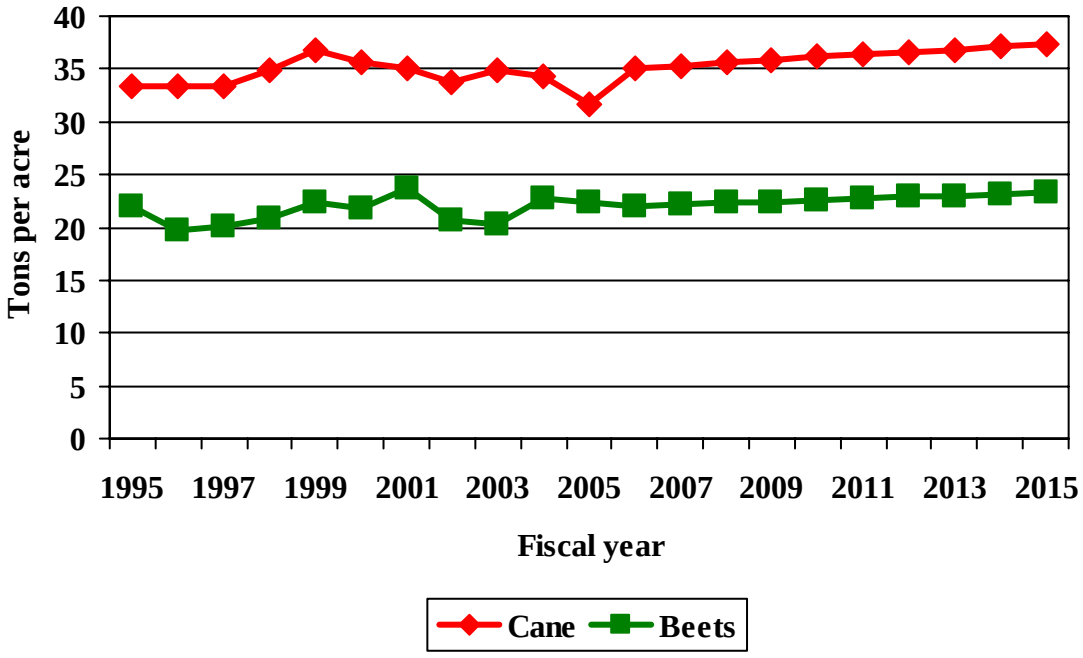

Figure 2. Baseline Sugar Recovery Rates

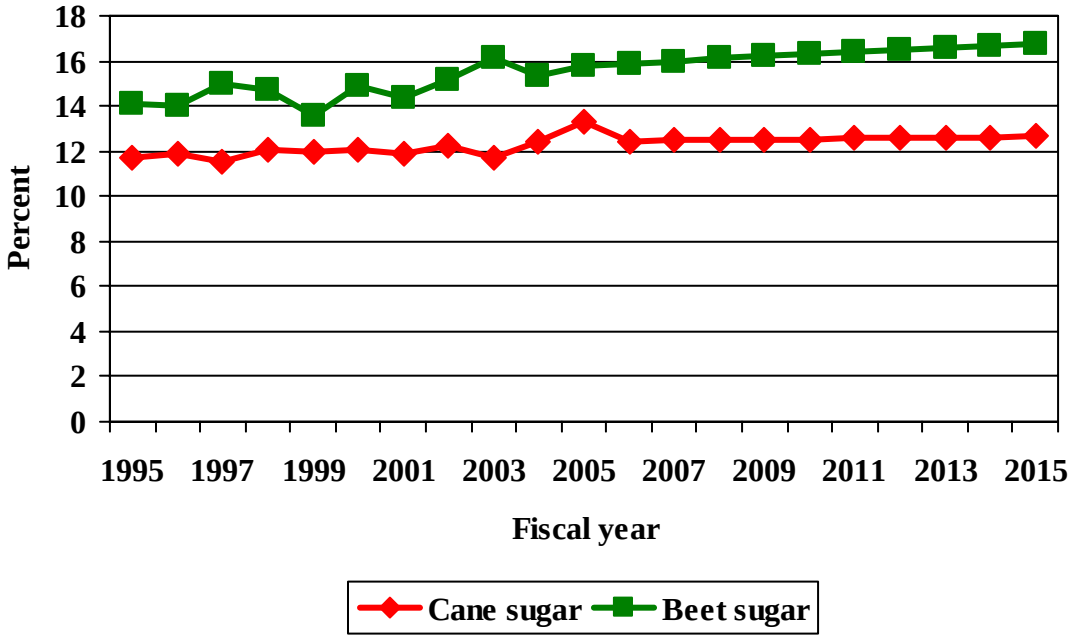

Figure 3. Baseline Sugar Deliveries (Low-import scenario)

