Sugar Policies: Opportunity for Change

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Abstract

Sugar is one of the most policy distorted of all commodities, and the European Union, Japan, and the United States are among the worst offenders. However, internal changes in the E.U. and U.S. sugar and sweeteners markets and international trade commitments make change unavoidable and provide the best opportunity for policy reform in several decades. The nature of reforms can have very different consequences for developing countries. If existing polices in the E.U. and the U.S. are adjusted to accommodate higher imports under international commitments, many low-cost producers, such as Brazil, will lose because they do not currently have large quotas and are not included among the preference countries. The benefits of sugar policy reform are greatest under multilateral reform, and according to recent studies, the global welfare gains of removal of all trade protection are estimated to total as much as $4.7 billion a year. In countries with the highest protection (Japan, Western Europe, the U.S., Indonesia, and Eastern Europe) net imports would increase by an estimated 15 million tons a year, which would create employment for nearly one million workers in developing countries. World sugar prices would increase by as much as 40 percent, while sugar prices in countries that heavily protect their markets would decline. Developing countries that have preferential access to the E.U. or U.S. sugar markets are likely to lose some of these preferences as sugar policies change. However, the value of preferential access is less than it appears, because many of these producers have high production costs and would not produce at world market prices.

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Executive Summary

Sugar is one of the most policy distorted of all commodities, and the European Union, Japan, and the United States are among the worst offenders. Producers in these countries receive more than double the world market price due to government guaranteed prices, import controls, and production quotas. Such high protection has converted this group of OECD countries from net importers of half of the world's internationally traded sugar to net exporters, in aggregate, over the past 30 years. In the process, lower-cost developing county producers have been deprived of export opportunities. Efforts to reduce protection have met with stiff opposition from well-funded and entrenched supporters of existing policies, while consumers who pay high prices have voiced little opposition because of the small share of their food budgets spent on sugar. However, internal changes in the E.U. and U.S. sugar and sweeteners markets and international trade commitments make change unavoidable and provide the best opportunity for policy reform in several decades. While pressures for change are less in Japan, it may be the right time to press for global reform of sugar policies focusing on the worst offenders. Such reforms could become a key component of negotiations on the part of developing countries during the current round of multilateral trade negotiations, and a broad-based reform effort could provide the political cover needed for countries to make difficult policy changes.

Protection is very high in the E.U., Japan, and the U.S., but many other countries also protect their sugar producers. Part of this protection has evolved as a defense against policies that subsidize exports and depress world prices, and part of it has evolved because the industry in these countries is uncompetitive but politically powerful. Among other OECD countries with high protection are Mexico, Poland and Turkey. Turkey, for example, has higher protection for its sugar producers than does the E.U., and this has led to rapid production increases and periodic large exports. Among developing countries, China has import restrictions that generally keep domestic prices higher than world market prices. India, the largest sugar producer, has a heavily regulated domestic sugar market and high import tariffs to protect local producers. Kenya has high tariffs and import quotas to protect domestic producers.

Current protectionist policies have their origins in the 1800s when northern hemisphere countries that produced sugar from beets could not compete with lower-cost sugar produced from cane in tropical countries. The situation remains the same today, with the cost of sugar produced from beets nearly twice as costly as sugar produced from cane—even though refined (white) sugar from beet or cane is chemically identical and indistinguishable. The struggle for market share between beet and cane sugar producers has continued for 200 years, with the shares of global production following protectionist policies. In 1800, nearly all the world's sugar was produced from cane. Then, in the early 1800s commercial sugar beet production began in Europe, and by 1900 sugar beets accounted for 60 percent of the world's production. Now, sugar beets account for only 27 percent of global production, however, in the heavily protected E.U., Japanese, and U.S. markets, sugar beets still account for 83 percent of production.

More than half of the value of sugar production in OECD countries comes from government support or transfers from consumers—an average of $6.4 billion per year during 1999-2001. This about equals the annual $6.3 billion of sugar exports of developing countries, and was more than half of the $11.6 billion annual world sugar trade. The E.U. provided the largest support to its sugar producers, with $2.7 billion average annual support during 1999-2001, while the U.S. provided the second-largest support with $1.3 billion annually. Japan provided $0.4 billion support, while Mexico, Turkey, and Poland, provided annual support of $0.7, $0.5, and $0.2 billion, respectively. Such high support typically limits consumption, through high prices to consumers, and encourages production even when a country does not have a comparative advantage in sugar production. It also distorts production of products which use sugar, such as confectionery and fruit juices, and production of sugar substituting products, such as high-fructose corn syrups. Products such as ethanol, which can be produced from sugar cane or beets, are also affected by sugar policies and vice-versa.

Sugar policies in the E.U. and U.S. will face increasing internal pressures for reform as imports increase under international agreements. The E.U. has committed to allow the 48 least developed countries duty-free access to its sugar market by 2009 under its Everything But Arms (EBA) initiative. This could result in as much as an additional 2.4 million tons of sugar imports according to recent estimates. These imports would need to be offset by about 17 percent lower production quotas or increased non-food uses such as ethanol production in order to comply with ACP/EU Sugar Protocol and WTO commitments. The E.U. began negotiating Economic Partnership Agreements with 77 African, Caribbean, and Pacific (ACP) countries in September 2002, and these Agreements could extend duty-free access to all ACP countries and allow an additional 6 million tons of sugar to enter the E.U. The enlargement of the E.U., with 10 new members scheduled to join in 2004, could further add to pressures for reform by increasing production and exports of sugar. A WTO challenge to the E.U. sugar regime by Brazil, Australia, and Thailand could lead to even more rapid changes to the sugar program if successful. The U.S. also faces major challenges to its sugar program because domestic production is increasing faster than consumption, and international agreements will allow increasing imports. Mexico will be allowed unlimited duty-free access in 2009 under NAFTA. This could lead to a surge in imports from Mexico and to building U.S. government stocks. Even before 2009, the over-quota tariff rate is scheduled to decline by 15 percent per year under NAFTA until it reaches zero in 2008, and this could lead to large imports in the next several years if world market sugar prices remain low. The free-trade agreement between the United States and five central American countries currently being negotiated could allow these large sugar producing countries eventual access to the protected U.S. sugar market. Policy changes will be needed to the U.S. sugar program, and they could include substantially reduced production quotas, or sharply lower sugar prices. Japan faces less pressure for reform, but it provides higher protection to its sugar producers than either the E.U. or U.S. The timing of needed E.U. and U.S. sugar policy reforms coincides with the expiration of the current E.U. sugar policy in June 2006 and the expiring U.S. Farm Bill in 2007. This provides an opportunity for coordinated reforms between these two important sugar producers.

The benefits of sugar policy reform are substantial, and the gains are greatest under multilateral reform. According to recent studies of the global sugar and sweetener

markets, the global welfare gains of removal of all trade protection are estimated to total as much as $4.7 billion per year. In countries with the highest protection (Japan, Western Europe, the U.S., Indonesia, and Eastern Europe) net imports would increase by an estimated 15 million tons per year which would create employment for nearly one million workers in developing countries. World sugar prices would increase by as much as 40 percent, while sugar prices in countries which heavily protect their markets would decline. The greatest price decline would occur in Japan, where sugar prices would fall 65 percent, followed by a 40 percent decline in Western Europe, and a 25 percent decline in the United States. Brazilian producers gain the most from liberalization, around $2.6 billion per year, but this is offset by a loss of $1 billion to Brazilian consumers who pay higher prices after liberalization—leaving a net gain of $1.6 billion for Brazil. One general conclusion from recent studies is that protection in the world sugar market is imposed by developed countries at great cost to themselves and those developing countries with the economic potential to expand exports.

A number of developing countries have preferential access to the E.U. or U.S. sugar markets through the ACP/EU Sugar Protocol or the U.S. sugar import program. These countries receive the high internal price on exports allowed by quotas and this preferential access is valued at about $0.8 billion per year when compared to world market prices. However, the value of this preferential access is less than it appears, because many of these producers have high production costs and would not produce at world market prices. Further, world market prices would rise by as much as 40 percent after full liberalization, which would partially offset the loss to producers of high prices in preferential markets. The net loss to these exporting countries from full liberalization is estimated to total $0.45 billion per year.

The benefits of sugar policy reform are substantial, but the nature of reforms can have very different consequences for developing countries. If existing polices in the E.U. and the U.S. are adjusted to accommodate higher imports from EBA, NAFTA and other policies, many low-cost producers, such as Brazil, will lose because they do not currently have large quotas and are not included in the EBA, ACP, or NAFTA countries. A better alternative is to push for full liberalization of the world sugar market in order to allow efficient producers to expand production and exports, and allow consumers in protected markets to benefit from lower prices. This may also make policy change more palatable because no country is being singled out for reform. It has the advantage of somewhat higher world prices from coordinated liberalization to soften the adjustment for producers in protected markets. While change will not be easy, a coordinated liberalization has substantial advantages over marginal adjustments which keep existing sugar policies in place but allow larger imports.

I.   Introduction

Sugar is one of the most policy distorted of all commodities, with a history of protection dating back to at least the 1800s. Protection has been greatest in northern hemisphere countries that produce sugar beets, because sugar produced from beets is nearly twice as expensive as sugar produced from cane and most beet producers cannot survive without high protection. Such high protection has led to a number of problems, as producers and consumers respond to high prices, and firms adjust their operations to benefit from high prices or to evade high prices if they manufacture products which use sugar. One of the unwanted consequences of high protection is surplus sugar production which is then disposed of in the world market at subsidized prices. For example, the European Union has shifted from being a small net importer during the 1960s to a net exporter of 4 million tons of sugar per year (10 percent of world trade), and most of this has been exported with direct or indirect subsidies. An estimated 80 percent of sugar production and 60 percent of world sugar trade occurs at higher than world market price. Many countries have been pressured to protect domestic producers from heavily subsidized exports and depressed world market prices. This cycle of protection, subsidies, and more protection has been occurring for decades. Efforts to reform sugar policies and stop the cycle of protection leading to more protection may finally pay off because the European Union and the United States—two of the worst offenders—now have internal pressures to reform sugar policies, which may prove more effective than external pressures.

