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A Primer on US Sugar in the 2007 US Farm Bill

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A Primer on US Sugar in the 2007 US Farm Bill

Abstract

This background paper is devoted to US sugar policy. A first section describes the features and economics of the US sugar program; a second section is devoted to the welfare and trade effects of the US sugar program; and a final section reports on potential emerging reforms, their expected effects, and implications. Beyond well-established findings on the social cost and inefficiency of the US sugar program, the main findings of this paper are as follows. The current sugar program is becoming unsustainable because sugar imports are progressively creeping into the US market through regional trade agreements, eventually inducing large sugar inventories, or contracting domestic production to unpalatable low levels in order to maintain high internal prices. The sugar program in its current form is also a potential target for reform because of likely reductions in amber box limits under a potential Doha Agreement of the World Trade Organization (WTO). The current support accounting for sugar under the WTO favors abandoning the current program. A possible outcome would be to change the current sugar program into a standard program, removing the domestic supply controls (allotments), lowering the loan rate, implementing countercyclical, and direct payments, but keeping the current trade protection nearly intact thanks to the high bound-tariff on sugar. Slightly lower consumer prices would result. Payment limitations would penalize large growers. The paper also looks at the cost and implications of a buy-out. The recent resolution of the sweetener dispute (sugar, and corn syrup) between the US and Mexico removes much uncertainty from these markets. Long-term expansion of Mexican sugar exports into the US remains a possibility in 2008. A standard crop program with a lower loan rate would reduce incentives for Mexican producers to export sugar to the US market.

Keywords: dispute, HFCS, NAFTA, sugar, sugar program, sweetener, trade, TRQ, US farm bill.

Acronyms/Initialisms

ACP	African, Caribbean, and Pacific (sugar group)
AMS	aggregate measure of support
CAFTA-DR	Central America Free Trade Agreement and Dominican Republic (Agreement)
CBI	Caribbean Basin Initiative
CCC	Commodity Credit Corporation
CCP	countercyclical payment
CGE	computable general equilibrium
CMO	common market organization
DP	direct payment
EBA	Everything But Arms
EU	European Union
FAIR	Food and Agricultural Improvement and Reform Act
FTA	free trade agreement
FTAA	Free Trade Agreement of the Americas
FY	fiscal year
HFCS	high fructose corn syrup
HTS	harmonized tariff system
LDP	loan deficiency payment
mha	million hectare
mnt	million metric ton
MPS	market price support
mt	metric ton, used as international trade units
NAFTA	North America Free Trade Agreement
OECD	Organization for Economic Cooperation and Development
PIK program	payment-in-kind program
PSE	producer support estimate
st	short ton (1 metric ton = 1.102312 short tons) used as domestic units
strv	short ton raw value (1 metric ton = 1.102312 short tons) used as domestic units
TRQ	tariff rate quota
URAA	Uruguay Round Agreement on Agriculture
USDA	US Department of Agriculture
USGAO	US General Accounting Office
USTR	US Trade Representative
WTO	World Trade Organization

Introduction

This paper is devoted to US sugar policy. It distills the large body of recent sugar policy analyses undertaken since 2000. The paper has three main sections: (i) a first section describing the features and economics of the US sugar program; (ii) a second section devoted to the welfare and trade effects of the US sugar program; and (iii) a final section on potential emerging reforms, their expected effects and implications.

It is well established that the US sugar program induces large transfers from US sugar users to US sugar producers, sugar crop growers, and select foreign producers. Net welfare losses to society are also significant but much smaller than are the transfers. The sugar program is also an inefficient way to transfer income to sugar exporters in developing countries because of massive trade diversion under the current system of bilateral import tariff rate quotas (TRQs).

In addition, the sugar program is becoming unsustainable in its current form because sugar imports are progressively creeping into the US market through regional trade agreements, eventually inducing large sugar inventories, or contracting domestic production to unpalatable low levels in order to maintain high internal prices. The sugar program in its current form is also a potential target for reform because of likely reductions in amber box limits under a potential Doha Agreement of the World Trade Organization (WTO). The current support accounting for sugar under the WTO favors abandoning the current program, which suffers from “double counting” under the accountability for domestic support and market access in the WTO.

A possible outcome would be to change the current sugar program into a standard program, removing the domestic supply controls (allotments), lowering the loan rate, implementing countercyclical, and direct payments, but keeping the current trade protection nearly intact thanks to the high bound-tariff on sugar. Under normal production conditions (no natural supply shocks), slightly lower consumer prices would result. Payment limitations would penalize large growers.

The recent resolution of the sweetener dispute (sugar and corn syrup) between the US and Mexico removes much uncertainty from these markets. Long-term expansion of Mexican sugar exports into the US remains a possibility after FY 2007. A standard crop program with a lower loan rate would reduce incentives for Mexican producers to export sugar to the US market because of lower prices.

Section 1. The simple economics of the US sugar program

This section reviews the key features of the US sugar program, its pivotal reliance on border protection to manage international supply, and the key role of domestic production distortions to sustain domestic prices higher than their world price counterparts. The sugar program has changed moderately in the last 70 years. It is increasingly under pressure to change, created by various regional and multilateral market access commitments, as explained in later sections.

The sugar program has been functioning as a price floor mechanism with the so-called loan program. A loan rate guarantees a minimum price to sugar producers, which is shared between processors and sugar-crop farmers (beet and cane). Control on domestic production and trade

actually keeps prices slightly above the loan rate. This system of price supports is made possible by a tight restriction on imports of sugar through a set of bilateral TRQs managed by the Office of the US Trade Representative and the US Department of Agriculture (USDA), as explained later in the paper.

The out-of-quota imports are taxed at a prohibitive tariff rate, which precludes importing more than the TRQ, except for imports coming from Mexico since 2000 under NAFTA. The high-tier sugar tariff faced by Mexico at the US border has been falling over time. Mexican exports can eventually compete with US sugar as the tariff progressively falls to zero. Domestic supply is managed with “allotments,” such that the US market prices of raw cane sugar and beet sugar price remain above the loan rate level. USDA then avoids having to buy up sugar forfeited under the loan program (USGAO; Jurenas). US sugar market equilibrium is reached when US domestic demand is equal to the sum of the production allotment, imports under the TRQ system, out-of-quota imports from Mexico, and change in stocks. Out-of-quota imports from Mexico, when they take place, determine the US market price at the margin.

1.1. The evolution of the sugar program

The Jones-Costigan Act in 1934 set the economic foundations of the current sugar program, with quantitative restrictions at the border allowing manipulation and management of supply domestically to create rents for sugar producers. In December 1974, record world sugar prices prompted the removal of domestic production restrictions on sugar, but these record prices did not last. A price support program, a non-recourse loan program, was put in place by the Food and Agriculture Act of 1977.¹ Sugar processors could obtain a loan using sugar as collateral if they agreed to pay sugar producers a price not lower than an established minimum price. The processors could either pay back the loan plus interest 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 bilateral quotas was initiated based on historical trade patterns. This system is still in place today under a set of bilateral TRQs. With the exception of 1980-81, which was characterized by high market prices, a series of sugar programs provided price support through a loan rate system and barriers on imports.