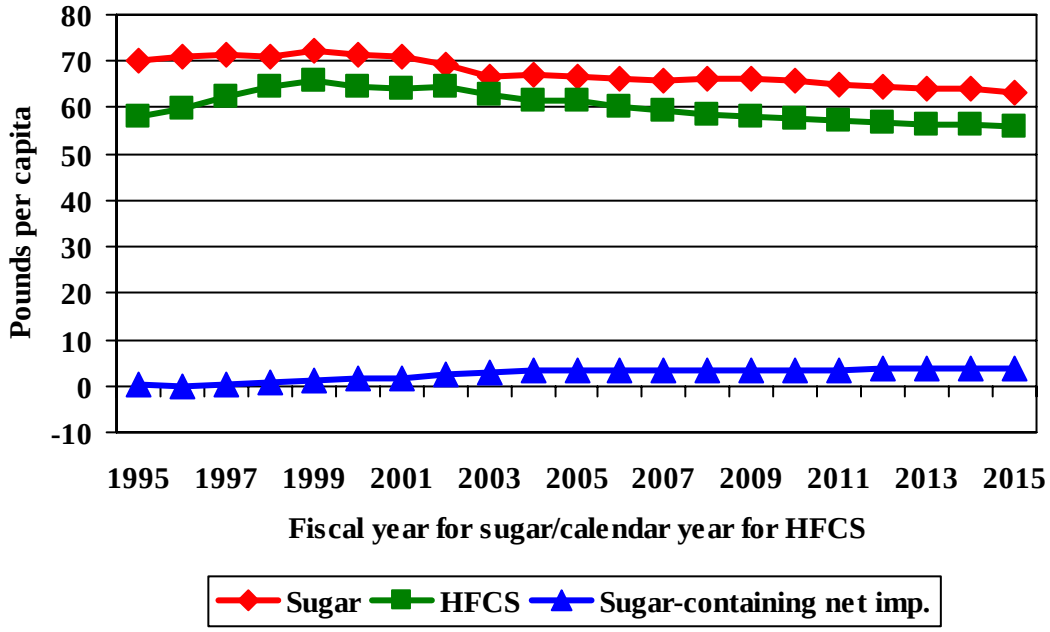

Figure 4. FOB Caribbean Price of Sugar under a New WTO Agreement

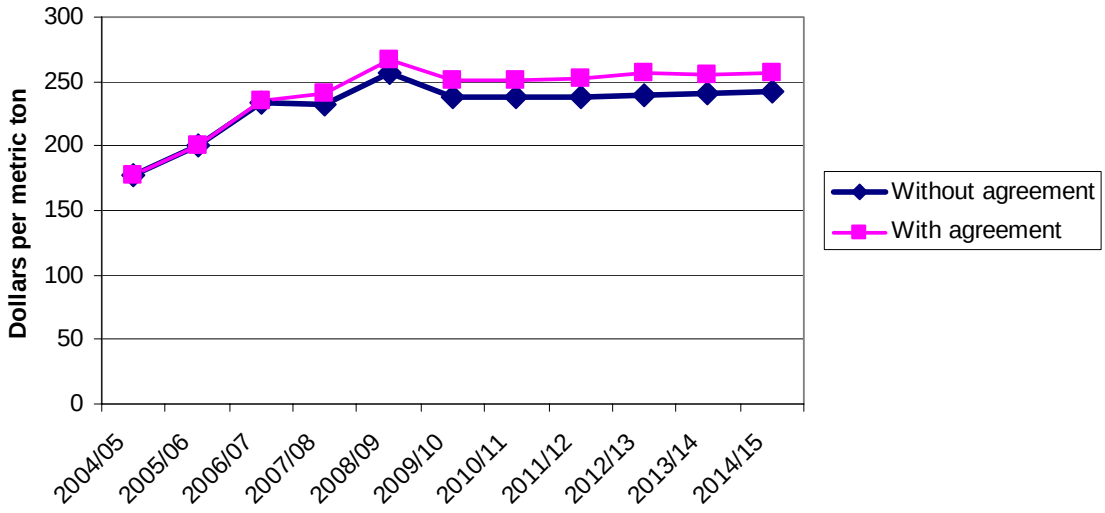

Table 1. US Sugar and Sweetener Supply, Utilization, and Prices

	1 Low Import Baseline Scenario	2 High Import Baseline Scenario	3 Low Import Standard Program Scenario	4 High Import Standard Program Scenario	5 = 2-1 High Import Baseline - Low Import Baseline	6 = 3-1 Low Import Standard Program - Low Import Baseline	7 = 4-2 High Import Standard Program - High Import Baseline
			(Thousand short tons, raw basis, fiscal year 2008-2015 average)				
Sugar allotment	8,564	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sugar production	8,591	8,287	9,088	8,630	-303	497	343
Sugar imports	1,847	2,984	1,767	2,919	1,137	-80	-64
(of which, duty-free NAFTA)	218	1,355	138	1,290	1,137	-80	-64
Sugar domestic deliveries	10,177	10,906	10,586	11,273	728	409	367
Sugar exports	213	216	217	220	3	4	3
Sugar ending stocks	2,050	2,709	2,085	2,148	658	35	-560
(of which, CCC stocks)	87	1,066	0	0	979	-87	-1,066
Sugar-containing product net imports	563	541	537	518	-22	-26	-23
			(Thousand short tons, calendar year 2008-2015 average)				
HFCS production	9,183	8,990	8,932	8,766	-193	-251	-224
HFCS domestic use	8,951	8,167	8,692	7,939	-784	-259	-228
HFCS net exports	232	823	240	827	591	8	4
			(Cents per pound, fiscal year 2008-2015 average)				
N.Y. spot raw sugar	20.60	18.73	18.42	16.86	-1.87	-2.17	-1.87
Refined beet sugar	23.64	21.05	20.63	18.45	-2.59	-3.02	-2.60
Retail refined sugar	44.02	41.09	40.55	37.99	-2.93	-3.47	-3.10
HFCS, 42%, Midwest (cal. yr.)	12.04	11.38	11.20	10.66	-0.65	-0.84	-0.72