The European Union's Everything But Arms (EBA) initiative approved in 2001 allows immediate expanded access to the E.U. sugar market by the 48 least developed countries, and unlimited access by 2009. These imports will need to be offset by reducing production quotas or lowering internal prices. Further, the E.U. is scheduled to admit 10 new countries in 2004, and many of these countries are sugar beet producers. An additional three countries, also sugar beet producers, will join at a later time. Once these countries join, they are expected to increase production and exports. If consumption in these accession countries does not increase apace with production, E.U. intervention stocks could be forced to absorb the surplus. An additional longer-term threat to the E.U. sugar program is the Economic Partnership Agreements (EPAs), which the E.U. began negotiating with all 77 ACP countries in September 2002. Under these Agreements, the same access provided to the 48 least developed countries will likely be extended to all 77 ACP countries. These countries currently produce 6 million tons of sugar and they could provide all of it to the E.U. on short notice while covering their own consumption from the world market. Combined EBA and EPA sugar imports could total more than half of current E.U. sugar production if fully implemented. An external pressure for reform of the E.U. sugar regime is a WTO complaint filed by Brazil, Australia, and Thailand on September 27, 2002, which charges that the E.U. sugar regime subsidizes exports beyond those allowed by WTO commitments. A finding against the E.U. could lead to an immediate reform of the sugar regime.

The U.S. also needs to reform its sugar policy because high prices have encouraged high domestic beet and cane production as well as the emergence of sugar-substituting high-fructose corn syrup (HFCS). Sugar and sweetener consumption is not growing fast enough to absorb such increases and minimum import commitments made under NAFTA and WTO could soon begin to pile up. Mexico gains unlimited duty-free

access to the U.S. sugar market in 2009, and may also increase exports before 2009 under the declining above-quota NAFTA tariff if world market sugar prices remain low. This could lead to large imports, which would destabilize the sugar program and lead to sharply lower prices or production quotas. The free-trade agreement currently being negotiated between the United States and five Central American countries (Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua) could also add to imports since these countries produce more than 3 million tons of sugar per year, export 1.2 million tons, and only have quotas to sell 126,000 tons in the U.S.

Japan faces less pressure for reform, but has the highest levels of protection of the three countries and could be targeted as part of a renewed effort at global sugar policy reform. This paper looks at the pressures for policy reform in the E.U., Japan, and the U.S. and argues that prospects for reform are better now than for several decades The remainder of the paper begins with a brief history of sugar that helps to explain why sugar policies have evolved as they have and why reform has been so difficult. The third section gives essential background on sugar and sweeteners, cost of production, the world market, and support to OECD sugar producers. The fourth section examines sugar policies in major non-OECD sugar producers and traders to see how they would be affected by reforms. The fifth section reviews policies in the E.U., Japan, and the United States in detail and shows why internal reforms are necessary. The final section provides a summary and conclusion to the paper. Appendix tables provide historical data on global and country sugar consumption, exports, imports, and production.

II.   A Brief History of Sugar

Sugar was a very precious commodity when the first shipments of Caribbean cane sugar were sent to Europe during the early sixteenth century. Sugar was produced for centuries before that in China, India, the Mediterranean, and throughout Polynesia. The Persians discovered a chemical process for solidifying and refining sugar in the sixth or seventh century and this greatly facilitated trade (Strong 1954). The first record of Caribbean sugar being shipped to Europe was in 1516 when sugar was shipped to Spain. By 1530, 12 ships were recorded as arriving in Spain with 1,500 tons of sugar (Hannah 2001). Sugar cane production quickly spread from the Caribbean islands south to Brazil, north to America, and around the world. The Dutch arrived in Java in 1596 and found a sugar industry operated by Chinese immigrants. They developed the industry and exported sugar to Persia and Japan during the early seventeenth century. The English began to grow sugar cane in Barbados in the early seventeenth century, and production expanded rapidly and displaced sugar cane production in other areas of the Caribbean and Americas (Harrison, 2001). By 1665, Barbados was exporting nearly 7,000 tons of sugar annually to England. The emergence of the beet sugar industry in Europe displaced sugar production in the Caribbean during the nineteenth century, but production recovered during the twentieth century. The long and colorful history of sugar, perhaps as much as anything, explains the current world sugar market, its policies, patterns of production, and trade.

The high demand for sugar, and the high cost of producing sugar in distant lands and transporting raw cane sugar back to Europe for refining and sale, led to the development of a competing sugar industry in Europe. This new industry was based on

sugar beets and the struggle between sugar beet and sugar cane producers began, and remains, at the root of sugar policy in Europe. The commercial production of sugar from beets began in the early 1800s and by 1815 sugar beet production was well established in Europe. Rebellion in the colonies during the late 1700s and early 1800s and the disruption of supplies encouraged European countries to establish their own sugar industries and many subsidized sugar beet production. Such subsidies still continue in the European Union as part of the Common Agricultural Policy.

European sugar beet producers had a comfortable cost of production advantage over sugar cane produced in the Caribbean because of the high transportation cost. Perhaps equally important was a favorable duty drawback system on raw cane sugar, began by France in 1684 and later extended to beet sugar by all major European beet producers (Hannah 2001). The system initially allowed cane sugar refiners to receive a drawback of the import duties on raw sugar when the refined sugar was exported. The system was extended to beet sugar exports in a way that allowed beet sugar to receive the drawback on domestic production and this allowed exports at less than the cost of production (perhaps the first sugar export subsidy). Cane sugar from the colonies could not compete with such subsidies and the industry went into decline. Between 1800 and 1900, sugar beet production emerged and grew to 60 percent of the world's sugar production and dominated trade. Opposition to the duty drawback system emerged and in 1863 France, Belgium, Holland, and Great Britain met in a conference to discuss the problem. It took another 40 years for the duty drawback system to be ended by an agreement among all major European producers. The ending of the duty drawback system, declining transport costs, and lower sugar cane production costs meant that sugar beets would lose market share during the next century. By 2000, about 27 percent of world sugar production was from sugar beets, and nearly all of that was produced in protected markets in Europe, Japan, the United States, and in Eastern Europe.

The current sugar program in the European Union began in 1968, when sugar was first included in the Common Agricultural Policy. It has afforded E.U. sugar beet producers high and stable prices which have encouraged production, reduced consumption and imports, and contributed to making the E.U. the second-largest sugar net exporter after Brazil. The first U.S. government sugar program began in 1934 (Lord, 1995, page 23) and continues in much the same form today—with high prices to producers and consumers, which have contributed to shrinking imports for foreign sugar cane exporters. Since the early 1970s, U.S. net sugar imports have declined from more than 5 million tons per year to slightly more than 1 million tons per year. Japan's sugar program began with the Sugar Price Stabilization Law of 1965 (Fukuda, Dyck and Stout, 2002), and it also provides high domestic support for its sugar beet and sugar cane producers. And, like the E.U. and the U.S., it has contributed to Japan's decreasing sugar imports over the past two decades. Thus, the three largest markets for sugar imports in the 1970s have been mostly closed to competition and emerged as self-sufficient on balance compared to the early 1970s when their combined net imports accounted for half of the world's exports (Figure 1).

Figure 1. World Sugar Exports & Net Imports of Selected Countries

Source: FAOSTAT
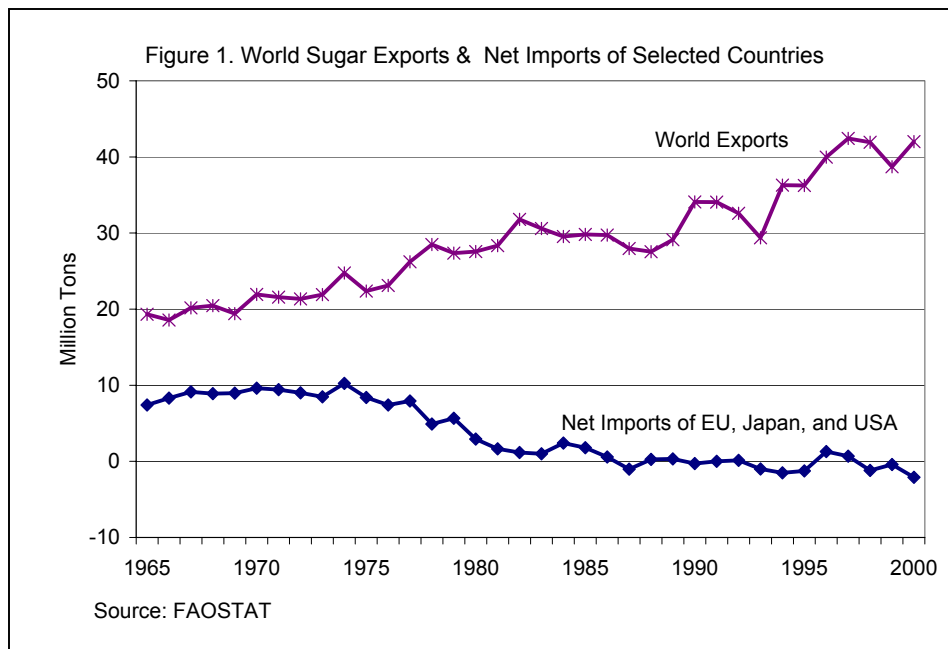
In much the same way that the European sugar beet industry emerged in the early 1800s because of high priced Caribbean sugar, a competitor to sugar has emerged because of high domestic protection to sugar producers. The competitor is high-fructose corn syrup, which is a nearly perfect sugar substitute in uses such as soft drinks. Corn syrups now account for 40 percent of caloric sweeteners use in Japan, and more than half of U.S. caloric sweetener consumption. The technique for commercial production of high-fructose corn syrup was discovered in the late 1960s and was made profitable by high sugar prices in the protected Japanese and U.S. markets. But now, economies of scale, improvements in production techniques, and large installed production capacity (financed under high prices), have made corn syrups competitive with sugar from cane and less costly than sugar from beets.