The Food Security Act of 1985 introduced the requirement that the program should be operated at “no cost” to the federal government (no federal outlays). This means that total domestic supply should be regulated to ensure that the government did not accumulate stocks of sugar. Hence, USDA has managed the program to keep US market prices above the loan rate to avoid forfeiture of sugar inventories. In addition to the existing trade barriers, 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 (strv). The sugar TRQ was created by Presidential Proclamation in 1990 in response to an adverse WTO ruling in a case brought by Australia against the former import quota system.

¹ Under the non-recourse provision, the CCC cannot refuse the repayment through forfeiture of the sugar collateral.

Under, the 1996 Food and Agricultural Improvement and Reform Act (FAIR), the loan rate system was modified such that loans were non-recourse if the TRQ was set at 1.5 million short ton raw value (strv) or greater and at recourse if the TRQ was less than that amount.² Several changes were introduced in the legislation. The marketing controls on domestic sugar and the no-cost requirement were both eliminated. Penalties were introduced and imposed for the forfeiture of sugar to the CCC (1¢ per pound for cane sugar and 1.07¢ per pound for beet sugar). The interest rate charged on loans was set at one percentage point above the CAC'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 nonrecourse loans were limited to farmers who had agreed to comply with each commodity program provision. Contract producers could pledge a quantity of a commodity as collateral and obtain a loan from the CCC. The borrower could repay the loan with interest within a specified period (often less than one year) and regain control of the commodity, or forfeit the commodity to the CCC with no interest penalty. Although the sugar program changes were moderate in 1996, the FAIR Act was framed by reforming free-market proponents in a climate of high market prices. Following several years of lower market prices, farm interest groups had "recaptured" the farm bill in 2002.

1.2. The current program under the 2002 farm bill

The current sugar program under the Farm Security and Rural Investment Act of 2002 continued loan rates to processors of 18¢ per pound for cane sugar and 22.9¢ per pound for refined beet sugar. Loans are non-recourse and may be taken for a maximum term of nine months. The marketing assessments, forfeiture penalty, and the interest rate premium on loans were eliminated.

The 2002 legislation allows for a payment-in-kind program, which had been 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 (no federal outlay) of previous sugar programs was reinstated in 2002 to avoid a likely unsustainable expansion of production generated under the FAIR Act. In order to achieve this, supply controls by means of a marketing allotment system were also reinstated. The allotment can only be applied when imports for domestic consumption are less than 1.532 million strv, the so-called trigger level. This way, sugar processors produce sugar they can sell domestically. The FY 2006 allotment quantity was set at 9.35 million strv.

1.3. The multilateral trade environment

Under the Uruguay Round Agreement on Agriculture (URAA) of the WTO in 1994, the US agreed to allow market access to a minimum quantity of 1,117,195 mt of raw sugar each marketing year (October–September), and 22,000 mt of refined sugar at a preferential tariff (the in-quota tariff rate). The low duty of 0.625¢/lb, raw value, applies to in-quota imports. Practically all of the imports under the TRQ come into the US at zero or near zero tariffs. Many countries continue to avoid the small duty because of the General System of Preference or Caribbean Basin Initiative (CBI) programs. US imports have systematically exceeded this minimum market access commitment since 1994. The raw sugar TRQ has been allocated to 40 quota-holding countries based on their historical export shares during the 1975-81 period when trade was relatively unrestricted.

² Under the recourse provision, the CCC can require repayment of the loan at maturity.

The duty on raw sugar above the quota was 17.62¢/lb beginning in January 1995 and lowered by 0.45¢/lb each year until it reached 15.36¢/lb in 2000 (see Table 1). The refined sugar above-rate tariff was 18.60¢/lb in 1995 and declined by 0.48¢ per year through 2000 to reach 16.21¢/lb. The over-quota tariff on raw sugar remains prohibitive. Even with an extremely low world price of about 5¢/lb, assuming a US raw sugar market price of 22¢/lb and a transportation price of 1.5¢/lb, the tariff would be prohibitive. These specific tariffs represent ad valorem rates of about 114-240% in ad valorem equivalent for world prices ranging from 13.5¢/lb down to 6.5¢/lb. The lower the reference world price, the higher the ad valorem tariff has to be to prohibit trade.

Between 1996/7 and 1999/2000, sugar imports were drastically reduced to accommodate a large domestic production supply expansion, probably unforeseen by designers of the 1996 farm bill. Prices changed in favor of sugar relative to wheat. Sugar production increased by nearly 26% and net imports were reduced by 41% to accommodate the supply expansion and keep market prices above the loan rate, at the cost of sugar users. However, the WTO commitment on market access put a lower bound on the import volume allowed under the TRQ system, as explained previously. Hence, import-contraction as an accommodating mechanism had been used up, as no further significant contraction could take place while at the same time meeting the WTO market access commitment. The current TRQ allocations (FY 2007) are shown in Table 2.

1.4. NAFTA

The North American Free Trade Agreement (NAFTA) became effective on January 1, 1994, and most trade barriers between Canada, Mexico, and the United States are in the process of being eliminated over the subsequent 15 years. Beginning in FY 2008, Mexico will have duty-free access with no quantitative limit. The high-tier tariff schedule for raw and refined sugar in the US has been declining by an equal annual amount, from the most favored nation 1994 tariff levels to zero (see Table 1, columns 4 and 5), respectively, over the transition period to duty-free access in January 2008. Out-of-quota imports from Mexico have been occurring on and off since 1998-99 depending on the relative attractiveness of the Mexican and US markets. As the out-of-quota tariff has been falling, the US market has become much more attractive.

The NAFTA sugar provisions signed in 1992 were altered by a side-letter agreement prior to the start of the NAFTA Agreement in 1993. According to the NAFTA side-letter, Mexico's low-tier tariff sugar exports to the United States are restricted by Mexico's "net surplus production" of sugar. The net surplus is defined as Mexico's production of sugar less its consumption of sugar and high fructose corn syrup (HFCS). From FY 2001 through FY 2007, Mexico is to have duty-free access to the US market for its surplus, up to a maximum of 250,000 mt raw value. Starting in 2008, access will be unrestricted as long as the rule of origin is satisfied.

Mexico never recognized the side-letter agreement while the US pressed for the application of modalities spelled out in the side-letter. A long and multifaceted trade dispute followed, involving US attempts to constrain sugar flows out of Mexico and Mexican attempts to block US HFCS from entering Mexico. HFCS has been popular with Mexican soft-drink bottlers as a good and inexpensive substitute for expensive Mexican sugar. The HFCS penetration has had a negative impact on Mexican sugar markets and exacerbated the negative effect of the constraint on sugar exports to the US under the side-letter agreement. Mexico has significant trade barriers and high domestic prices of sugar, which reduce the attractiveness of exports to the world markets.