Table 2. US Sugar Beet Production, Prices, and Returns

	1 Low Import Baseline Scenario	2 High Import Baseline Scenario	3 Low Import Standard Program Scenario	4 High Import Standard Program Scenario	5 = 2-1 High Import Baseline - Low Import Baseline	6 = 3-1 Low Import Standard Program - Low Import Baseline	7 = 4-2 High Import Standard Program - High Import Baseline
	(Thousand short tons, raw basis, fiscal year 2008-2015 average)						
US sugar beet production	28,350	26,970	29,688	28,362	-1,380	1,338	1,392
California	1,713	1,625	1,807	1,701	-88	94	76
Colorado	689	646	702	659	-43	13	13
Idaho	5,224	4,953	5,461	5,138	-271	237	185
Michigan	3,134	2,965	3,086	2,918	-169	-47	-47
Minnesota	9,209	8,802	9,739	9,427	-406	531	624
Montana	1,202	1,141	1,271	1,216	-62	69	75
Nebraska	781	736	809	738	-44	29	2
North Dakota	5,202	4,970	5,633	5,444	-232	431	474
Ohio	37	35	36	34	-2	-1	-1
Oregon	342	326	332	316	-16	-10	-11
Washington	146	139	141	134	-7	-4	-5
Wyoming	672	632	669	637	-40	-2	5
	(Cents per pound, fiscal year 2008-2015 average)						
Refined beet sugar price	23.64	21.05	20.63	18.45	-2.59	-3.02	-2.60
	(Dollars per ton, fiscal year 2008-2015 average)						
Sugar beet price	40.38	37.08	36.55	33.79	-3.29	-3.82	-3.29
	(Dollars per acre, fiscal year 2008-2015 average)						
Gross market returns	920.08	844.78	833.59	769.97	-75.31	-86.49	-74.81
Variable expenses	488.50	488.50	488.50	488.50	0.00	0.00	0.00
Net market return	431.58	356.27	345.09	281.47	-75.31	-86.49	-74.81
Loan deficiency payment	0.00	0.00	0.00	18.33	0.00	0.00	18.33
Counter-cyclical payment	0.00	0.00	0.00	12.61	0.00	0.00	12.61
Direct payment	0.00	0.00	164.06	164.06	0.00	164.06	164.06

Table 3. US Sugarcane Production, Prices, and Returns

	1 Low Import Baseline Scenario	2 High Import Baseline Scenario	3 Low Import Standard Program Scenario	4 High Import Standard Program Scenario	5 = 2-1 High Import Baseline - Low Import Baseline	6 = 3-1 Low Import Standard Program - Low Import Baseline	7 = 4-2 High Import Standard Program - High Import Baseline
			(Thousand short tons, raw basis, fiscal year 2008-2015 average)				
US sugarcane production	31,279	30,673	33,471	31,566	-606	2,192	893
Florida	15,095	14,977	16,107	15,069	-118	1,012	92
Hawaii	1,779	1,085	973	361	-693	-806	-724
Louisiana	12,893	13,093	14,660	14,454	200	1,767	1,362
Texas	1,512	1,518	1,731	1,682	6	219	164
			(Cents per pound, fiscal year 2008-2015 average)				
N.Y. raw sugar price	20.60	18.73	18.42	16.86	-1.87	-2.17	-1.87
			(Dollars per ton, fiscal year 2008-2015 average)				
Sugarcane price	27.81	25.33	24.93	22.86	-2.47	-2.87	-2.47
			(Dollars per acre, fiscal year 2008-2015 average)				
Gross market returns	1014.32	910.08	890.34	804.89	-104.25	-123.98	-105.19
Variable expenses	748.45	748.45	748.45	748.45	0.00	0.00	0.00
Net market return	265.87	161.63	141.89	56.44	-104.25	-123.98	-105.19
Loan deficiency payment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Counter-cyclical payment	0.00	0.00	0.00	16.73	0.00	0.00	16.73
Direct payment	0.00	0.00	217.57	217.57	0.00	217.57	217.57

Table 4. US Corn Use and Price

	1 Low Import Baseline Scenario	2 High Import Baseline Scenario	3 Low Import Standard Program Scenario	4 High Import Standard Program Scenario	5 = 2-1 High Import Baseline - Low Import Baseline	6 = 3-1 Low Import Standard Program - Low Import Baseline	7 = 4-2 High Import Standard Program - High Import Baseline
			(Million bushels, crop year 2007/08-2014/15 average)				
Corn for HFCS production	539	528	525	515	-11	-15	-13
			(Dollars per bushel, crop year 2007/08-2014/15 average)				
US corn farm price	2.329	2.326	2.325	2.323	-0.003	-0.003	-0.003

Table 5. US Government Program Costs

	1 Low Import Baseline Scenario	2 High Import Baseline Scenario	3 Low Import Standard Program Scenario	4 High Import Standard Program Scenario	5 = 2-1 High Import Baseline - Low Import Baseline	6 = 3-1 Low Import Standard Program - Low Import Baseline	7 = 4-2 High Import Standard Program - High Import Baseline
			(Million dollars, fiscal year 2008-2015 average)				
Sugar direct payments	0	0	463	463	0	463	463
Sugar counter-cyclical payments	0	0	0	36	0	0	36
Sugar loan deficiency payments	0	0	0	23	0	0	23
Sub-total	0	0	463	521	0	463	521
Other sugar costs (loans, etc.)	8	175	-1	-1	167	-9	-176
Sugar total costs	8	175	462	520	167	454	345
Corn counter-cyclical payments	221	233	238	250	12	16	16
Sugar total + corn CCPs	229	408	699	770	179	471	362