III.   Essential Background

Sugar occurs naturally in most foods, but it is economically extracted from only a few crops such as sugar beets, sugar cane, and corn. The common sugar, which we are most familiar with, is sucrose. It is a disaccharide of dextrose and fructose with a chemical formula of $C_{12}H_{22}O_{11}$. It is extracted in nearly pure form from sugar cane and sugar beets. Sucrose from sugar beets and sucrose from sugar cane are chemically identical and indistinguishable. Dextrose is a sugar derived synthetically from starch (most commonly from corn) and its chemical formula is $C_6H_{12}O_6 \cdot H_2O$. Fructose is a very sweet sugar, which is derived from dextrose, and its chemical formula is $C_6H_{12}O_6$. High-fructose corn syrup is produced by the enzymatic conversion of a portion of the dextrose in corn syrup to fructose. The composition of the most common HFCS, HFCS-55, is 55 percent fructose, 40 percent dextrose, and 6 percent higher saccharides. It is chemically similar to invert sugar used in soft drinks, which is a mixture of equal parts of dextrose and fructose produced by enzymatic action on sucrose. The fact that identical, or nearly identical sugars can be produced from different crops provides producers and consumers with a wide range of substitution possibilities. However, it also means that sugar policies are often complex as the different industries vie for support. For example, sugar producers in the E.U. have been able to legislate quotas on HFCS production in order to limit

competition. Japan also limits HFCS production in order to prevent it from further eroding sugar's market share. In the U.S., HFCS producers benefit from high sugar prices and are powerful supporters of current sugar policies.

Sugar beets are an annual root crop grown in temperate climates, while sugar cane is a tall perennial grass grown in tropical and semitropical climates. About 55 countries grow sugar beets and 105 countries grow sugar cane according to the FAO. The process of extracting sugar (sucrose) from sugar beets or sugar cane requires that the juice be extracted and processed in a factory near where the beet or cane is grown. The byproducts of sugar cane are bagasse and molasses. Bagasse is the residue of cane, after the juice is extracted. It has some industrial uses and is often used to fuel the boilers in the sugar factory (also called a sugar mill). Molasses is an edible byproduct as well as an animal feed. The byproducts of sugar beets are beet tops, which are the leafy portion of the beet used for animal feed, and molasses which is also used primarily as an animal feed. Once harvested, sugar cane is highly perishable and must be processed quickly. Sugar beets are less perishable than sugar cane, but still must be processed in a timely fashion after harvest. In addition, the high cost of transporting sugar beets or cane precludes locating the factory distant from the producing areas.

Sugar growers and sugar processors are economically interdependent, and normally share in the value of total sugar and molasses sales according to a contractual agreement. Both can influence the value of total output since the volume and sugar content of sugar beets or cane is affected by input use and production practices, and the recovery of sugar from beets or cane is dependent on the technology and operation of the sugar factory. Various ownership arrangements exist in the sugar industry--ranging from ownership of the factory and producing lands by a single company to independent growers who contract production with a factory. Some growers are members of cooperatives, which own and operate a sugar factory. State ownership of factories and/or lands are still common in developing countries, but there has been substantial privatization in recent years.

The processes for obtaining sugar from beet and cane juice are slightly different, involving a two-step process for sugar cane compared to a one-step process for beets. Both beet and cane juice contain molasses, but the molasses in raw beet juice has an unpleasant taste and, because of that, raw beet sugar is always refined directly into white sugar. In contrast, the molasses in raw cane juice has a pleasant taste and cane sugar can be consumed directly in its raw form as brown sugar.[2] The process for converting juice into white sugar is also more efficient for sugar beets than for sugar cane, and this further contributes to the incentives for producing refined white sugar directly from beets. The refining of raw cane sugar to remove the molasses and obtain white sugar is costly and requires a separate factory.[3] Consequently, many low-income countries use less expensive refining techniques to produce sugar. About 10 percent of the world's sugar production is consumed in raw or partially processed form as sugar cane syrup or crystals

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[2] However, in the U.S. and most industrial countries raw cane sugar is not consumed directly because it may have foreign matter and contaminant from bulk shipping. It is refined into white sugar and then the molasses is added back to obtain brown sugar.
[3] The standard conversion of raw cane sugar to refined white sugar is that 1.087 unit of raw cane sugar is required to produce 1.0 tons of white sugar. This assumes a standard sugar content of the cane of 96 percent (96° polarization).

in countries in South Asia, East Asia, and Latin America. An example is "gur" produced in India by boiling cane juice to produce a cake of brown sugar. In Colombia the same product is called "panela." A better quality intermediate product, which has some of the properties of refined white sugar, can also be produced at a lower cost than refining by treating raw cane syrup with chemicals to remove the impurities and improve the color and quality. This process is somewhat similar to the process of refining beet sugar, and the sugar produced is called "plantation white," "mill white," "blanco directo," or "crystal" sugar (Fry, 1985, p2).

Caloric sweeteners produced from corn starch or other commodities such as wheat (in the E.U.) or potatoes (in Japan), are used to replace sugar in some uses. The most important of these is HFCS, which is an ideal substitute for sugar in a number of applications, such as soft drinks, which require liquid sugar. It also has certain flavor properties which make it superior to sugar in some uses. Other corn sweeteners have specific properties which make them ideal for certain applications, but which limit their competitiveness with sugar. Starch-based caloric sweeteners now account for a larger share of U.S. caloric sweeteners consumption than does refined sugar, and HFCS use is only slightly less than refined sugar (Figure 2).

Figure 2. U.S. Sugar and HFCS Consumption

Source: USDA
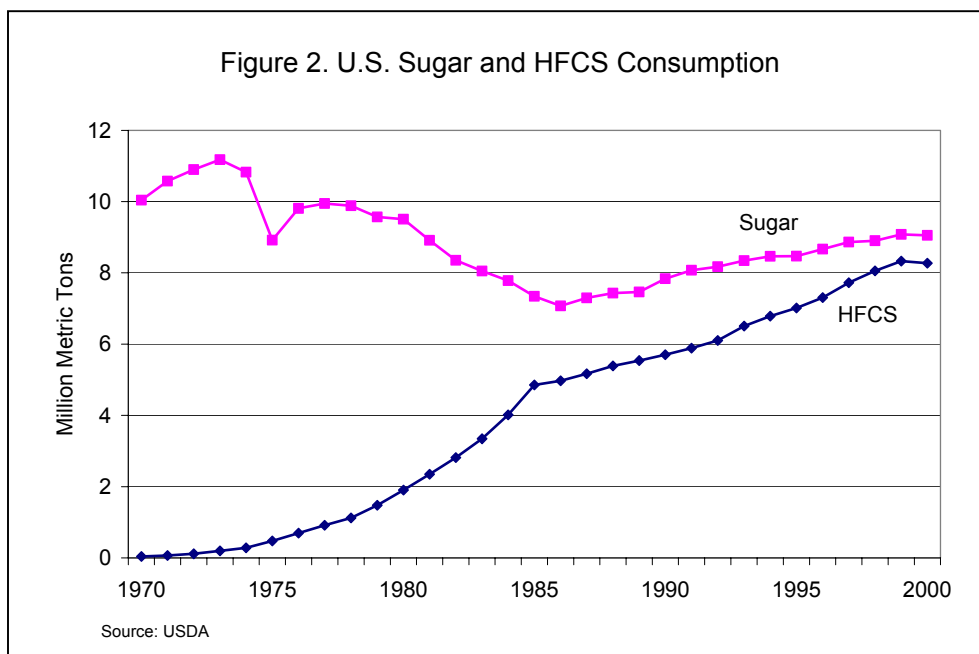
Trade of HFCS is limited mostly to cross-border shipments because HFCS is produced in liquid form and is expensive to transport. Thus, an HFCS industry must develop mostly within each country. The three factors which are critical to the competitiveness of HFCS with sugar are the cost of sugar, the cost of the corn, and economies of scale in HFCS production. The U.S. is the world's low-cost producer of HFCS because of the access to corn at world market prices and large plants which benefit from the substantial economies of scale. In contrast, the E.U. is a high-cost producer because corn must be purchased at high prices under the Common Agricultural Policy and E.U. policies limit sales of HFCS by quotas on individual companies which prevent

producers from reaching economies of scale. Thus, HFCS has limited market share in the sugar and sweetener market in the E.U.

Artificial non-caloric chemical sweeteners also compete with caloric sweeteners among calorie-conscious consumers. The first such sweetener, saccharin, was discovered largely by accident in 1879 by a young chemistry research assistant named John Hopkins (Harrison, 2001, p60). He noticed that the organic compound he was testing was intensely sweet and he named it after the Greek word for sugar, *sakcharon*. It was used as a sweetener for diabetics and the weight conscious until it was banned in the early 1900s. Its use was restored during the sugar shortage years of World War I, and it remained popular through World War II. By the 1960s, with no other artificial sweetener available, its use soared in America. It is now banned in Britain, has restricted use in France, and carries a health warning in the U.S. because of suspected links with cancer. But, it is currently approved for use in 100 countries. Aspartame was also discovered by accident, in 1965, and was approved in the U.S. in 1981 for use as an artificial sweetener (it is commonly sold as Nutrasweet). The use of artificial sweeteners has been limited by their poor properties in baking since most lack the bulk of sugar. Efforts have been underway for many years to develop a non-caloric sweetener which has the taste and feel of sugar in baking. One such product is Sucralose, which was approved for use in the U.S. in 1998. It is made from sugar and has most of the properties of sugar, except that it is chemically altered to prevent it from being digested by the body. Thus, consumers can have their cake but not the calories. It has not yet captured a significant share of the sweetener market, but it has the potential to increase sugar demand.