Table 1. Out-of-Quota Tariff on US Sugar Imports under URAA and NAFTA

Year	Other Countries	Other Countries	Mexico	Mexico
	Raw cane Sugar	Refined Sugar	Raw cane Sugar	Refined Sugar
Base	18.08	19.08	16.00	16.95
1995	17.62	18.60	15.20	16.11
1996	17.17	18.12	14.80	15.69
1997	16.72	17.65	14.40	15.26
1998	16.27	17.17	14.00	14.84
1999	15.82	16.69	13.60	14.42
2000	15.36	16.21	12.09	12.81
2001	15.36	16.21	10.58	11.21
2002	15.36	16.21	9.07	9.61
2003	15.36	16.21	7.56	8.01
2004	15.36	16.21	6.04	6.41
2005	15.36	16.21	4.53	4.81
2006	15.36	16.21	3.02	3.20
2007	15.36	16.21	1.51	1.60
2008	15.36	16.21	0.00	0.00

Source: USDA ERS

In July 2006, Mexico and the US resolved their eight-year-old sweetener dispute. Two major elements were part of this dispute: the Mexican consumption tax on soft drinks containing HFCS and the flow of out-of-quota sugar imports from Mexico to the US under NAFTA. The tax on soft drinks had been found inconsistent with the GATT 1994 (WTO, 2006b,c) but Mexico had been dragging its feet to remove the tax, pending resolution of the contention within NAFTA on Mexican sugar exports to the US. Under the new agreement, the US will provide duty-free access to 250,000 metric tons of Mexican sugar during this marketing year (FY 2007); in addition, it will allow at least 175,000 mt of sugar import from Mexico from October 1, 2007 through December 31, 2007 (FY 2008).

Under the July agreement, Mexico provides reciprocal duty-free access for US HFCS, including 250,000 mt in FY 2007 and at least 175,000 metric tons for the first three months of FY 2008. Mexico also agreed not to impose duties on US HFCS, starting in calendar year 2008. The 250,000 mt of HFCS imports is smaller than the HFCS amount that was displaced by the Mexican soft drink tax in 1999. Expert opinion (Elobeid, Roney) estimates that about 300,000 mt of HFCS were displaced by the tax. Mexico also established a small sugar TRQ for US sugar starting in FY 2007. Mexico will establish a duty-free quota for US sugar of not less than 7,258 metric tons (raw value) for each of marketing years 2006, 2007 and 2008. It is not clear what will happen after 2008.

According to the original NAFTA, the over-quota tariff on US sugar should be eliminated effective January 1, 2008. For its part, Mexico announced on July 27 its intention to implement the July 27 agreement with respect to FY 2007 amounts. Mexico and the United States will consult before July 1, 2007 in order to set allocations for the first three months of FY 2008, which per the agreement may range from 175,000 metric tons raw value to 250,000 metric tons raw

value. Hence, a dispute could erupt in summer 2007 over how much Mexican sugar could be exported to the US and how much US HFCS could be exported to Mexico. In 2008, there is no official restriction on bilateral trade between Mexico and the US. Depending on relative prices, one could see trade going either way, although it is expected that Mexico's excess supply of sugar created by the end of the HFCS dispute would find its way to the US. Assuming that US HFCS imports replaced 250 tmt of Mexican sugar, Mexican sugar exports to the US could easily double, from roughly 250 tmt to 500 tmt. There is the credible threat that US sugar could be exported to Mexico, especially if Mexican prices are higher than US market prices. Hence, both parties are likely to tread water before making an aggressive move that could disturb both countries' markets.

Table 2. FY 07 Raw Cane Sugar Country Allocations (mt raw value)

Argentina	55,112	Madagascar	7,258
Australia	106,378	Malawi	12,817
Barbados	8,972	Mauritius	15,380
Belize	14,098	Mexico	7,258
Bolivia	10,253	Mexico (NAFTA)	250,000 (net of 7,258)
Brazil	185,841	Mozambique	16,662
Colombia	30,760	Nicaragua	26,915
Congo	7,258	Panama	37,168
Costa Rica	19,225	Papua New Guinea	7,258
Cote d'Ivoire	7,258	Paraguay	7,258
Dominican Republic	225,573	Peru	52,548
Ecuador	14,098	Philippines	173,025
El Salvador	33,323	South Africa	29,478
Fiji	11,535	St. Kitts & Nevis	7,258
Gabon	7,258	Swaziland	20,507
Guatemala	61,520	Taiwan	15,380
Guyana	15,380	Thailand	17,943
Haiti	7,258	Trinidad & Tobago	8,972
Honduras	12,817	Uruguay	7,258
India	10,253	Zimbabwe	15,380
Jamaica	14,098	Total (including NAFTA)	1,586,733

Notes: 1) The FY 2007 refined sugar TRQ is set at 57,000 mt raw value, inclusive of the minimum market access level under the WTO (22,000 mt raw value, of which 1,656 mt raw value specialty sugar) and an additional 35,000 mt raw value of specialty sugars. USTR allocates 10,300 mt raw value of refined sugar to Canada, 2,954 metric tons raw value to Mexico, and 7,090 metric tons raw value to be administered on a first-come, first-served basis. The 36,656 mt raw value allocation of specialty sugar will be administered on a first-come, first-served basis. 2) Of the 64,709 mt TRQ for certain sugar-containing products, 59,250 mt are allocated to Canada. The remainder is available for other countries on a first-come, first-served basis. 3) Quantities allocated to Mexico under WTO raw cane sugar tariff-rate quota, but not the WTO refined sugar tariff-rate quota, will be counted against the 250,000 mt. At least 175,000 metric tons raw value of raw or refined sugar will be allowed for the first three months of FY 2008 (Oct. 1 through Dec. 31, 2007).

1.5. Recent trade developments following hurricanes Katrina and Rita

In 2005, US sugar production was hit by a series of natural shocks. Hurricanes Katrina and Rita destroyed a large part of the sugar cane crop and weather shocks also affected the sugar beet crop. Domestic prices surged as a result. USDA released 500,000 tons of sugar from its CCC stocks,

increased imports from Mexico, and reallocated unmet production allotment to imports to deal with the market disruption (Schmitz, Schmitz, and Seale). Disruptions in refineries from hurricane Katrina were also reported (USDA FAS, 2005). Imports exceeded 2 mmt.

In January 2006, the secretary authorized the usual 1,117,195 metric tons of raw value market access commitment and an additional amount of 387,017 metric tons raw value to ensure sufficient supplies on the domestic market. This amount includes the minimum amount authorized by the harmonized tariff system (HTS) under chapter 17 (1,117,195 mt raw value) and an additional amount of 387,017 mt raw value, which represents the amount of the domestic cane sugar allotment that the CCC estimates will not be filled in FY 2006 (USDA FAS 2006a), including the allowance for 250,000 mt to Mexico sugar suppliers (USDA FAS 2006b). An exception to the allotment-trigger rule, which is at the discretion of the USDA secretary, allows maintaining the allotment system under unusual circumstances when sugar imports exceed the trigger level.

Additional provision changes by USDA in 2006 included the following measures for the end of FY 2006 and FY 2007: an increase in the FY 2006 refined sugar TRQ of 90,700 mt (100,000 strv) and an increase in the FY 2006 specialty sugar TRQ of 9,000 mt. The most recent (July 2006) program provisions establish the FY 2007 raw sugar TRQ at 1,481,497 strv, which is 226,800 mt (250,000 strv) above the WTO minimum access commitment of 1,117,195 mt. The FY 2007 refined and specialty sugar TRQ is set at 57,000 mt, 35,000 mt above the WTO minimum access of 22,000 mt. The allotment for FY 2007 is set at 8.75 million strv, reflecting the continuing limitations in domestic production following the hurricanes of 2005. As sugarcane is a perennial crop, its production is resistant to natural shocks over time. As US sugar production recovers, additional TRQ allocations will shrink and trade partner gains will disappear.