Table 6. Parameters Assumed for a Standard Commodity Program for Sugar

	Beet	Cane
Loan Rate	16.48 cents per pound	12 cents per pound
Direct payment (per pound)	3 cents per pound, raw sugar equivalent	3 cents per pound
Target price	20 cents per pound, raw sugar equivalent	20 cents per pound
Base area	1.5 million acres	1.0 million acres
Base yield	3.2 tons per acre, raw sugar equivalent	4.3 tons per acre

Table 7. US Aggregate Measure of Support for Sugar

Year	Admin. Price	External Reference Price	Eligible Production	AMS
	(dollars/metric ton)		(million MT)	(million dollars)
1995	396.83	230.82	6.67	1,108
1996	374.79	230.82	6.51	937
1997	374.79	230.82	7.26	1,045
1998	374.79	230.82	7.59	1,093
1999	374.79	230.82	8.20	1,180
2000	374.79	230.82	7.87	1,133
2001	374.79	230.82	7.17	1,032

Appendix A. Further Details on Assumptions for Each of the Scenarios

The major macroeconomic assumptions used in our analysis are summarized in tables A1-A4.

Baseline

In calculating the allotments applied in the two variants of the baseline, we use the following formula: Allotment = Sugar deliveries + 0.185 * (Sugar deliveries + Sugar exports) - Beginning stocks - 1,532,000 tons. The 0.185 factor was that used by USDA in setting fiscal 2005 allotments to reflect a normal stocks-to-use ratio.

Standard Program

Except for loan rates, beet sugar provisions are expressed in raw sugar equivalents. Counter-cyclical payment rates for both cane and beet sugar are determined by the following formula: max (0, (Target price - Direct payment rate – max (NY raw sugar price, raw sugar loan rate)).

Program base areas and yields are based on 1998-2001 averages. The sugar beet base area is set equal to 1998-2001 average planted area, while the sugarcane base area is set equal to 1998-2001 average area harvested for sugar and seed. The program yields are set equal to the respective yields of raw sugar equivalent per acre harvested for sugar. Alternative rules could have been used; the rules selected mimic those used in setting program provisions for peanuts in the 2002 Farm Act.

Under the marketing loan provisions for other crops, producers have the ability to repay loans based on a loan repayment price if that is lower than the loan rate plus interest. How this loan repayment price would be set for sugar is an important question for which there is no obvious answer. For wheat, feed grains, and oilseeds, “posted county prices” (PCPs) are the loan repayment rates. PCPs are set using a complicated formula that ultimately ties local county prices to terminal market prices. For cotton and rice, loan repayment rates are tied to “adjusted world prices” that are linked to world market developments. Neither approach seems directly applicable to sugar. For the purposes of our analysis, we assume that the average loan repayment rate for sugar will be 2 cents per pound below the average market price. This is arbitrary, but is consistent with the experience in other crops, where loan repayment rates are almost always at slightly lower level than observed market prices. This ensures that farmers rarely have an incentive to forfeit commodities in lieu of repaying loans.

Trade Liberalization

The only Doha Round proposal with detailed modalities is the Harbinson draft and that information was used in evaluating the impact of a WTO agreement.[12] We also reduce the installment period for developing countries to five years, given the constraints on the time horizon used in the baseline for our study.

There are three types of trade policy reforms under this scenario: tariff-rate quota (TRQ) expansion to a minimum share of a reference consumption level; bound tariff decreases using a tiered system; and the elimination of export subsidies with the value and volume of subsidized exports being reduced to zero.

Market access – TRQs

We use the same approach for tariff cuts and minimum TRQ increases. Rather than applying an average increase, we assume that countries will act strategically to achieve a 10 percent average increase with up to a 12 percent increase in marginal TRQs to offset the 8 percent minimum on "key" products. We monitor current levels of TRQ fill in the TRQ expansion. The fill rate is often less than 100 percent but the TRQ expansion may go to low-cost producers. The fill rate could also decrease when the US producer price (and the new EU reference price) decline. We assume that for a quota fill of less than 60 percent the increase in the quota does not lead to an actual increase in sugar imports because the under-fill is so substantial.

Developed-country WTO members:

TRQ volume increases to a minimum of 8 percent of domestic consumption based on the 2003-04 average (a 1999-2000 average was used in the original Harbinson proposal) in five equal increments. We assume no changes to in-quota tariffs.

Developing-country WTO members:

TRQ volume increases to a minimum of 5 percent of domestic consumption with respect to 2003-04 average consumption (1999-2000 was specified in the Harbinson proposal), in five increments. There were ten increments in the Harbinson proposal but that was shortened to fit our period of analysis. We assume no changes to in-quota tariffs

As shown in Table A5, the TRQ expansion affects only Colombia, South Africa and the Philippines. Many countries do not fill their TRQs (less than 60 percent of TRQ filled in recent years), and many countries already have a TRQ higher than 8 percent of their consumption for developed-country WTO members or 5 percent for developing-country WTO members. The combination of these two factors (substantial under-fill, and large TRQ relative to consumption) means that

[12] WTO. *Negotiations on Agriculture: First Draft of Modalities for the Further Commitments*. TN/AG/W/1/Rev.1. March 18, 2003. http://www.wto.org/english/tratop_e/agric_e/mod_tnagw1r1_e.pdf.

only three major countries experience an actual increase in imports under the TRQ expansion.