Another product which can be produced from sugar beets, sugar cane, and corn (or other crops) is ethanol--a clear colorless, flammable, oxygenated, hydrocarbon with chemical formula C_2H_5HO. Ethanol can be used for a number of purposes including as a vehicle fuel, and that use accounts for about two-thirds of world consumption (Berg, 2001). However, it is normally more costly than petroleum based fuels and it is only used when special incentives, such as environmental regulations or government subsidies, are used to encourage production and use. Ethanol can be produced from crude oil, ethylene and coal, or from agricultural products. Roughly 60 percent of global ethanol production is from sugar cane and sugar beets. The process of ethanol production consists of fermentation and distillation of the sugars in the basic raw material. In Brazil, half of sugar cane production is used for ethanol production and government ethanol policies influence the share of sugar cane used for sugar production and export. Brazil began a large ethanol production program from sugar cane in 1975 as a way to protect itself against high imported fuel prices. However, conditions in the world energy market changed and the program was scaled back in the early 1990s, with some of the sugar cane previously used for ethanol production being shifted to sugar production. Sugar exports from Brazil increased from 1.5 million tons in 1990 to 11.3 million tons in 2000 (USDA) and nominal world sugar prices fell from $.27 per kilogram to $.18 per kilogram (World Bank, 2003) partly because of the increase.

The U.S. is a major producer and consumer of ethanol from corn. Ethanol has environmental advantages, when used as a fuel, because it is cleaner burning and does not produce greenhouse gases. In 1990, the U.S. legislated in the Clean Air Act Amendments that certain U.S. regions must use oxygenated, reformulated gasoline during certain high smog months, and that a certain percentage of oxygenates must be derived from

renewable sources such as corn (Novack, 2002). The legislation provided tax incentives which amounted to about $.54 cents per gallon for ethanol when blended with gasoline at a 10 percent rate. Some mid-western states provide additional tax incentives. The cost of ethanol production from corn is about $1.10 per gallon, but because ethanol contains less energy than gasoline the comparable energy-equivalent cost to gasoline is $1.65 per gallon (Oregon Office of Energy, 2002). Thus, with the $.54 tax incentive ethanol is competitive with regular gasoline at $1.11 per gallon ($1.65-$.54) and very profitable at current gasoline prices. In response to the tax incentive, U.S. ethanol production has been growing by about 6 percent per year (Berg, 2001). Since both HFCS and ethanol can be produced in the same facility by adding an additional ethanol unit to an HFCS producing facility, the tax incentive on ethanol production partly finances the facilities which can be used for HFCS production. A seasonal complimentarity between ethanol and HFCS production is also possible because ethanol is used for fuels primarily during the winter months while the demand for HFCS use in soft drinks increases during summer months. The U.S. ethanol policy contributes to production capacity which can also be used for HFCS production and thereby reduces HFCS production costs and makes HFCS more competitive with sugar.

Costs of Production Estimates

Costs of production vary among countries for a variety of reasons, but the difference between the cost of producing sugar from beets and sugar from cane is large in all countries. London-based consulting firm, LMC International, periodically estimates production costs for cane sugar, beet sugar, and HFCS. The most recent cost estimate averages are given in Table 1 for low-cost producers and major exporters. The estimates cover 41 beet producing countries, 63 cane producing countries, and 19 HFCS producing countries. LMC bases its estimates on an engineering cost approach that accounts for the physical inputs of labor, machinery, fuel, chemicals, and fertilizers used in field and processing operations. The estimates are of actual average costs, and estimates include the impact of policies that protect producers in certain countries. Such cost estimates do not represent the supply curve normally estimated by economists since they are not estimates of marginal costs, however, they are useful for comparing average costs of production for different products and countries computed using a consistent methodology. Actual raw cane sugar and corn prices are provided for comparison, (note that the prices are f.o.b. while costs are ex-factory and thus the prices should be higher).

The average cost of producing raw cane sugar by major exporters, was 10.39 U.S. cents per pound during 1994/95-1998/99, and the average cost of refined cane sugar was 14.25 cents per pound. The raw-to-white spread averaged 3.86 cents per pound. Refined sugar from beets cost an average of 25.31 cents per pound—78 percent more than refined cane sugar. Among low-cost producers, the difference between refined cane and beet sugar was even wider. The average production cost for low-cost producers of refined cane sugar was 11.44 cents per pound compared to 22.29 cents per pound for refined beet sugar—a difference of 95 percent. Based on this comparison, sugar from beets was not competitive with sugar from cane by either major exporters or low-cost producers. However, the wide margin between refined sugar from beets and cane is partly a

reflection of protection to sugar beet producers in the E.U. and U.S., which encourages production in marginal areas and contributes to higher average costs.

HFCS-55 production costs averaged 13.68 cents per pound and were lower than white sugar from cane produced by major exporters in four of the five years. They only exceeded the cost of cane sugar when corn prices rose sharply in 1995/96. Thus, it appears that HFCS-55 can compete with refined cane sugar in the current policy environment, and perhaps even in a fully liberalized market environment since many studies have suggested that raw sugar prices would rise more than corn prices under a liberalized policy environment.

The LMC International estimates do not provide information on variable and fixed costs that would be needed to determine the average price at which producers would stop producing. However, such information is available for the U.S. from the USDA for refined beet sugar and raw cane sugar. They estimate that approximately 63 percent of total costs of U.S. producers of refined beet sugar are variable costs and 64 percent of production costs of raw cane sugar are variable costs. Based on these estimates, U.S. producers could face about a 60 percent price decline before average variable costs would not be recovered. If a similar structure of variable and fixed costs applied to other producers, then it would partly explain the slow response of supply to declines in prices. In addition, many countries have policies that keep producer prices higher than world market prices.

Table 1. Average Costs of Producing Cane Sugar, Beet Sugar, and High-Fructose Corn Syrup by Categories of Producers, and Actual Corn and Sugar Prices 1994/95 – 1998/99.

Category	1994/95	1995/96	1996/97	1997/98	1998/99
	U.S. cents per pound /1				
Raw cane sugar					
Low cost producers /2	7.43	8.10	8.18	7.78	7.58
Major exporters /3	10.37	10.60	10.72	10.52	9.73
Cane sugar, white equiv.					
Low cost producers /2	11.02	11.75	11.84	11.41	11.19
Major exporters /3	14.23	14.48	14.61	14.38	13.53
Beet sugar, refined					
Low cost producers /4	21.31	23.16	23.09	21.21	22.67
Major exporters /5	25.47	26.87	25.90	23.56	24.75
High-fructose corn syrup/6					
Major producers /7	13.45	16.78	13.57	12.86	11.76
Actual Market Prices					
Corn /8	102.8	162.6	128.8	112.4	93.8
Raw cane sugar /9	13.53	12.23	11.21	10.71	7.05

1/ Measured in nominal U.S. cents per pound, ex-mill, factory basis. 2/ Average of five producing regions (Australia, Brazil – Center/South, Guatemala, Zambia, and Zimbabwe). 3/ Average of seven countries (Australia, Brazil, Colombia, Cuba, Guatemala, South Africa, and Thailand). 4/ Average of seven countries (Belgium, Canada, Chile, France, Turkey, United Kingdom, and United States). 5/ Average of four countries (Belgium, France, Germany, and Turkey). 6/ HFCS-55, dry weight. 7/ Average of 19 countries (Argentina, Belgium, Canada, Egypt, Finland, France, Germany, Hungry, Italy, Japan, Mexico, Netherlands, Slovakia, South Korea, Spain, Taiwan, Turkey, United Kingdom, and United States). /8 Corn price is US$/ton, July-June average of monthly prices for US No. 2 yellow corn, fob U.S. Gulf. /9 Raw cane sugar price is US cents per kg, July-June average of monthly prices, fob Caribbean ports.
Source: LMC International as reported in Sugar and Sweetener Situation & Outlook, Economic Research Service, USDA, September 2001. Actual market prices are from World Bank databases.

Employment

　　Estimates of employment in developing countries' sugar industries are not readily available, but they can be developed from various reports, surveys, and industry statements. Such estimates (Table 2) show considerable cross-country consistency among high and low-cost producers. For example, Brazil, Guyana and South Africa are known to be among the lowest-cost producers and the raw sugar production per industry employee for these countries is estimated to range from 16.3 to 19.9 tons. In contrast, countries which are known to be high cost producers such as Fiji, Kenya and Mauritius have production of 7.0 to 8.3 tons of raw sugar per industry employee. Thus, we can reasonably conclude that an additional million tons of sugar production from a low cost sugar producing developing country would generate about 55,500 direct employment jobs. If the exports came from a high-cost producer, the same million tons of production would generate about 128,000 direct employment jobs. Additional indirect employment jobs would also be generated in transportation and related industries, but no attempt was made to estimate these jobs.

Table 2. Raw sugar produced per sugar industry employee, selected developing countries.

Country	Direct Employment (growers and factory)	Tons of Raw Sugar Produced Average 1999-2000	Tons of Raw Sugar Produced Per Employee
Low Cost Producers			
Brazil	1,100,000	19,485,000	17.7
Guyana	18,000	293,072	16.3
South Africa	130,000	2,589,667	19.9
High Cost Producers			
Fiji	40,500	336,333	8.3
Kenya	69,000	485,333	7.0
Mauritius	65,000	529,299	8.1
Other Producers			
Malawi	17,000	200,667	11.8
Mexico	300,000	5,069,233	16.9

Notes and Sources: Production is the 3 year average of raw sugar production during 1999-2001 from FAOSTAT. Employment comes from various sources and includes total direct employment in sugar factories and the number of growers. Employment data for Brazil is from OECD (1999), Fiji and Guyana data are from F.O.Lichts, Kenya data is from the Kenya Sugar Board, Malawi data is from the Malawi Ministry of Commerce and Industry, Mauritius data is from F.O.Lichts, Mexico and South Africa data are from OECD (1999).

<u>The World Market</u>

India, the European Union, and Brazil are the largest sugar producers with roughly 14 percent of world production each during 1999-2001 (Table 3). They are followed by the United States and China which each produce about 6 percent of the world's sugar. Sugar trade is dominated by Brazil and Russia, with Brazil accounting for about one-quarter of world net exports and Russia accounting for about 14 percent of world net imports during 1999-2001. The E.U. is the second largest net exporter, and it is followed by Australia, Thailand and Cuba which each export about 8-10 percent of the world total. Net imports are widely dispersed after Russia, with the next largest net importer accounting for less than 5 five percent of world imports. India is the largest sugar consumer with about 15 percent of world consumption, followed by the E.U. with 10 percent, and Brazil with 7 percent.