1.6. Other trade agreements: missed opportunities

The US-Australia Free Trade Agreement (FTA) entered into force on January 1, 2005. Sugar was exempted for the bilateral trade integration package. Australia's market access for sugar under the FTA was unchanged to the great disappointment of Australian sugar interests. Australia's allocation was 149,126 mt for FY 2006 and is 106,378 mt for this fiscal year. There is no expansion planned under this FTA, unlike in the Central American-Dominican Republic Free Trade Agreement (CAFTA-DR). An opportunity to impose world market discipline on US sugar markets was missed.

Central American countries (Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua) and the Dominican Republic historically have charged high tariffs on US goods, limited by WTO commitments. In contrast, under the CBI, the US allows many goods from Central America with little protection, sugar being one major exception, with a very large tariff slapped on out-of-quota imports of sugar and limited quota allocation gains of 107,000 mt for the six countries. The US-CAFTA-DR aims at reducing the tariff asymmetry and integrating the various markets of this region. Relative to sugar, Central American countries and the Dominican Republic are phasing-out their sugar tariffs over 15 years, although the out-of-quota duty on sugar in the US remains unchanged and will only change according to new multilateral commitments under the WTO once the Doha Round is concluded. The US is establishing additional TRQs for the Dominican Republic and Central American countries under CAFTA, starting at a collective gain in access of

107,000 mt with the gain growing to just over 151,000 mt in year 15, thereafter growing by 2% a year (simple growth) into perpetuity. The United States also establishes a quota for specialty sugar goods of Costa Rica in the amount of 2,000 mt annually. Provisions will ensure only net surplus exporting countries in the region have increased access, and provisions have been made to allow alternative forms of compensation to be established to facilitate sugar stock management by the United States.

In sum, the CAFTA-DR agreement provides a moderate added pressure to NAFTA (151 tmt) but no real jolt to US sugar markets, as could have been done (shown later in Section 2). Another opportunity was missed to bring price discipline to US sugar markets. The US sugar industry was very effective at fighting trade opening under the CAFTA-DR agreement.

There are several free trade agreements being considered by the US government including the Free Trade Agreement of the Americas (FTAA), and agreements with Brazil, Colombia, Thailand, and others (Orden; Schmitz, Schmitz, and Seale; and Salassi, Kennedy, and Breaux). Schmitz, Schmitz, and Seale; and Salassi, Kennedy, and Breaux look at the various FTAs being considered by the US with Latin American countries and assess the export potential of Latin and Central America producers and the implications for US sugar producers. They reiterate the case that domestic sugar markets are sensitive to the volume of imports. The potential for expanded trade from Latin American exporters is large in the context of an FTAA that would include Brazil, or even in the simpler context of a bilateral agreement with Colombia. Brazil and Thailand are major world sugar exporters and larger countries than CAFTA member countries. They are less dependent on the United States, and less likely to bow to pressure to accommodate US sugar interests. However, the lack of success of the US-Australia FTA at liberalizing and integrating the US sugar market might be a bad omen for the forthcoming FTAs.

Section 2. The welfare and trade effects of the US sugar program

This section provides estimates of gains and losses to users (final consumers and food processors), farmers, taxpayers, and trade partners (competitive exporters, others) based on recent analyses by Abler et al.; Andino, Taylor, and Koo; Beghin et al.; Elobeid and Beghin; Sheales et al.; Wolhgenant, and others. The analysis identifies the large transfers among economic agents and net welfare losses. It stresses the importance of the conditioning environment when estimating trade and welfare effects, with a focus on the relevant border price in light of the current world price hike, the recently resolved sweetener dispute with Mexico, and the interaction between world ethanol and sugar markets. The analysis also contrasts the implications of unilateral and multilateral reforms of sugar market interventions. The paper presents estimates of the effects of full liberalization of the sugar market, unilaterally and multilaterally.

2.1. Domestic effects

The sugar program and associated trade restrictions have major welfare effects. They greatly tax US users of sugar (final consumers, food processors). The program is a blunt instrument for supporting sugar farmers, as consumption decisions are strongly distorted, unlike programs for other crops. US users of sugar have been paying between two and three times the world price of sugar depending on world and domestic market conditions. Transfers have been larger than the associated deadweight losses, as is often the case in agricultural markets with inelastic demand and supply schedules.

Estimates of the social cost and transfers associated with the US sugar program include USGAO, Sheales et al.; Beghin et al., and others. Most studies of full liberalization provide welfare, trade, and price effects of comparable magnitudes. Some analyses of partial liberalization find lower welfare effects for comparable trade effects, because they assume a larger price elasticity of demand for sugar (e.g., Andino, Taylor, and Koo assume a demand elasticity of -0.52).

USGAO estimated that the net benefit from the program and trade protection to sugar producers (combined growers and refiners) was \$561 million (at 1995 prices); HFCS manufacturers gained \$548 million; exporters' gains were 166 million, while deadweight loss was 110 million on average for the 1989-1991 period. The total cost to users (food processors and final consumers) was estimated at \$1.4 billion (at 1995 prices) on average for the 1989-1991 period.

Sheales et al. found that removing the US sugar program and opening US borders to foreign sugar would induce a net US welfare gain of \$452 million, saving US consumers about \$1.6 billion per year in 1998-99 dollars. US sugar beet and cane market prices would fall by roughly 34%. Production would fall 21% from a base of 7.7 mmt; and total imports would increase by 1.8 mmt to 4.3 mmt.

Beghin et al. found that, with the removal of the program and under free trade, in 1998 cane growers, sugar beet growers, and processors would have lost \$307, \$650, and \$89 million, respectively; and sweetener users would have gained \$1.9 billion. The deadweight loss of the program was estimated at \$532 million. All of these figures are based on 1998 data. Estimates based on 1996 data provide comparable but lower figures because the world price of sugar was higher in 1996 relative to 1998 (12.24¢/lb versus 9.68¢/lb), hence reducing the drop in sugar prices following liberalization. Using 1998 data, full liberalization has the following short-term effects: production of cane would fall by 0.5 million short tons (st) to about 29.5 million st, whereas beet production would fall more sharply, by nearly 2 million st to 28 million st. Raw sugar imports would increase from 1.7 to 3.3 million strv. The world price of raw sugar would increase from 9.68¢/lb to 10.96¢/lb; the world refined sugar price would increase from 11.59¢/lb to 14.12¢/lb; and the US raw sugar price would fall from 22.06¢/lb to 12.46¢/lb. Long-term effects with doubled long-term Nerlovian responses to prices would lead to US beet and cane production contracting by 4.1 and 2.1 million st, and imports increasing by 2.2 million strv. The domestic raw sugar price would fall from 22.06¢/lb to 12.39¢/lb and the world price would increase from 9.68¢/lb to 10.89¢/lb. Beghin et al. also analyzed the implications of differing assumptions on the pass-through of lower sugar prices by food processors to final consumers. The US sugar industry has long argued that consumers would not gain from unfettered sugar markets. The gains to users are insensitive to the pass-through assumptions, but the distribution of the gains between final consumers and food processors is not, of course. Westhoff provides evidence of incomplete short-term pass-through of raw cane and beet sugar prices to the consumer retail price for sugar but a full pass-through in the long term (elasticity of one).