Market access – bound tariffs

We use the minimum tariff line cuts in the Harbinson proposal, not the average reduction, under the assumption that countries will act strategically to meet the average proportional reduction criteria without any consequence for sugar other than the minimum cut. We use applied or Most Favored Nation (MFN) rates in our analysis, not the bound rates. We monitor bound and applied rates in each country to determine when there is "water" in the tariffs (tariff redundancy) and thus when an effective tariff change is likely to occur. The bound and applied tariffs for major countries and the implied reductions in applied tariffs are given in Table A6.

Developed-country WTO members:

Bound tariffs cuts are in five equal installments. The minimum line cuts are as follows:

1. For tariffs above 90 percent: the minimum line reduction is 45 percent in five equal installments
2. For tariffs in the range 15-90 percent: the minimum line reduction is 35 percent in five equal installments
3. For tariffs below 15 percent: the minimum line reduction is 25 percent in five equal installments.

Developing-country WTO members:

1. Tariffs above 120 percent: 30 percent reduction per line in five equal installments
2. Tariffs between 60 and 120 percent: 25 percent minimum line reduction in five equal installments
3. Tariffs between 20 and 60 percent: 20 percent reduction in five equal installments
4. Tariffs under 20 percent: 17 percent reduction in five installments.

We assume that sugar will not be declared a "sensitive" product by any developing country, and therefore will not be subject to lower tariff reductions than agreed for this group of countries as a whole.

As shown in Table A6, the changes in applied out-of-quota tariffs are modest because bound tariffs are very high and many countries have applied tariffs lower than the final bound tariffs that would result from the implementation of a Doha WTO agreement.

Export subsidies

This reform component has the strongest impact on the sugar market but through one market participant (the European Union). The changes are as follows:

Developed-country WTO members:
If the sector outlay represents at least 50 percent of all outlays: 30 percent reduction annually in the previous year's outlay for five years, then to zero in year 6. This probably will not apply to sugar. For all other subsidies: there is a 25 percent reduction of the previous year's outlay for five years, then to zero in year 6. The export volume commitment is also cut 30 percent annually from its previous year's level for five years.

Developing-country WTO members
If the sector outlay represents at least 50 percent of all outlays: there is a 25 percent decrease from the previous year's outlay, annually for five years, then to zero by year 6. Actual cuts for developing countries may be more modest. For all other export subsidies, there is a 20 percent reduction from the previous year's outlay for five years, then to zero in year 6. This keeps us within the 10-year baseline period for our study (the Harbinson proposal had a 12-year implementation period).

As may be deduced from Tables A7 and A8, the reduction in export subsidies is likely to have the largest impact on international markets. The reduction in EU export subsidies induces a one-for-one permanent decrease in production under quota. The affected exports are non ACP subsidized exports (about 1.273 million metric tons [mmt] of white sugar) but not the 1.6 mmt of ACP re-exports which are also subsidized but not part of the WTO commitment. These are covered by a recent WTO ruling that is being appealed. Under this scenario the EU is expected to become an even larger importer because production will fall by an additional 1.27 mmt. We do not include the ACP re-exports as part of the export subsidy reform because these are still part of the unresolved WTO dispute. The elimination of the latter would intensify the necessary reductions in EU sugar production.

Table A1. Population Growth Projections (percent change from previous year)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Major Exporters												
Australia	0.92	0.89	0.86	0.84	0.82	0.79	0.77	0.76	0.74	0.73	0.71	0.70
Brazil	1.14	1.09	1.06	1.03	1.00	0.97	0.94	0.90	0.88	0.85	0.83	0.80
European Union-15	0.22	0.21	0.19	0.17	0.16	0.14	0.13	0.11	0.10	0.09	0.07	0.06
European Union-New Member States	-0.07	-0.06	-0.06	-0.05	-0.06	-0.06	-0.06	-0.07	-0.08	-0.09	-0.11	-0.12
Mexico	1.20	1.18	1.17	1.16	1.15	1.14	1.13	1.12	1.10	1.08	1.07	1.05
Thailand	0.93	0.89	0.86	0.82	0.79	0.75	0.72	0.68	0.65	0.62	0.59	0.56
Major Importers												
Canada	0.93	0.91	0.90	0.88	0.87	0.85	0.84	0.83	0.82	0.80	0.79	0.78
China	0.57	0.57	0.59	0.60	0.62	0.64	0.67	0.69	0.69	0.68	0.66	0.63
India	1.46	1.43	1.40	1.37	1.35	1.32	1.29	1.27	1.25	1.23	1.20	1.18
Indonesia	1.52	1.48	1.44	1.40	1.36	1.31	1.27	1.23	1.20	1.16	1.12	1.08
Japan	0.09	0.07	0.04	0.00	-0.03	-0.07	-0.11	-0.15	-0.19	-0.23	-0.27	-0.30
Russia and Ukraine	-0.49	-0.45	-0.43	-0.41	-0.41	-0.40	-0.40	-0.40	-0.41	-0.41	-0.42	-0.43
United States	0.93	0.92	0.90	0.89	0.87	0.87	0.87	0.86	0.86	0.85	0.85	0.84