Table 3. Major sugar producers, net exporters and net importers, 1999-2001 average.

Producers		Net Exporters		Net Importers	
Country/Region	Million tons	Country/Region	Million tons	Country/Region	Million tons
India	19.4	Brazil	9.3	Russia	5.2
E.U.	18.6	E.U.	4.2	Indonesia	1.7
Brazil	18.5	Australia	3.8	Japan	1.6
U.S.	7.9	Thailand	3.6	U.S.	1.4
China	7.8	Cuba	3.2	Korea, Rep.	1.2
Thailand	5.4	R. S. Africa	1.3	Canada	1.2
Mexico	5.1	Guatemala	1.1	Iran	1.0
Australia	4.9	Colombia	1.0	Malaysia	1.0
Cuba	3.8	Turkey	0.6	Algeria	0.9
Pakistan	3.0	Mauritius	0.5	Nigeria	0.7
All Other	38.9	All other	10.3	All other	20.7
World	133.3	World	38.9	World	36.6

Source: USDA PS&D 2002. Note: Data is in raw sugar equivalents.

World HFCS production averaged 11.7 million tons (dry weight basis) during 1999-2001, and U.S. production averaged 9.2 million tons—79 percent of the world total. Japan was the second largest producer, with an average of .78 million tons, followed by Argentina, Canada, European Union, Mexico, and Republic of Korea with between .3 and .4 million tons each. HFCS is considered equivalent to sugar on a dry weight basis when used to produce products such as soft drinks. Thus, when sugar plus HFCS are combined, U.S. to obtain total caloric sweeteners production increased to 17.1 million tons of caloric sweeteners.

World sugar prices have historically been characterized by periodic sharp increases followed by long periods of low or declining prices (Figure 3a). This pattern has been caused, in large part, by policies in both developed and developing countries that isolated consumers and producers from international prices and diminished their price responsiveness. However, this has been changing somewhat as some developing countries have reformed their policies during the past two decades and the share of developing countries in global consumption and imports has increased due to population and income growth (Figure 3c and 3f). This has led to greater price responsiveness by

Figure 3. The World Sugar Market.

Figure 3a. Raw Sugar Prices

Figure 3b. Production

Figure 3c. Consumption

Figure 3d. Developed Country Trade Shares

Figure 3e. Raw and Refined Exports

Figure 3f. Imports
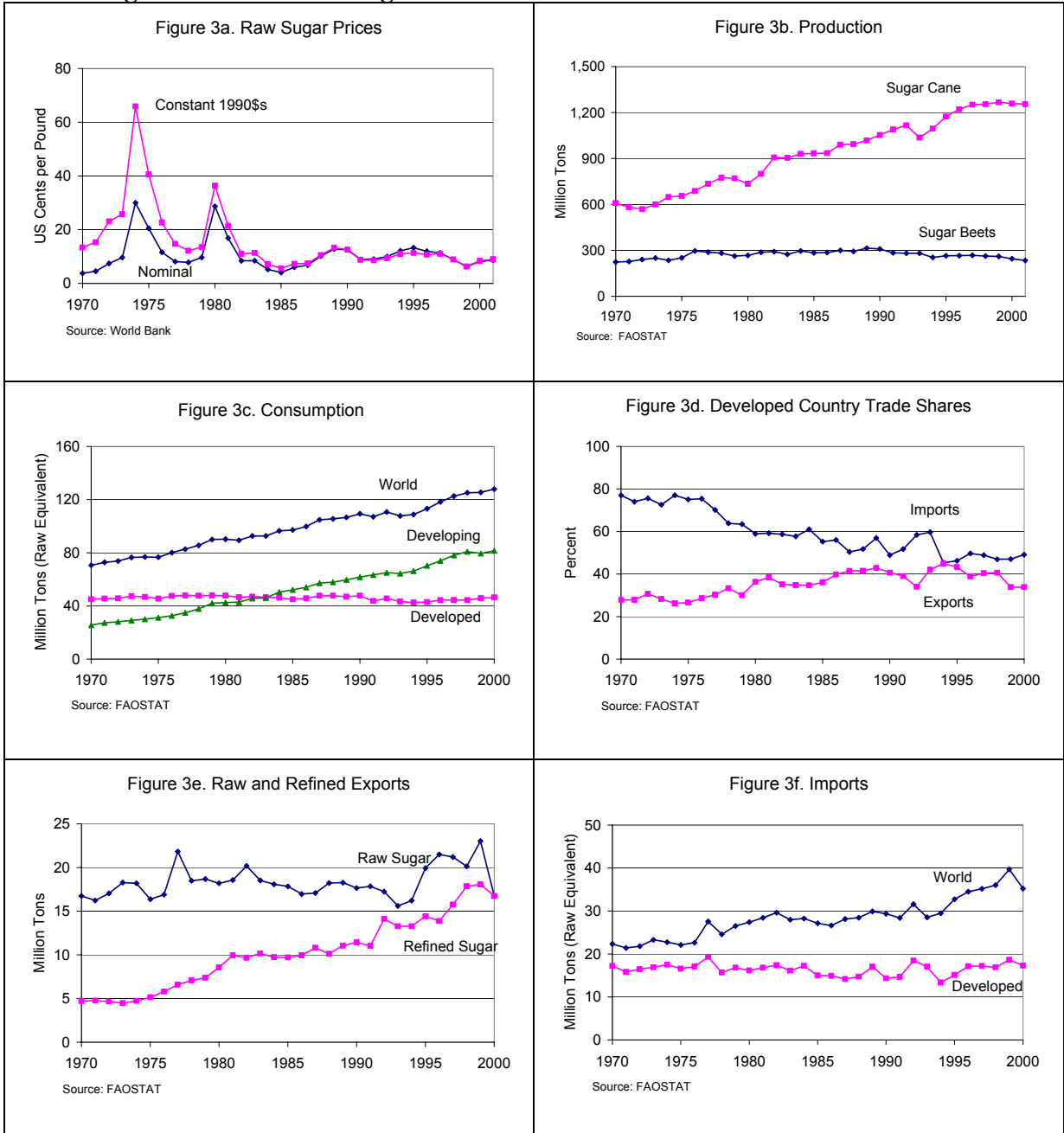
Source: FAOSTAT

sugar producers and consumers and likely reduces the severity of future price spikes. The collapse of the former Soviet Union also led to the abandonment of dedicated sugar imports from Cuba and increased trade at world market prices. Many developed countries still maintain highly protected sugar sectors and thus contribute to the likelihood of price spikes, but they now account for only one-third of consumption and one-half of imports compared to slightly more than half of world consumption and 60 percent of imports when the last sugar price spike occurred in 1980.

Despite some liberalization of sugar policies, roughly 80 percent of world production and 60 percent of world trade is at subsidized or protected prices. Only 3 major producers (Australia, Brazil, and Cuba) have sugar sectors which produce and operate at world market price levels.[4] These 3 producers account for a combined 20 percent of world production and 40 percent of world trade. The remaining 80 percent of world production and 60 percent of world trade relies on production subsidies, export subsidies, or preferential access to protected markets. The E.U., Japan and the United States account for 20 percent of world production and have average producer prices which are more than double the world market. China and India account for another 20 percent of world production and protect producers with prices which are higher than world market prices. The remaining 40 percent of production is in countries which either produce for preferential markets (as is the case with Fiji, Mauritius, Philippines and many others) and thus receive higher than world market prices, or they protect their domestic producers with policies which restrict imports to provide above market prices.

An important change that has taken place in the world sugar market has been the increasing share of developing countries in world sugar consumption and imports, and the increasing share of developed countries in exports. About two-thirds of world sugar consumption is now in developing countries, compared to one-third in 1970, and sugar consumption is growing by about 2.6 percent per annum in developing countries compared to no growth in developed countries (Figure 3c and Appendix Table A1). Approximately one-half of world sugar imports are now by developing countries compared to less than one-quarter in 1970 (Figure 3f). This has diminished the importance of developed country imports to developing country sugar exporters. It also reflects increased competition from developed countries exporters, which are heavily concentrated in refined sugar (primarily the E.U.) which has reduced export opportunities for value added refined sugar exports from developing countries.

The more rapid consumption growth in developing countries is partly a reflection of more rapid income and population growth and higher income elasticities, but it also is a reflection of higher protection in developed countries which has reduced demand growth and encouraged use of substitute sweeteners such as HFCS. High protection has also increased exports from some developed countries (especially the E.U.), and such exports have often been supported by export subsidies. Developed countries accounted for 40 percent of world exports during the 1990s compared to 30 percent during the 1970s. This role reversal of developing countries exporting a primarily tropical commodity has contributed to the slow growth of world sugar trade and reduced export opportunities for developing country producers.

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[4] Brazil has government policies on ethanol which indirectly affect sugar, but no direct subsidies to sugar producers. Other small sugar producers which produce at world market prices include Canada and Malaysia.

The value of world sugar exports has remained relatively constant in nominal dollars ($11.8 billion during 1980-85 vs. $11.6 billion during 1995-2000), and sugar has remained an important source of export earnings for a number of developing countries. However, the share of developing countries' exports of total sugar exports has declined from 71 percent during 1980-85 to 54 percent in 1995-2000, as developed country exports have increased and the share of higher-valued refined sugar exports by developed countries has increased. Twelve countries received 10 percent or more of their total export earnings from sugar during 1995-2000, and an additional 5 received 5-10 percent of total export earnings from sugar (Table 4). In contrast, during 1980-85, 10 countries received 20 percent or more of total exports from sugar, and 9 additional countries received from 5 to 20 percent of total export earnings from sugar.

Table 4. Sugar Exports and Export Shares, 1995-2000 and 1980-85.