Andino, Taylor, and Koo analyze the implications of increasing sugar imports from Mexico on US sugar markets and provide estimates on welfare effects for the US economy. Their analysis is equivalent to several partial unilateral trade liberalization scenarios. The last scenario assumes increases in imports of 1.5 million strv, which is close to the full liberalization shock of Beghin et al., and Sheales et al. If the US increases its imports from Mexico by 500,000 strv, the reduction in US production would be moderate (4% less from a level of 8.5 million strv). There is an

asymmetric effect on cane and beet sugar. The latter is more affected than the former, a recurrent finding with larger price and output contractions (changes in levels). The wholesale sugar price would fall by about 10% and retail prices would fall about 8%. Changes for larger import increases (1 million strv and 1.5 million strv) are almost linear, that is, twice and three times as large as the effects of the 0.5 million strv scenario. In terms of welfare effects, Andino, Taylor, and Koo find that consumer surplus would increase by \$68 (500,000 strv increase in imports) to \$223 million (1.5 strv increase in imports). Producer surplus would decrease by \$29 million (0.5 strv increase in imports) to \$57 million (1.5 million strv increase in imports) with losses to beet producers slightly larger than losses to cane producers. Their respective outputs fall from 4.772 and 4.4431 million strv to 4.276 and 4,072 million strv. Total welfare improves by about \$40 million to \$136 million for the same respective shocks.

Salassi, Kennedy, and Breaux (2003) evaluated the impact on US sugar prices and of increases in sugar imports due to FTAs. Starting from a US raw sugar price of 22.92¢/lb, an increase in imports of 1 mmt, resulted in a raw sugar price of 16.57¢/lb, a decline of 28%. A 3 mmt increase in sugar imports would cause raw sugar prices to fall to near world price levels. They estimate that CAFTA countries have an export potential of nearly 28 mmt. This analysis is quite unrealistic, as world prices barely increase by 23¢/lb following the removal of 3 mmt of sugar out of the world market. This implies a price response larger than 60% for the world supply faced by the US.

2.2. International effects

An additional major criticism of the sugar program centers on the historical quota allocation, which does not allow the most efficient sugar exporters (Brazil, Thailand, Australia, among others) to exhaust their export potential to export to the US (Mitchell). World prices are also depressed because of the import TRQ system. The system is inefficient at transferring rents to TRQ-right holders, as high-cost holders cannot sell these exporting rights to efficient exporters. The resource allocation in the country holding the TRQ right is distorted, as too many resources are allocated to sugar production for which the exporting country has no inherent comparative advantage. The exporting country under the TRQ could be made much better off by renting or selling its TRQ rights to Brazil or another low-cost producer and have its sugar producers face a more relevant scarcity signal than the inflated US prices. Determining what this scarcity signal should be is a recurrent controversy, especially among sugar-producing interests (Elobeid and Beghin). Another significant issue is determining the relevant shadow price for sugar in policy analysis. There are diverging points of view. The higher the shadow price, the lower the US welfare gains of reforming the US sugar program. US proponents of reforms tend to focus on current world price and unilateral reform (USGAO; Beghin et al.), whereas US sugar interests insist on multilateral reforms (Roney, 2006). International agencies emphasize the beneficial terms-of-trade effects from multilateral reforms for sugar-exporting developing countries (Mitchell; Beghin and Aksoy). One could use the prevailing world price.

The US is a large country in world sugar markets and its imports influence world sugar prices. Hence, one should allow for a world price response in the analysis of US policy whenever changes in trade take place. For example, following the removal of the US sugar program and associated TRQ, the world price of sugar would increase by 14% (Beghin et al.) to 17% (Sheales et al.). Further, the US may liberalize its sugar policy in the context of multilateral liberalization. As sugar markets are heavily distorted in many countries (Mitchell; Elobeid and Beghin; and

Roney, 2006), one could argue that the long-term opportunity cost or shadow price of sugar should be the non-distorted long-term equilibrium world price prevailing in absence of distortions in all countries.

Under global trade liberalization, the world price of sugar would increase by 40% to 60% depending on the partial modeling approach (30% to 43.2% in Wohlgenant; 48% in Elobeid and Beghin for a global removal of all distortions; 41% in Hafi, Connell, and Sturgiss; 60+% in a Center for International Economics study). CGE model-based analysis tends to estimate smaller price effects (21% increase in world price in van der Mensbrugge, Beghin, and Mitchell; 20% in Bouët et al.).

These effects are large in partial equilibrium models because the latter do not model the potential entry of new sugar producers at high price levels. Expert opinion in the US sugar industry is that 12¢/lb represents a long-term sustainable level of the world price of raw sugar, at which several countries, beyond Brazil, can produce and export sugar profitably (Roney, 2004). Hence, the price effects of the PE models may represent a medium-term response, whereas the CGE model estimates indicate the long-term effects on prices. See Gohin and Bureau (2006a) for further review of this issue.

2.3. The sugar-corn-ethanol linkage

This section discusses the sugar-corn-ethanol interface on world markets and in the US. Does the ethanol market expansion help or hurt the sugar program? At the international level, ethanol expansion increases cane sugar prices because the latter product is an intermediate demand in ethanol production. Sugar and ethanol productions compete for the same sugarcane fields in Brazil. Ethanol production in the northern hemisphere mostly uses corn (e.g., in the US). As a result, corn prices are driven up by ethanol production expansion (Westhoff; Elobeid and Tokgoz). Roughly, a 10% expansion of Brazilian ethanol production increases world sugar prices by 2%. Similarly, a 10% increase in US ethanol production increases US farm prices for corn by about 2%. Hence, a joint expansion of ethanol markets worldwide and in the US removes some pressure on the current US sugar program, first by increasing the price of corn relative to the US sugar price, resulting in higher prices for US HFCS, a competing sweetener. The demand for US sugar in food processing could potentially increase. This effect is likely to be very small if not inexistent as HFCS has become a specialized sweetener (Evans and Davis).

In addition, by increasing the world sugar price, the differential between the US and world markets prices decreases. Political pressure to reform the program would decrease, as potential welfare gains from reform would be smaller. A higher world price also lowers the cost of a potential buyout of the sugar program, as less compensation has to be provided to entice sugar producers to exit (see section 3). In Mexico, the higher world price of sugar slightly reduces the attractiveness of the US market for Mexican sugar exports relative to the world market. This latter effect is likely to be minor, as the incentives provided by the current sugar program to Mexican sugar exporters still dominate what the world market has to offer. If the sugar program was converted to a regular crop program (LDP, CCP, direct payments), this argument would be more potent, as the domestic price of sugar would be lower to start with under a reform sugar program, assuming the reformed loan rate would be lower than the current loan rate. The gap between the world price and US market would be further reduced (Abler et al.).

There are second-order effects on the corn/sugar prices and ethanol expansion through feed markets and ethanol-HFCS capacity expansion, but they are even smaller than the primary effects just described (Mitchell; Westhoff; Elobeid and Tokgoz). Mitchell notes that increased capacity for ethanol production helps by increasing capacity for HFCS, as the same plants can be used for both products. But corn prices are driven up in the net by ethanol production (see the current run-up of prices, with futures prices above \$3/bushel), partly because ethanol production is protected in the US.