Table A2. Real GDP Growth Projections (percent change from previous year)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Major Exporters												
Australia	3.71	3.27	2.86	2.68	2.69	2.76	2.71	2.69	2.65	2.66	2.65	2.61
Brazil	4.00	4.10	4.08	4.03	4.28	4.30	4.15	4.19	4.06	4.02	4.06	4.10
European Union-15	2.05	2.26	2.39	2.13	2.09	2.08	2.10	2.10	2.10	2.10	2.07	2.09
European Union-New Member States	5.00	4.78	4.65	4.54	4.34	4.07	3.94	4.13	4.10	3.95	4.00	4.05
Mexico	3.63	3.65	3.66	3.67	3.68	3.69	3.70	3.66	3.69	3.72	3.76	3.80
Thailand	7.23	6.01	5.35	5.18	5.40	5.51	5.60	5.75	5.99	5.83	5.53	5.38
Major Importers												
Canada	3.00	3.55	3.32	3.16	3.12	3.11	3.10	3.02	2.80	2.57	2.40	2.31
China	8.64	7.23	7.01	7.02	6.79	6.78	6.56	6.35	6.27	6.27	6.37	6.26
India	6.39	6.16	5.49	5.73	5.85	5.58	5.53	5.51	5.47	5.45	5.39	5.31
Indonesia	4.73	5.00	4.81	4.76	4.63	4.61	4.72	4.87	4.76	4.80	4.82	4.62
Japan	4.06	2.55	1.97	1.86	1.76	1.66	1.61	1.61	1.63	1.66	1.71	1.70
Russia and Ukraine	6.30	5.27	4.58	4.57	4.26	3.82	3.82	3.48	3.66	3.88	3.89	3.83
United States	4.27	3.32	2.90	3.17	2.88	2.96	3.08	3.07	3.02	3.23	3.50	3.26

Table A3. GDP Deflator Growth Projections (percent change from previous year)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Major Exporters												
Australia	2.39	2.80	1.97	1.47	2.68	2.53	2.49	2.50	2.60	2.57	2.55	2.54
Brazil	7.42	8.22	8.02	7.33	7.87	7.63	7.56	7.49	7.41	7.34	7.27	7.20
European Union-15	3.16	1.64	1.71	1.61	1.76	1.89	1.90	1.92	1.89	1.89	1.90	1.89
European Union-New Member States	1.02	6.22	2.80	2.97	2.49	2.48	2.38	2.46	2.26	2.52	2.46	2.40
Mexico	6.05	4.41	4.39	4.34	4.34	4.33	4.33	4.34	4.34	4.36	4.37	4.39
Thailand	2.51	2.35	2.26	2.39	2.53	2.62	2.75	2.91	3.00	3.05	3.08	2.97
Major Importers												
Canada	2.41	1.08	1.43	1.50	1.70	1.94	1.95	1.81	1.73	1.71	1.78	1.91
China	3.67	4.90	4.05	3.75	3.38	3.10	3.11	3.23	3.39	3.38	3.27	3.26
India	5.70	5.10	5.00	5.10	5.30	4.68	4.51	4.64	4.66	4.58	4.50	4.43
Indonesia	5.33	5.43	5.29	4.32	4.00	3.95	3.92	3.96	4.02	4.05	4.08	4.10
Japan	-1.70	-0.34	0.37	1.12	1.46	1.66	1.85	1.96	2.04	2.11	2.12	2.11
Russia	12.42	8.99	8.11	7.36	6.70	6.23	5.91	5.46	5.25	5.16	4.97	4.91
Ukraine	8.43	7.01	5.92	5.50	5.20	4.50	4.20	4.20	4.50	4.10	4.00	4.00
United States	2.11	1.94	1.71	1.89	1.97	1.98	2.13	2.34	2.34	2.17	2.19	2.26

Table A4. Exchange Rate Growth Projections - Local Currency per US Dollar (percent change from previous year)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Major Exporters												
Australia	-10.04	1.10	-0.83	-0.37	-0.25	-0.27	-0.28	-0.28	-0.30	-0.31	-0.32	-0.33
Brazil	-1.14	6.19	5.88	6.71	4.25	4.22	3.86	3.84	3.81	3.79	3.76	3.73
European Union	-8.85	-1.89	-0.95	-3.34	-1.08	-0.31	-0.33	-0.34	-0.30	-0.26	-0.22	-0.23
Mexico	4.75	2.41	4.37	5.79	4.33	4.62	6.35	4.81	4.44	4.11	3.73	4.43
Thailand	-3.36	-1.12	-1.75	-1.77	-1.27	-0.86	-0.97	-0.75	-0.94	-0.92	-0.62	-0.73
Major Importers												
Canada	-4.70	-1.48	-3.07	-3.79	-1.04	-0.92	-0.76	-0.54	-0.40	-0.57	-0.65	-0.56
China	0.00	0.00	-2.35	-4.36	-3.51	-2.02	-1.00	-1.00	-0.36	0.28	0.20	0.12
India	-2.11	3.99	2.04	1.48	2.08	1.92	1.77	1.70	1.66	1.61	1.54	1.49
Indonesia	3.23	-4.47	-3.13	0.57	1.05	0.99	0.95	0.92	0.93	0.97	1.00	1.02
Japan	-7.67	-5.81	-3.35	-0.49	-1.10	-1.55	-1.37	-1.02	-0.75	-0.50	-0.28	-0.07

Table A5. Analysis of the Increase in Sugar Tariff-Rate Quotas (TRQs)