Country	Sugar Export Share of Total Merchandise Exports (percent)		Sugar Exports Million U.S. Dollars	
	Average 1995-2000	Average 1980-85	Average 1995-2000	Average 1980-85
Gambia	91.4 1/	9.5	25 1/	4
Réunion	63.0 2/	75.2	131 2/	75
Cuba	40.6	76.4	803	4,594
Saint Kitts and Nevis	37.1	53.8	15	11
Fiji Islands	25.4	46.9	187	134
Belize	24.5	36.0	51	35
Guyana	23.5	32.6	153	87
Mauritius	20.5	54.9	415	215
Swaziland	16.9	37.5	183	114
Dominican Rep.	14.0	35.7	153	320
Guadeloupe	11.5 /3	22.0	19 /3	19
Barbados	11.3	10.0	36	30
Guatemala	9.8	5.7	280	66
Jamaica	6.5	6.8	119	53
Mozambique	6.1	7.3	17	13
Moldova. Rep.	5.3	n.a.	42	n.a.
Malawi	5.0	12.9	31	35

Notes: 1/ Data for Gambia was incomplete and this result is for 1999 and 2000 only.
2/ Data for Réunion was incomplete and this result is for 1995 only.
3/ Data for Guadeloupe was incomplete and this result is for 1995 only.
Source: FAOSTAT.

IV.   Sugar Policies in Selected Developing Countries

While the focus of this paper is on policy reform prospects in the E.U., Japan, and the United States, it is also useful to look at policies in other major sugar producing and trading countries to see how these countries would likely be affected by such reforms. Some of these countries have policies which are similar to those of the E.U. (Thailand) or the U.S. (China) and domestic market liberalization in these countries would lead to substantial changes in production, consumption, and trade, with important implications for the world sugar market. There are also important cases of unilateral sugar policy reforms (Brazil) which have occurred during the past two decades and these countries would be more directly affected by reforms in the E.U., Japan, and the U.S.

Brazil is the world's largest sugar exporter and it is generally considered to be the world's lowest cost producer. It would be a major beneficiary of increased world sugar trade and higher prices because it has the capacity to substantially increase sugar production and exports. Domestic retail sugar prices in September 2001 were U.S.7.7 cents per pound (Bolling and Suarez, 2001) compared to U.S. retail prices of roughly 40 cents per pound. The devaluation of the Brazilian *real* by 65 percent, relative to the dollar since end-1998 contributed to the competitiveness of sugar exports. However, despite the dominance of Brazil's sugar exports in the world market, exports are viewed as the third alternative for Brazilian sugar cane after production of ethanol and sugar for the large domestic market. Only half of Brazil's sugar cane is used to produce sugar and the other half is used to produce ethanol for automotive fuel. Sugar cane production can easily be directed between sugar and ethanol production depending on market conditions and government policies. If all the sugar cane was used to produce sugar, production would roughly double (an increase of roughly 18.5 million tons), and most of this could be exported subject to port capacity. The government has pursued a biofuel policy since the 1970s, when concerns about the adequacy of petroleum supplies were high. These policies included tax incentives and direct subsidies to ethanol production and use, sugar price controls, and restrictions on sugar exports. Lower petroleum prices during the 1980s led to reduced ethanol subsidies and the removal of export and price controls on sugar beginning in 1990. Other controls on sugar were eased during the 1990s and sugar exports increased from 1.5 million tons in 1990/91 to 11.3 million tons in 2000/01, making Brazil the world's largest exporter. Some subsidies remain on ethanol production and use, and the future of such subsidies can strongly influence the use of sugar cane for ethanol versus sugar production. Government mandates on the share of ethanol to be included in gasoline (currently 20 to 24 percent) can strongly influences demand for ethanol as automotive fuel and the supplies of sugar cane directed to sugar production. Sugar cane production has increased rapidly in the Centre-South region where sugar cane faces a favorable climate, available land, and favorable returns relative to other crops. Sugar is also produced in the Northeast region where high cost growers receive a small subsidy. The central government allocates Brazil's total annual premium priced U.S. sugar import quota to this region. Further expansion of sugar cane production in the Centre-South region is possible and expected by most industry experts, but milling capacity will need to be expanded to allow significantly more sugar production. The future of the biofuel program is important to the future of sugar exports and this depends on international petroleum prices as well as Brazilian policy. Recently marketed flex-fuel

engines which run equally well on gasoline or pure hydrous alcohol are expected to boost ethanol demand and direct some sugar cane production away from sugar production. (This section is based on ABARE 1999, Bolling and Suarez, 2001, and F.O. Licht 2002 and 2003).

China has been an occasional large sugar importer and exporter over the past decade, but average net imports were about 400,000 tons during 1990-2000. Most of these imports came from Cuba under a long-term trade agreement. The government has followed a policy aimed at self-sufficiency by providing strong price incentives to producers, controlling imports, and accumulating and releasing government stocks so as to maintain high internal market prices. About 90 percent of China's sugar production comes from sugar cane and the remainder from sugar beets. A 'guidance price' is provided to sugar refiners for sugar cane and beet, but market forces largely determine prices (ABARE, 1999). The policy and strong demand growth kept sugar prices high during most of the 1990s, but prices fell sharply following the record 1998/99 crop and remained low through 2000. Prices increased in 2001, with white wholesale sugar prices averaging about $.22 per pound during the first half 2001 (F.O. Licht, 2002, page 38), which was more than double the world market price and similar to U.S. domestic prices. A record 2002/03 harvest caused prices to fall. Artificial sweeteners, mainly saccharin, are an important competitor to sugar in China and substitute for as much as 2.4 million tons of sugar (F.O. Licht, 2002 page 233). When China entered the WTO in 2001, it agreed to a tariff rate quota of 1.6 million tons at a tariff rate of 20 percent with an over-quota tariff of 76 percent. The quota is scheduled to increase to 1.945 million tons and the over-quota rate is scheduled to fall to 65 percent by 2004. If China were to import the full amount specified by the tariff rate quota, imports would increase substantially over the levels of recent years. However, China's WTO tariff quota does not commit the country to import all of the tariff quota tonnage and China can choose among a number of different methods of administering the tariff rate quota to influence the tariff quota fill rate (Jolly, 2001). For example, actual imports during 2001/02 were 1.15 million tons according to the International Sugar Organization (2002) despite the tariff rate quota of 1.6 million tons. The Chinese sugar industry would undergo substantial adjustment if it were opened to international competition. A large number of small high-cost sugar mills would be unprofitable and production would likely decline.

India's sugar industry is heavily regulated under the Essential Commodities Act of 1955, and is very politicized because of the large number of sugar cane growers (reported to total 5 million) and the importance of sugar in Indian diets (F.O. Licht, 2002). The industry is largely self sufficient, with occasional imports to offset domestic shortfalls. An import duty (currently 60 percent) is varied to control imports in order to maintain domestic prices above world market prices. Large stocks of sugar currently burden the industry and can only be exported with substantial subsidies or at substantial losses. India provides an internal freight reimbursement and ocean freight subsidy to help export surplus production. State controls limit internal sugar movements, and licensing and stock holding requirements for mills and shops contribute to industry inefficiencies. Sugar mills are small and inefficient, and high internal transport costs limit export potential even if world prices rose above internal prices. Sugar millers and importers are required to sell a portion of their supplies to the Public Distribution System (PDS) at below market prices for resale to low income consumers. The mandated share of supplies

which goes to the PDS has declined over time, with for example, sugar millers currently required to sell only 10 percent of production to the PDS compared to 70 percent during the 1970s. Sugar cane production is more profitable than most other crops, because sugar cane producers receive prices which are about 50 percent higher than world market prices due to central government established minimums and higher State Advised Prices established by individual state governments. India provides an internal freight reimbursement and ocean freight subsidy to help export surplus production. India has a small ethanol program, and there are government proposals to require ethanol to be blended with gasoline to produce a cleaner burning fuel to reduce pollution. The government has announced plans to liberalize the sector, however, past efforts at liberalization have been unsuccessful and government pre-conditions for liberalization appear difficult to meet. Decades of regulation have also created complicated political interdependencies which will be difficult to disentangle and hamper liberalization. It is unlikely that India would emerge as a significant exporter if policies in the E.U., Japan and the U.S. were changed to allow greater imports.

Kenya is a small sugar producer, but the industry is still a major employer. Sugar cane production totals about 400,000 tons of raw sugar per year and imports total another 200,000 tons. The sugar industry employs approximately 29,000 workers,[5] and 40,000 smallholders grow sugar cane on an out-grower basis.[6] The sugar sector has been partially liberalized since 1995, and a new Sugar Act became effective in April 2002, which created the Kenya Sugar Board to replace the previous Kenya Sugar Authority. The Act continued the broad authority of the Sugar Board and the Minister of Agriculture to control all aspects of the sugar industry (production, manufacturing, marketing, imports and exports of sugar and its by-products). A development levy of 7 percent is imposed by the Sugar Board on all domestically produced and imported sugar. Sugar imports from COMESA[7] countries are subject to the VAT of 18 percent and the development levy of 7 percent. Imports from countries outside of COMESA face a 100 percent duty plus the 18 percent VAT and 7 percent development levy. In 2001, imports from COMESA countries rose sharply and accounted for 40 percent of total imports. Subsequently, a temporary quota was negotiated with COMESA countries to limit imports. Kenya lost its preferential ACP sugar quota to the E.U. a number of years ago because it failed to file the required documents to invoke the *force majeure* clause when it failed to meet its quota. It has been attempting to regain its quota for the past several years, and the E.U. has granted Kenya a temporary quota of 11,000 tons under its Special Preference program. Sugar prices in Kenya are nearly double the world market price because of border measures. However, a large part of the industry could compete at international prices according to industry experts.