The US ethanol market is protected at the border by a combined specific (54¢/gallon) and ad valorem tariff of 2.5% on imported ethanol. For the CBI countries, there is a TRQ rule. The in-quota tariff rate is zero. The out-of-quota tariff rate is 2.5 % plus 54¢ per gallon. The TRQ is set at 60 million gallons, or 7% of US consumption, whichever is greater. CBI countries are currently unable to fill the quota (Elobeid and Tokgoz). When the domestic price of ethanol reaches the world price of ethanol (Brazilian anhydrous ethanol price plus transportation cost) plus the US border tariffs less the cost of transporting the ethanol from the Midwest to the coasts, imports from Brazil take place along the US coasts, as transporting ethanol within the US is costly, especially in summer when demand for gasoline is higher.

What would happen if the US liberalized its ethanol market? Elobeid and Tokgoz have analyzed the implications of liberalizing ethanol trade in the US market. They find that the removal of trade distortions induces a 23.9 % increase in the price of world ethanol (2006-2015 average). The US domestic ethanol price decreases by nearly 14%; production declines by 7%, whereas consumption increases by a bit less than 4%. US net ethanol imports increase by nearly 200%, albeit from a small basis. Brazil expands its ethanol production by 9%, and its net exports increase by 64%. The higher ethanol price leads to a 5% increase in the Brazilian share of sugarcane used in ethanol production relative to its sugar production. World raw sugar prices increase by about 2% and corn prices in the US fall by 1.5%. This is not likely to happen, however, as political forces rather than economics are driving new mandates to expand ethanol production in the US.

The attractiveness of both sugar and ethanol production has implications for planting decisions in Brazil. In the long term, sugarcane plantings in Brazil are expected to expand from 6.6 mha in the 2006/07 harvest to 12.2 mha in 2015/16. Sugarcane production would rise to 902.8 mmt, up from 455 mmt (Agronet). The increase in area and sugarcane production is motivated by the higher demand for ethanol and the higher prices for sugar on the world market.

Section 3. Policy options, likely reforms and their effects

This section looks at proposed policy options to reform the current sugar program. The Doha Round could lead to changes in the three pillars (market access, export subsidies, and domestic support), which could affect sugar markets in the US and the rest of the world.

Pressures to reduce amber box domestic support are likely to induce reforms of the sugar program, as this constitutes a convenient way to meet new commitments on amber box support. Removing the domestic component of the sugar program would eliminate the “double-counting” of the program (under market access and the amber box), with moderate effects on actual market equilibrium and rents as long as border protection remains high. Moving to a standard program

creates a significant problem with payment limits for large sugar crop growers (Abler et al.; Roney, 2005).

The paper reviews the consequences of changing the sugar program to a standard program crop, similar to grains and oilseeds (with direct payments, CCP, and market loan assistance payments). The latter proposed change has been considered by some US farm interest groups as a way to make the sugar program less of an outlier and to ensure that it is sustainable within NAFTA and a potential WTO Doha agreement, while preserving much of the rent transfers.

Political economic considerations are drawn on potential coalitions of interest groups affected by US sugar policy and their support or opposition to needed reforms.

3.1. Trade component of a Doha agreement

Abler et al. have analyzed the potential implications for US sugar of a plausible new agreement under the current Doha Round of WTO negotiations by making assumptions about the modalities (the cuts to be implemented) not yet finalized by the negotiations. A framework for the modalities was agreed upon in Geneva on August 1, 2004 (WTO, 2004). Several proposals were made by countries and groups of countries with little consensus achieved (Hanrahan and Schnepf). The agreed framework provides general guidelines but lacks the necessary information to lead to a quantitative analysis.

The Hong-Kong Ministerial meeting of the WTO did not produce modalities and the April 2006 deadline set by the WTO to provide modalities was missed (WTO, 2005). Abler et al. have chosen to base their assessment using the Harbinson modalities and those common to several of the group/country proposals (WTO, 2003). The assumptions chosen by Abler et al. are shown in Tables 3 through 5. They consider plausible provisions on (i) increased market access, achieved primarily through reductions in bound out-of-quota tariffs and increases in minimum access quantities (TRQ); (ii) reductions in and eventually elimination of export subsidies; and (iii) reductions in the amount limits of the most trade-distorting forms of domestic support—amber-box measures—with limitations and cuts on other forms of distorting support, particularly blue box measures, and total support inclusive of amber and blue boxes and *de minimis* support. The domestic support reforms are examined in section 3.2.

The market access provisions of a potential Doha agreement, if significant, could have consequences for the sugar program. Increases in imports would stress the existing sugar program under normal production conditions (no natural shocks as in 2005). An increase in access to the US market accorded to other countries, by increasing the TRQ for sugar or reducing over-quota tariffs, could lead to additional pressure on the program by stimulating a further buildup in government stocks under normal market conditions.

In examining the potential implications of a WTO agreement, one should take into account the likely impact on international trade and prices from recent changes in the EU sugar policy, the so-called common market organization (CMO) (Commission of the European Communities 2004, 2005, and 2006; Gohin and Bureau 2006b). The legality of the older EU policy had been challenged successfully in the WTO by several sugar-exporting countries (Brazil, Australia, and Thailand) alleging that export subsidy limits were violated (WTO 2006a). Following the

resolution of the WTO dispute and with the change in the CMO, all sugar exports are strictly limited by existing commitments under the URAA (export volume and subsidy outlay limits). The current export volume limit includes all exports including the re-export of ACP (African, Caribbean, and Pacific) sugar admitted under the EU sugar TRQ system. In the new CMO, the so-called C sugar, formerly destined to the export market, has been abolished and producer price support (intervention price) has been drastically lowered. Voluntary buyout of the most inefficient producers is being undertaken. The EU has also 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.

These policy changes are turning the EU into a net importer of sugar and are pushing world prices higher. Further reductions in export subsidies under a potential Doha agreement would accentuate this trade pattern reversal by eliminating the 1.2735 mmt of EU sugar exports, would further decrease EU sugar production by the same amount, and would also result in further increases in world sugar price.

Multilateral changes under a potential Doha agreement coupled with the EU reforms would have some impacts on world sugar markets but virtually no effect on the US market as long as the US TRQ system remains in place. Abler et al. estimate that the EU reform plus tariff changes in other countries lead to a moderate increase in world sugar prices by 4% above reference levels. Most of this increase originates in the EU reforms. Brazil and Australia pick up the bulk of the increase in sugar exports induced by the hypothetical Doha agreement.

In the US sugar market, a new WTO agreement would have no impact as the existing TRQ already exceeds a commitment of 8% of domestic consumption—the TRQ expansion proposed by the G-20 proposal. The reduced out-of-quota tariff would still remain prohibitive (see Table 3). The fill rate could also decrease when the US producer price (and the new EU reference price) decline in the case of high-cost foreign exporters. Abler et al. assume that a quota fill rate of less than 60% indicates that the increase in the market access does not lead to an actual increase in sugar imports because the under-fill is so substantial. For developed WTO members, the TRQ volume is assumed to increase to a minimum of 8% of domestic consumption based on the 2003-04 average consumption. No change in in-quota tariffs takes place. For developing members, the TRQ volume increases to a minimum of 5% of domestic consumption with respect to its 2003-04 average level. In-quota tariffs are maintained.