Countries	TRQ	Recent fill	Consumption	TRQ expansion							
	(tmt)	rate	threshold	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Colombia	57	78%	70	60	62	65	68	70	70	70	70
European Union 25	1,590	100%	1,410	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590
South Africa	62	100%	129	75	89	102	116	129	129	129	129
Thailand	14	0%		14	14	14	14	14	14	14	
Mexico	184	54%		184	184	184	184	184	184	184	184
China	1,945	42%		1,945	1,945	1,945	1,945	1,945	1,945	1,945	1,945
Morocco	274	187%	82	274	274	274	274	274	274	274	274
Philippines	64	100%	100	71	78	85	93	100	100	100	100
United States	1,229	83%	777	1,229	1,229	1,229	1,229	1,229	1,229	1,229	1,229
Venezuela	132	250%	68	132	132	132	132	132	132	132	132

Notes:

1. If the fill rate is less than 60 percent then no expansion is assumed.

2. Fill rate estimated by using TRQ notification if recent or gain reports if dated notification.

3. TRQ increase is up to 8 percent of average 2002-3 consumption if developed countries fill their TRQ at least at 60 percent and if the current TRQ is less than 8 percent of consumption.

4. The consumption threshold is only 5 percent for developing members of the WTO.

Table A6. Bound and Applied Tariffs and Implied Reductions in Applied Tariffs

Country	WTO Status	Bound Level Uruguay Final	Doha Modality	Reduction in Doha Modality	Applied Tariffs	Implied reduction in applied tariff
ARGENTINA	Developing	35	28	7	23	0
AUSTRALIA	Developed	24	16	8	0	0
BRAZIL	Developing	35	28	7	16	0
CANADA	Developed	11	8	3	9	0
COLOMBIA	Developing	117	88	29	20	0
CUBA	Developing	40	32	8	10	0
EGYPT	Developing	20	17	3	5	0
EUROPEAN UNION	Developed	194	107	87	194	87
INDIA	Developing	150	105	45	65	0
INDONESIA	Developing	95	71	24	31	0
JAPAN	Developed	353	194	159	353	159
KOREA	Developing	18	15	3	5	0
MALAYSIA	Developing	17	15	3	0	0
MEXICO	Developing	212	148	64	233	85
MOROCCO	Developing	168	118	50	35	0
PAKISTAN	Developing	150	105	45	35	0
PERU	Developing	68	51	17	25	0
PHILIPPINES	Developing	50	40	10	65	25
SOUTH AFRICA	Developed	105	58	47	65	7
THAILAND	Developing	94	71	24	65	0
TURKEY	Developing	135	95	41	137	42
UNITED STATES	Developed	210	116	95	195	79
VENEZUELA	Developing	105	79	26	20	0
CHINA	Developing	50	40	10	50	10

Notes:

1. Countries covered individually in the sugar model. Other countries are aggregated under a "Rest of the World" category.
2. Calculations include: Column F=D*(1-E/100); Column G= D minus F; Column I = H minus F.
3. Bound and applied specific tariffs have been converted to an ad valorem equivalent.
4. The EU-25 includes New Member Statesand; all countries incorporate EU tariff policy after 2004.

Table A7. Export Subsidy Notifications for Major Exporters and Importers

Algeria	Not a WTO member
Argentina	Notified no export subsidies in 2002 or 2003
Australia	Notified no export subsidies in 2002 or 2003
Brazil	No subsidy in 1996 reported in 2003
Canada	No export subsidies applied to sugar
China	2004 notification of no export subsidies applied in 2002 or 2003
Colombia	2001 notification of no subsidies in 2000
Cuba	Notified no subsides applied in 2002.
Egypt	1999 notification of no export subsidies in 1998 and beyond
European Union	1,273.5 tmt white sugar and 499.1 million euros commitments nearly binding in recent years. Implied reduction = volume commitment
Former Soviet Union	No subsidies used in Georgia. Russia is not a WTO member
India	No subsidies
Indonesia	No sugar export subsidy notification
Iran	Not a WTO member
Japan	2004 notification of no export subsidies applied in 2003
Malaysia	2000 notification of no export subsidies used in 1997 and 1998
Mexico	Notified in 2002 that no export subsidies were used in 1996
Morocco	2003 notification of no sugar subsidies in 2001
Pakistan	2001 notification of no subsidies on sugar for 2000
Peru	2003 notification of no sugar subsidies in 2002
Philippines	2004 notification of no export subsidies in 2002 or 2003
South Africa	Some subsidized exports notified in 2000 and 2002 (2.1% of volume target) . Reduction of exports = 2.1%
South Korea	2002 notification of no sugar export subsidies in 2000
Thailand	2004 notification of no export subsidies in 2002
Turkey	2001 notification of no subsidies on sugar for 2000
United States	2004 notification of no subsidies on sugar in 2002

Table A8. Implied Change in EU-15 Production Quota (thousand metric tons) with the Reduction in Export Subsidies

	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Net baseline quota level	**14,275**	**13,400**	**12,984**	**12,568**	**11,508**	**11,508**	**11,508**	**11,508**	**11,508**	**11,508**	**11,508**
Export subsidy reduction	**0**	**0**	**0**	**382**	**267**	**187**	**131**	**92**	**214**	**0**	**0**
Net quota in trade reform scenario	**14,275**	**13,400**	**12,984**	**12,186**	**10,858**	**10,671**	**10,540**	**10,448**	**10,235**	**10,234**	**10,234**

Appendix B. Impact of Payment Limitations

Payment limits set the maximum amount of commodity program benefits an individual or entity can receive by law. Under the 2002 Farm Act, payment limits per individual or entity are $40,000 for direct payments, $65,000 for counter-cyclical payments, and $75,000 for loan-deficiency payments/marketing assistance loan gains. Under the Act's three-entity rule, individuals can receive program payments from up to three separate entities engaged in farming operations, effectively doubling the payment limits per individual. The 2002 Farm Act also established a $2.5 million adjusted gross income (AGI) cap. An individual or entity whose AGI exceeds $2.5 million is not eligible for payments unless 75 percent or more of AGI is derived from farming, ranching, or forestry operations.