Mexico privatized its sugar mills, and partially deregulated its sugar industry in reforms which concluded in 1992 (Escandon, 2002). However, it has maintained strong government regulation of the sector by setting sugar cane prices for its 150,000 sugar

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[5] Kenya Central Bureau of Statistics, Statistical Abstract, 2001.
[6] Kenya Sugar Board Year Book of Sugar Statistics 2001.
[7] Kenya is one of the founding members of the Common Market for Eastern and Southern Africa (COMESA), which was launched in October 2000 to allow goods to be traded duty-free. The other members of COMESA are Djibouti, Egypt, Madagascar, Malawi, Mauritius, Sudan, Zambia, and Zimbabwe.

cane growers. Mexico liberalized pricing and production of sugar in 1995, but simultaneously increased protection by increasing tariffs on raw sugar from 65 percent to 136 percent and from 73 to 127 percent on refined sugar (F.O. Licht, 2002, page 157). This led to a 60 percent increase in domestic sugar prices and contributed to a 50 percent increase in production from 1992 to 2002 and a doubling of exports. The North American Free Trade Agreement (NAFTA) came into force on January 1, 1994 with a 15 year adjustment period ending in 2008, after which, there will be free trade in sugar between Mexico and the United States. The implementation of NAFTA has been contentious because of a last minute side-letter agreement on sugar which was added in order to get U.S. Congressional approval. The side-letter agreement was never ratified by the Mexican Congress and is not recognized as valid by Mexico. Nevertheless, the U.S. government administers NAFTA in accordance with the side-letter agreement. Under NAFTA, the amount of Mexico's duty-free access to the U.S. sugar market depends on whether Mexico is a surplus sugar producer (sugar production minus sugar consumption). However, the side-letter agreement changed the definition of surplus producer to include combined sugar and HFCS consumption. Using this definition, Mexico could export up to 25,000 tons per year of surplus production sugar duty-free during the first 6 years of NAFTA. Beginning in year 7 (the 2000/01 marketing year), and until the end of the 15 year adjustment period, Mexico can export up to 250,000 tons of surplus sugar production duty-free. High domestic sugar prices in Mexico led to large imports and increased production of HFCS which quickly displaced sugar in the soft-drinks industry and left Mexico with large sugar stocks which could not be exported duty-free to the U.S. because of the 25,000 ton limit. The U.S. rejected a request to allow increased duty-free exports from Mexico, and Mexico then charged that the U.S. was dumping HFCS in Mexico and initiated anti-dumping duties of 20 percent on beverages made with HFCS. The 60 local sugar mills were caught between high prices which the government established for sugar cane and the weak domestic and world market prices for sugar, and many became insolvent. The government expropriated 27 mills with large and un-payable debts in September 2001. Government investments are being made to prepare these mills for re-sale to private investors. The government recently announced its national sugar policy for 2002-2006 designed to help the sector become profitable (F.O. Lichts 2002, page 159). Among the measures is the creation of a sugar export cooperative association of all private and government-owned sugar mills which is solely authorized to export sugar. Mexico's sugar exports in the 2001/02 marketing year are estimated to total about 650,000 tons of which 148,000 was exported to the U.S. duty-free. Negotiations are continuing to resolve the trade and duties on HFCS. Beginning in 2009, Mexico will have unlimited duty-free access to the U.S. sugar market and will likely increase exports substantially.

Russia is by far the world's largest sugar importer, with average imports of 5.2 million tons during 1999-2001 compared to the next largest importer with 1.7 million tons. Following the breakup of the Soviet Union, the Russian sugar sector faced an uncertain future, an unstable and confused policy structure, and a technically weak industry. Sugar production is from beets, and sugar beet production declined by about 45 percent from 1992 to 2000, sugar consumption declined by 17 percent, and sugar imports increased by 35 percent (USDA). Low beet yields, poor factory recovery rates, outdated technology, and shortages of fuel and machinery replacement parts hampered the

adjustment of the Russian sugar industry to privatization. Foreign investment has been small due to high perceived risks and this slowed the modernization of the industry. Trade policy changed frequently, and the government uses high tariffs to protect the domestic industry. Tariffs on white sugar are higher than on raw sugar to protect domestic sugar refiners. Seasonal tariffs are added during periods of peak domestic production to protect local producers and support prices. The import duty on raw cane sugar for 2003 has been set at $95/ton ($.043 per pound) (F.O. Licht, 2002). Russia is expected to remain a large importer as long as the investment climate remains uncertain and foreign companies are reluctant to invest. Even with foreign investment, Russia will likely remain a high-cost producer because its industry is based on sugar beets.

Thailand is the fourth-largest exporter, with net exports of 3.6 million tons during 1999-2001. Thailand's sugar policy is patterned after that of the E.U., with high internal sugar prices which are maintained by quotas and import tariffs, and 'A', 'B', and 'C' production quotas designed to expand exports. The government also provides tax incentives to encourage exports and subsidized credit to millers and exporters. The tariff rate quota agreed under the WTO Agreement on Agriculture was 65 percent for within quota imports in 1999 and 99 percent for outside quota imports (ABARE, 1999, page 129-130). Despite high protection, Thailand's cost of production are among the lowest in the world and about comparable to those of Australia (Borrell and Pearce, 1999). High protection and low costs have led to rapid growth of production and a more than tripling of exports over the past two decades.

This selective review of policies in major sugar producing and trading countries reinforces the significance of policy distortions in the world sugar market. India, the largest sugar producer, has a heavily regulated domestic sugar market and high import tariffs to protect local producers. China, has import restrictions which keep domestic sugar prices very near those in the United States. Russia, the largest sugar net importer, has high tariffs to protect sugar beet producers and additional tariffs on white sugar to further protect local refiners. Brazil, the largest sugar exporter, has a sugar policy which is partly driven by its own biofuel policies and until recently had restrictions on sugar exports. Thailand, the fourth largest net exporter and a low cost sugar producer, has used high domestic prices, tax incentives, and subsidized credit to increase exports. Mexico, has high domestic prices which have stimulated production in anticipation of unlimited duty-free access to the U.S. sugar market beginning in 2009. Kenya has high tariffs and import quotas to protect domestic producers.

V.   Sugar Policies in Selected OECD Countries

More than half of the value of sugar production in OECD countries during 1999-2001 came from government support or transfers from consumers. Such high support typically limits consumption, through high prices to consumers, and encourages production even when a country does not have a comparative advantage in sugar production. Support to OECD sugar producers during 1999-2001 totaled $6.35 billion, compared to the value of world sugar trade of about $11.6 billion and developing country exports of about $6.5 billion. The E.U. provided the largest support, with $2.71 billion in support to sugar producers, while the U.S. provided $1.30 billion, and Japan provided $0.44 billion. A number of developing countries also provided high levels of support to sugar producers

including Mexico, Turkey, and Poland (Table 5). Much of this support is provided through border protection.

Table 5. Support to OECD Sugar Producers, 1999-2001.

OECD Country/Region	Producer Support (million US$)	Producer Nominal Assistance Coefficient	Support from Border Protection (percent)
OECD	6,351	2.11	
Australia	51	1.11	0.0
Czech Republic	16	1.25	47.6
E.U.	2,713	2.11	91.7
Hungary	12	1.20	41.5
Japan	437	2.17	88.7
Mexico	713	2.10	83.9
Poland	176	2.28	92.9
Slovak Rep.	16	1.94	54.7
Switzerland	86	4.36	73.0
Turkey	749	3.02	95.8
U.S.A.	1,302	2.37	84.3

Notes: **Producer Support** was converted from local currency to U.S. dollars using period average annual exchange rates from the IMF's IFS, May 2002. **Producer Nominal Assistance Coefficient** is an indicator of the nominal rate of assistance to producers measuring the ratio between the value of gross farm receipts including support and gross farm receipts valued at world market prices without support.
No calculations were made for Canada, Iceland, New Zealand, Norway, or the Republic of Korea.
Source: OECD, Agricultural Policies in OECD Countries, Monitoring and Evaluation, June 2002.

The benefits to more liberalized trade in sugar, especially in OECD countries, are substantial according to a number of studies: Borrell and Pearce (1999), Elbehri, et al. (2000), GAO (1993 and 2000), Sheales, et al. (1999), USITC (2002), and Wohlgenant (1999). The results of the various studies differ because of different assumptions, methodology, and scenarios, however, the general conclusions are that reduced support to OECD sugar producers would result in lower production in those countries, lower prices, increased consumption, and increased net imports. World sugar prices would increase and exports from developing countries, and some developed country exporters, would increase. According to Sheales, et al. (1999), the full liberalization of the world sugar market would result in a 41 percent increase in world sugar prices. Sugar imports would increase by 44 percent in the U.S. and exports would decline by 34 percent in the E.U. Low-cost sugar producing countries would increase exports, with Australia's exports rising 16 percent, Brazil's exports rising 23 percent, and Thailand's exports rising 22 percent. Removal of government support programs to domestic producers in the E.U., Japan, and the U.S. would save consumers $4.8 billion per year according to the report. A study by the GAO (2000) concluded that the U.S. sugar program resulted in a net loss to

the U.S. economy of $1 billion in 1998. Elbehri, et al. (2000) used the GTAP multi-sectoral, multi-regional general equilibrium model to examine the impacts of partially liberalizing sugar TRQ import regimes, and concluded that if the E.U.'s over-quota tariff was cut by one-third, it would result in a global welfare gain of $568 million. Coordinated global reforms would result in the greatest benefits. Wohlgenant (1999) estimated that global sugar trade liberalization would result in a 43 percent increase in world price.

Borrell and Pearce (1999) used a 24 region model of the global sweetener market to examine consumption, production, trade, price, and welfare effects for 7 classes of sweeteners. A baseline projection which continued current protection was compared with a fully liberalized sweetener market with no trade protection in any country or region. Under the fully liberalized scenario (vs. the baseline), sugar prices were projected to fall 65 percent in Japan, 40 percent in Western Europe, 25 percent in the United States, Mexico, Indonesia, Eastern Europe, and by 10 percent in China, the Ukraine, and Philippines. Lower prices would lead to higher consumption, lower production, and increased imports of sugar in those countries which have trade protection. World prices would increase by 38 percent and lower-cost producers would increase production and exports—however consumption decreased with the higher prices. In countries with the highest protection (Japan, Western Europe, the U.S., Indonesia, and Eastern Europe) net imports increased by 15 million tons per year. Japan reduced production by 44 percent, the U.S. by 32 percent, and Western Europe by 21 percent. Among low-cost producers and exporters, Australia and Thailand increased production by 25 percent, and Brazil, Cuba and Other America (Latin America excluding Brazil, Mexico, and Cuba) increased production by about 15 percent.