As shown in Table 3, the TRQ expansion affects only Colombia, South Africa, and the Philippines. Many countries do not fill their TRQs (less than 60% of TRQ filled in recent years), and these countries already have a TRQ higher than 8% of their consumption for developed-country WTO members or 5% for developing-country WTO members. The combination of these two factors (substantial under-fill, and large nominal TRQ) means that only three major countries have an actual import increase under the TRQ expansion, and the increase is moderate. Abler et al. consider the minimum tariff line cuts under the Harbinson proposal and not the average reduction. They assume countries will follow mercantilist logic for protected industries such as sugar and will act strategically to meet the average proportional reduction criteria with little impact for sugar other than the minimum cut. Bound-rate reductions translate into small reductions for applied rates in many countries, as shown in Table 4. “Water” in the tariffs (tariff

redundancy) is widespread, as shown in the table, which assumes that bound tariff cuts are as follows for developed WTO members. For tariffs above 90%, the minimum line reduction is 45%; for tariffs in the range of 15%-90%, the minimum line cut is 35%; and for tariffs below 15%, the minimum line cut is 25%. For developing members, tariffs above 120% face a 30% reduction; tariffs above 60% and below 120% face a 25% minimum reduction; tariffs between 20% and 60% are reduced by 20%; and tariffs under 20% are reduced by 17%. The Abler et al. analysis abstracts from sensitive product consideration. As shown in Table 3, the implied changes in applied out-of-quota tariffs are modest. Alternative analysis suggests that the EU and the US would benefit in a mercantilist sense by declaring sugar as sensitive in order to preserve the water in their respective tariffs and preserve the protection of their sugar industry (FAPRI).

Table 3. Analysis of the Increase in Sugar TRQs under a Hypothetical Doha Agreement

Countries	TRQ (tmt)	Recent Fill Rate	Consumption Threshold	TRQ Expansion					
				2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Colombia	57	78%	70	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
South Africa	62	100%	129	102	116	129	129	129	129
Thailand	14	0%		14	14	14	14	14	
Mexico	184	54%		184	184	184	184	184	184
China	1,945	42%		1,945	1,945	1,945	1,945	1,945	1,945
Morocco	274	187%	82	274	274	274	274	274	274
Philippines	64	100%	100	85	93	100	100	100	100
United States	1,229	83%	777	1,229	1,229	1,229	1,229	1,229	1,229
Venezuela	132	250%	68	132	132	132	132	132	132

Source: Abler et al.

Notes: 1) If the fill rate is less than 60 percent than 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 2002-03 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.

Based on the Hong-Kong ministerial meeting, export subsidies will be phased out by a Doha agreement. This reform component has the strongest impact on the world sugar market but through one market participant, the EU. Abler et al. suggest that the reduction in export subsidies is likely to have the largest impact on international sugar markets but not on the US market. The reduction in EU export subsidies induces a one-for-one permanent decrease in production under quota and result in significant price increases on world market.

3.2. Change in domestic sugar policy

While any direct implications of a new WTO agreement are unlikely for the US sugar market, important indirect implications are related to domestic support. In addition, it influences what would happen under NAFTA after 2008. The change in the sugar program to a standard program would provide a significant credit in reduced trade-distorting amber box support and could make the program more sustainable by decreasing incentives perceived by Mexican sugar exporters.

Table 4. Bound and Applied Tariffs and Implied Reductions in Applied Tariffs

Country	WTO Status	Bound Level Uruguay Final	Bound Level under Doha Modality	Reduction in Bound Tariff under Doha	Current 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

Source: Abler et al.

Notes: 1) Bound and applied specific tariffs have been converted to an ad valorem equivalent. 2) The EU-25 includes New Member States and all countries incorporate tariff policy after 2004.

Table 5 shows the aggregate measure of support (AMS) for US sugar from 1995 to 2001. For market price support (MPS) programs such as sugar, the AMS is calculated as equal to the product of the price gap between a fixed external reference price and the applied administered price from the program and the quantity of production eligible under the program. Hence, the MPS component of the AMS is not based on actual expenditures or current price gap information as is the case in the producer support estimate (PSE) used by the Organization for Economic Cooperation and Development (OECD) to compute the MPS component of the PSE. The program is a price support program in which the support originates in the form of commodity-backed loans. The administered price is the loan rate for the program less a forfeiture penalty. The administered price changed with the change in the loan rate in the 1996 farm bill. The external reference price is the 1986-88 average Caribbean price of \$202.16 per mt plus \$28.66 per mt transportation charge to the US. The AMS for the program only varies with the eligible production. The average level of AMS was \$1.075 billion and the range between high and low

years was roughly \$250 million. Estimates of the would-be AMS for sugar in 2005 and 2006 by FAPRI give roughly comparable figures (\$1.2 to 1.3 billion).

As shown in Table 6, if the sugar program became a standard commodity program and if NAFTA trade occurred with no surge, the potential contribution of sugar to the blue and amber boxes would be zero, according to Abler et al. Under more drastic scenarios, NAFTA trade degenerates into large sugar imports. The latter are shown first under the current program in column 3 of Table 6 and then under the standard program in column 6 of the table. Higher imports under the current program translate into large and unsustainable CCC stocks. Under the standard program, these large Mexican import supplies decline somewhat with lower prices, which triggers CCP and LDP payments. CCPs would be about \$36 million and LDP payments would amount to \$23 million (column 6). The parameters assumed by the latter authors for a standard commodity program for beet and cane sugar, respectively, are loan rates of 16.48¢/lb and 12¢/lb, direct payment of 3¢/lb raw sugar equivalent and 3¢/lb, target prices of 20¢/lb raw sugar equivalent and 20¢/lb, base area of 1.5 million acres and 1.0 million acres, base yield of 3.2 tons per acre raw sugar equivalent and 4.3 tons per acre. These parameters for areas and yields are based on 1998-2001 averages and are comparable to what other crops receive. Total current CCPs for all commodities are about \$4.1 billion (Hanrahan and Schnepf).

Reductions under the most stringent proposal (say, the US proposal of October 2005) would cut blue box support to 2.5% of the total value of production, or about \$5 billion for the US. Hence, the sugar CCPs would be “WTO” feasible, as the sum of existing CCPs plus the hypothetical sugar CCPs amount to less than the proposed limits and cuts in blue box support under all proposals. The LDPs would be real outlays but would represent a radical reduction in the sugar contribution to the amber box. The sugar industry has warned that LDPs could reach up to \$500 million (Roney, 2005). Sensitivity analysis undertaken by Abler et al. (some shown in Table 6, column 7) shows that for every cent that sugar prices decline, the cost of a standard sugar program to the federal government rises by \$150 to \$170 million. In sum, some uncertainty exists on the precise cost of moving to a standard program. Direct payments under the standard program would amount to \$463 million and would qualify as green box provided the US removes the current restrictions on direct payments for some agricultural commodities.

Table 5. United States Sugar Program AMS Calculations

Year	Admin. Price	External Reference Price	Eligible Production	AMS
	(dollars/metric ton)	(million metric tons)		(million dollars)
1995	396.83	230.82	6.67	1,107.77
1996	374.79	230.82	6.51	937.19
1997	374.79	230.82	7.26	1,045.45
1998	374.79	230.82	7.59	1,093.25
1999	374.79	230.82	8.20	1,180.20
2000	374.79	230.82	7.87	1,132.84
2001	374.79	230.82	7.17	1,031.78

Source: Hart and Beghin.