At a direct payment rate of $164 per acre for sugar beets,[13] a farmer not taking advantage of the three-entity rule would encounter the $40,000 payment limit at 244 or more acres of beets. Taking advantage of the three-entity rule to double the limit to $80,000 would raise the threshold number of beet acres to 488. In the case of sugarcane, at a direct payment rate of $218 per acre, a farmer not taking advantage of the three-entity rule would encounter the payment limit at 183 or more acres of cane. Taking advantage of the three-entity rule would raise the threshold number of cane acres to 366. These thresholds would be lower for farmers already receiving direct payments for other program crops because those payments count toward the limit. Sugar beet farms often produce significant amounts of wheat and, to a lesser extent, corn. Production of other program crops is less common among sugarcane farms, the major exception being rice production by some Louisiana sugarcane growers.

About one-seventh (14 percent) of sugar beet farms have 500 or more acres of sugar beets, and they account for 41 percent of total US sugar beet acreage and 40 percent of total US sugar beet production.[14] About one-fifth (22 percent) of sugar beet farms have between 250 and 499 acres of sugar beets, and they account for 29 percent of total sugar beet acreage and 30 percent of total production. For sugarcane, about one-fifth (22 percent) of growers have farm sizes of 2,000 or more acres, and they account for 69 percent of total US sugarcane acreage and 71 percent of total US sugarcane production.[15] An additional 45 percent of sugarcane growers have farm sizes between 500 and

[13] A direct payment of 3 cents per pound for beet sugar is equivalent to $164 per acre of beets, given the figures we use for program yields and sugar recovery rates. Similarly, a direct payment of 3 cents per pound for cane sugar is equivalent to $218 per acre of cane.

[14] M. B. Ali, *Characteristics and Production Costs of US Sugarbeet Farms*. Statistical Bulletin Number 974-8. US Department of Agriculture. Economic Research Service. October 2004. http://www.ers.usda.gov/publications/sb974-8/sb974-8.pdf.

[15] National Agricultural Statistics Service. *2002 Census of Agriculture*. http://www.nass.usda.gov/census/.

1,999 acres, and these growers account for 28 percent of total sugarcane acreage and 25 percent of total production.

The number of sugar beet farms in the United States declined from 8,810 in 1992 to 5,027 in 2002, and average sugar beet acreage per farm increased from 164 to 272 during this period.[16] In sugarcane, the trends were less pronounced but similar in direction: the number of sugarcane farms declined from 1,031 in 1992 to 953 in 2002, and average sugarcane acreage per farm increased from 857 to 1,027. If these trends continue, the proportion of total sugar beet and sugarcane acreage operated by farms that could be subject to payment limits would be higher in the future than today.

The degree to which payments limits would actually restrict payments to sugar beet or sugarcane growers is uncertain. A recent report by the Commission on the Application of Payment Limitations for Agriculture concluded that producers have many options for reorganizing their farm businesses in ways that reduce the effects of payments limits.[17] The Commission also concluded that payment limits have a very small impact on total direct payments and CCPs for current program crops.

Assuming that producers take full advantage of the three-entity rule but do not otherwise reorganize their farm businesses in response to payment limits, we estimate that 60 percent or more of sugar beet acreage would be farmed by producers subject to payment limits and at least 95 percent of sugarcane acreage would be farmed by producers subject to payment limits. We estimate that strict payment limits along these lines would reduce expenditures on direct payments by about one-half, from $463 million per year to about $224 million per year ($166 million per year for beets and $58 million per year for cane). CCP and LDP expenditures would be reduced by a similar percentage in the scenarios where these occur (those involving high sugar imports from Mexico). Actual expenditures on direct payments would likely fall somewhere between $224 million and $463 million per year.

One option for facilitating adjustment by producers to the new program would be to provide transitional payments along the lines of those offered under the recent tobacco and peanut quota buyouts. Transitional payments could be made proportional to current marketing allotments, and producers could be given the

[16] National Agricultural Statistics Service. *2002 Census of Agriculture*. http://www.nass.usda.gov/census/, and National Agricultural Statistics Service. *1992 Census of Agriculture*. http://www.nass.usda.gov/census/census92/agrimenu.htm.

[17] Commission on the Application of Payment Limitations for Agriculture. *Report of the Commission on the Application of Payment Limitations for Agriculture*, *Submitted in Response to Section 1605, Farm Security and Rural Investment Act of 2002.* Office of the Chief Economist, US Department of Agriculture. August 2003. http://www.usda.gov/oce/oce/payments/paymentLimitsAll.pdf.

option of receiving the payments over a period of years or in one lump sum. The situation is not completely analogous to tobacco or peanuts because quotas for those commodities had an established economic value that marketing allotments for sugar do not have. Nevertheless, the marketing allotments could form a basis for such transitional payments.