Table 6. U.S. Sugar Policy Scenarios. Government Outlays, and Market Effects

Column/	1	2	3	4	5	6	7
		Low Import Current Program	High Import Current program	High Import Low Substitution Current Program	Low Import Standard Program	High Import Standard Program	High Import Low Substitution Standard Program
Production & imports		(Thousand short tons, raw basis, fiscal year 2008-2015 average)					
Sugar allotment		8,564.1	n.a.	n.a.	n.a.	n.a.	n.a.
Sugar production		8,590.6	8,287.4	8,105.1	9,087.5	8,630.2	8,410.8
Sugar imports		1,846.6	2,983.5	2,978.3	1,766.8	2,919.4	2,887.3
duty-free NAFTA		217.6	1,354.5	1,349.3	137.8	1,290.4	1,258.3
Sugar domestic deliveries		10,177.3	10,905.7	10,708.1	10,586.3	11,272.6	11,016.3
Sugar exports		213.1	216.5	216.5	217.0	219.9	221.2
Sugar ending stocks		2,050.2	2,708.7	2,750.8	2,085.4	2,148.4	2,172.6
CCC stocks		87.0	1,065.7	1,081.1	0.0	0.0	0.0
Payments		(Million dollars, fiscal year 2008-2015 average)					
Sugar DPs		0.0	0.0	0.0	463.2	463.2	463.2
Sugar CCPs		0.0	0.0	0.0	0.0	35.6	131.7
Sugar LDPs		0.0	0.0	0.0	0.0	22.6	96.4
Sub-total		0.0	0.0	0.0	463.2	521.4	691.3
Other costs (loans, etc)		7.6	174.9	245.0	-1.4	-1.3	-1.3
Sugar total costs		7.6	174.9	245.0	461.8	520.1	690.0
Corn CCPs		221.2	233.4	218.2	237.6	249.7	224.5
Total sugar and corn		228.9	408.3	463.2	699.4	769.9	914.5
Prices		(Cents per pound, fiscal year 2008-2015 average)					
N.Y. spot raw sugar		20.6	18.7	18.7	18.4	16.9	16.2
Refined beet sugar		23.6	21.1	21.0	20.6	18.5	17.5
Retail refined sugar		44.0	41.1	41.0	40.5	38.0	37.0
HFCS 42%		12.0	11.4	12.4	11.2	10.7	12.2

Source: Abler et al.

Note: colors indicate allocation in the WTO domestic support boxes.

3.3. Buying out the sugar program

One way to radically reform the sugar program would be to offer a buyout of the allotment and open the border. To be incentive-compatible, the buyout scheme should offer at least as much profit as the current program offers. As profits are difficult to measure, revenues can be used as an upper bound on profit. Orden analyzes this buyout possibility. One difficulty in designing a buyout of the sugar program is the absence of an established market price for rental or purchase of marketing allotments. Table 7 shows Orden's estimates of the order of magnitude of the budgetary cost of a sugar program buyout assuming a 5% discount rate. Annual production is assumed to be 9.5 million strv (domestic producers and TRQ holders).

Column 1 in Table 7 is based on Abler et al. (see “high import” column 3 in Table 6). It assumes an increase of duty-free imports (by about 1.3 million strv). In this case, the domestic price falls by about 1.9¢ per pound. The resulting annual value of protection lost under this scenario is \$355 million, leading to a discounted lump sum value of \$1.887 billion for the 2002-2007 period of the 2002 farm bill. A 10-year buyout of 25 years of anticipated producer revenue loss has an annual cost of \$647 million and corresponding present and infinite annuity values. The cost of a more complete buyout allowing free trade would depend on the expected decline in US prices. Columns 3 and 4 of Table 7 show the results for assumed US sugar price decreases of 6¢ and 9¢ per pound, respectively. Such a buyout would be costly. Orden also discussed a partial buyout on a regional basis, which would allow compensation of the least-efficient sugar beet producers by enticing them to exit. This approach might be politically acceptable, as beet growers are smaller than and not as visible as the large cane growers of the Southeast. Larger imports could take place and the most efficient producers could survive. This path of reform would look more like the EU CMO reform.

Table 7. Possible Buyouts of US Sugar Protection

	(2)	Full Trade Opening	
	Partial Buyout Limited Trade 1.9¢/lb Price Decline	(3) 6¢/lb Price Decline	(4) 9¢/lb Price Decline
		billion dollars	
Approximate protection lost compared to period of 2002 farm bill (crop years 2002-2007)	0.355 (average) 1.887 (lump sum)	1.140 (average) 6.053 (lump sum)	1.710 (average) 9.080 (lump sum)
Buyout payments over 10 years equivalent to lost protection at levels above for 25 years	0.647 (annual) 5.240 (lump sum)	2.081 (annual) 16.810 (lump sum)	3.121 (annual) 25.215 (lump sum)
Infinite annuity equivalent of buyout payments	0.248 (annual)	0.798 (annual)	1.197 (annual)

Source: Orden.

Conclusions

This paper focused on US sugar policy. Using recent sugar policy analyses undertaken since 2000, the paper looked at the welfare and trade effects of the US sugar program. The paper also explored potential reforms and their expected effects and implications.

The US sugar program induces large transfers from US sugar users to US sugar producers, sugar crop growers, and select foreign producers. Net welfare losses are significant but smaller than are the transfers. The sugar program is an inefficient way to transfer income to sugar exporters in developing countries.

The current sugar program is slowly becoming unsustainable in its current form because sugar imports are creeping into the US market through regional and bilateral trade agreements (see also Josling). What happens to sugar in the FTAA will be pivotal. Further, the sugar program in its

current form is a potential target for reform because of likely reductions in amber box limits under a potential Doha agreement of the WTO. A possible outcome would be to change the current sugar program into a standard program, removing the domestic supply controls, lowering the loan rate, implementing LDPs, CCPs, and DPs, but keeping the current trade protection nearly intact. This is possible, as Doha is unlikely to change the border protection enjoyed by US sugar producers. Payment limitations under a standard program would antagonize large cane producers. Some initial rationalization of the industry would occur, as prices would be slightly lower.

The recent resolution of the sweetener disputes between the US and Mexico removes much uncertainty from these markets but adds a question mark for 2008 and beyond. Both governments are jointly managing trade integration in these sweetener markets. After 2008, trade will be unrestricted but the US and Mexico have little to gain in disrupting trade surges. A convergence of producer protection levels could occur.

A full buyout of the sugar program would be expensive. There is an inter-temporal trade-off when considering a reform of the sugar program. One could wait for the current program to crumble under increasing pressure from trade integration or one could think of a buyout in the next farm bill. The fiscal situation is tighter this year than it was during the last farm bill debate. Less will be spent if current farm programs continue unchanged, as commodity prices are high for the near future. This may help focus resources on a partial sugar buyout.

A partial buyout is an opportunity to rationalize the US sugar industry. Let the least-efficient producers exit with generous compensation, then let the most efficient compete at prices close to recent world prices (12¢-14¢ per pound). US sugar user and consumer gains would be sizeable. However, a partial buyout is more expensive annually in budgetary terms and yields lower protection than that given by a standard program. The political economy calculus suggests that policymakers would heavily discount future budgetary savings while farmers would oppose the loss of rents. Hence, a partial buyout is less likely than a conversion to a standard program.

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