Increased sugar imports of 15 million tons by the countries with the highest protection would generate about one million jobs in the sugar industries of developing countries according to the employment estimates from Table 2. Most of these new jobs would be in the lowest cost producers (Brazil, Cuba, Guatemala other Latin American producers, Sudan and Thailand) while jobs would be lost in the countries with highest protection. Some jobs would be lost in the countries which currently have preferential access to the E.U. and U.S. sugar markets.

Global welfare gains from liberalization are estimated by Borrell and Pearce to total $4.7 billion per year based on historical supply responses and may be as high as $6.3 billion per year if higher supply responses occur. Brazilian producers gains the most from liberalization, at around $2.6 billion per year, but this is offset by a loss of $1 billion to Brazilian consumers who pay higher prices after liberalization—leaving a net gain of $1.6 billion for Brazil. Japan had a net gain of about $0.4 billion from lower consumer prices which more than offset lower producer prices on the 40 percent of sugar which is domestically produced. The United States had a small net loss of about $0.2 billion from full liberalization, as producer losses were slightly larger than consumer gains. Western Europe had a net gain of about $1.5 billion as consumer gains of about $4.8 billion exceeded producer losses of about $3.3 billion. One general interpretation of these results is that protection in the world sugar market is imposed by developed countries at great cost to themselves and developing countries with the economic potential to expand exports.

The exporting countries which currently have preferential access to the E.U. and U.S. sugar markets gain about $0.8 billion per year (relative to world market prices) from this access through prices which average more than double world market prices on sales to the E.U., and prices which average 80 percent more than the world market prices for sales to the U.S. However, the value of the preferential access is less than it appears, because many of these producers have high production costs and would not produce at world market prices. Further, world market prices would rise by an estimated 38 percent after full liberalization which would partially offset the loss of high prices in preferential markets for producers. Borrell and Pearce estimate the net loss to these exporting countries from full liberalization at $0.45 billion. The cost to the E.U. and U.S. of providing each $1 of preferential access is estimated to be more than $5. In a recent study of the Fijian economy (Levantis, et. al, 2003), alternative forms of aid were found to deliver much greater economic benefit and higher growth paths. However, the removal of sugar subsidies would lead to considerable structural change with the rural poor incurring the bulk of the burden of adjustment. The study concludes that Fiji would best be served by a gradual process of removal of trade preferences to give sufficient time for measures to be implemented and labor force adjustments to occur to avert a crisis in rural unskilled employment.

In an effort to further understand the effects of global sugar policy reform, a global computable general equilibrium (CGE) LINKAGE Model was used which modeled the tariff rate quota systems in OECD countries using mixed-complementary-problem programming (van der Mensbrugghe, Beghin, and Mitchell, 2003). The model divides the world into 16 countries/regions and incorporates 22 sectors, including a combined raw and refined sugar sector. A number of liberalization scenarios were run, including a full multilateral sugar trade liberalization. The results generated by a comparative-static version of the model, show that the sugar trade policies of the European Union, Japan, and the United States create substantial trade diversion which exclude many low-cost producers from trading opportunities. An expansion of the import quotas of these countries/regions, without multilateral trade liberalization, preserves most of the trade diversion patterns and would favor African exporters relative to more efficient producers such as Brazil. Even a 33 percent tariff cut or quota expansion by the European Union, Japan and the United States would not induce great changes in production or income-generating opportunities for sugar exporters.

A multilateral reform which reduces tariffs by 33 percent in all countries along with a 33 percent increase in TRQ quotas and a 33 percent reduction in out-of-quota tariffs in the EU, Japan and the U.S. generates global welfare gains of $1.3 billion and induce production and trade expansion in the least-cost producers (Brazil, Thailand, Australia-New Zealand, and the Rest of Latin and Central America). It also causes output to contract in countries favored by the current policies of the European Union and United States that are not truly competitive without preferential trade. The global welfare gains of full multilateral liberalization would total about $3 billion, with the largest gains going to the liberalizing countries, and efficient exporters. The reforming countries gain by reducing inefficiencies in both consumption and production.

While the benefits to reform are not widely disputed, the opposition to reform within certain countries has been strong. In the remainder of this section, the sugar policies of the E.U., Japan, and the United States are examined and the prospects for

reform are examined. Recent trends and expected changes in these countries/region suggest that reform will become a higher priority in the future.

<u>E.U. Policy</u>

The European Union's sugar policy uses production quotas, import controls, and export refunds (subsidies) to support producer prices at levels which are well above international prices. The program is financed primarily by E.U. consumers who pay higher than world market prices. The sugar policy began in 1965, as part of the Common Agricultural Policy (CAP) which dates to 1958.[8] Under the CAP, an intervention price is set for each commodity as a guaranteed minimum price for farmers. If prices fall below this intervention price, then the European Union buys the commodity and stores it until the Commission decides to sell it domestically or export it. These prices vary by country to allow transportation costs between surplus and deficit areas. Intervention sugar prices have been constant in nominal terms since 1984/85; however, they vary by exchange rate movements when expressed in U.S. dollars (Figure 4). As shown, they have been more than double world market prices during most of the past 20 years. Some countries (Italy, Portugal, and Spain) have also been allowed to pay national aid to sugar producers which further encourages production. Import duties are used to prevent lower priced imports from the world market, and export refunds are paid to exporters to cover the gap between the E.U. price and the generally lower world market prices when commodities are sold from intervention stocks. The basic market support system for sugar remains much the same today as initially designed in 1968, despite reforms to the CAP.

Figure 4. E.U. Sugar Intervention Price and World Price

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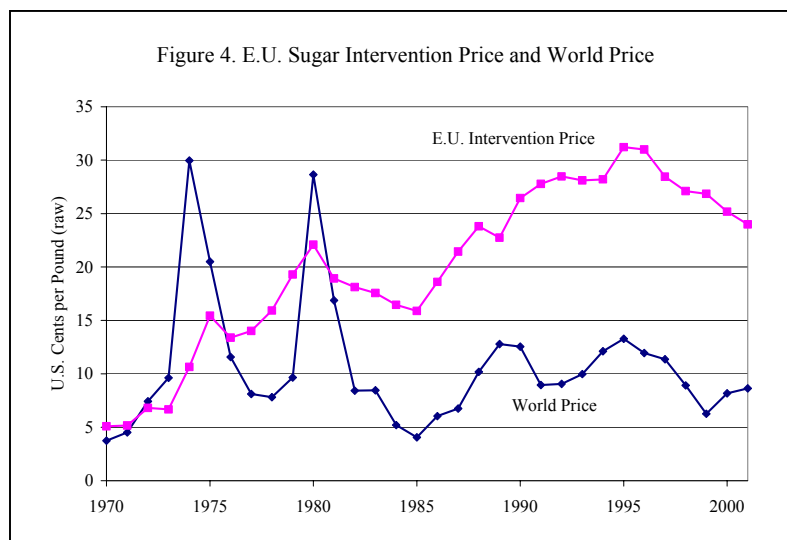
[8] The Common Agricultural Policy (CAP) was agreed to at the Stresa conference in July 1958. The CAP established a common pricing system for all farmers in the EEC, and fixed agricultural prices above world market levels to protect farmers in member countries who generally had higher production costs than other world market producers. Commodities covered by the CAP included cereals, beef, butter and skimmed milk powder, fruits and vegetables, and olive oil. Sugar was included in 1968 and E.U. sugar policy has remained largely unchanged since the original system was established.

Production quotas are used to limit sugar eligible for price support. Quotas are divided into A and B with different levels of price support. Sugar production in excess of quota is classed as C sugar, and is not supported but can be carried over for use as quota sugar in the next years or else it must be exported at world market prices. The total of A and B quota sugar was 14.592 million tons in 2000/01, of which 11.983 million tons was for A quota and 2.611 million tons was for B quota (Agra Europe, 2001). The quotas have been declining in order to meet WTO commitments, and the combined A and B quota for 2003/04 is 13.449 million tons. The surplus of A and B quota sugar above domestic consumption is about 1.5 million tons which is exported with subsidy. Excess quota or C sugar, averaged 1.59 million tons (white equivalent) between 1995/96 and 2000/01. Thus, the E.U. sugar program results in about 3.1 million tons of sugar exports per year (about 10 percent of world exports), and half of this is subsidized.[9] Critics of E.U. policy charge that A and B quota sugar is subsidizing the production and export of C sugar and Brazil, Australia, and Thailand have filed a complaint with the WTO to that effect. Poonyth, et al. (2000) found that E.U. sugar producers respond to world sugar prices, even though E.U. sugar intervention prices are well above world prices. This supports the argument that A and B quota sugar is used to pay farmer's fixed costs while sugar produced for the world market need only cover variable costs.

Production levies are applied to all quota sugar production to cover the costs of export refunds. The levy on A quota is 2 percent and the levy on B quota sugar varies from 30 to 37 percent depending on world market prices. An additional levy can be collected in the next marketing year to recover any shortfall in export refunds. Quotas are also set for alternative sweeteners; isoglucos (know as high-fructose corn syrup in the U.S.) and inulin (produced from chicory and Jerusalem artichoke). The quota for production of HFCS is 303,000 tons and the quota for inulin is 323,000 tons. Quotas can be reduced temporarily to meet WTO export limits or reduced permanently by the European Commission.

The high sugar prices have limited E.U. consumption growth and led to growing exports of quota and non-quota sugar. In the early 1970s, the E.U. was a net importer of about 2.5 million tons of sugar compared to net exports of about 5 million tons in recent years (Figure 5).

Figure 5. E.U. Sugar Trends, 1970-2001

Source: FAOSTATA

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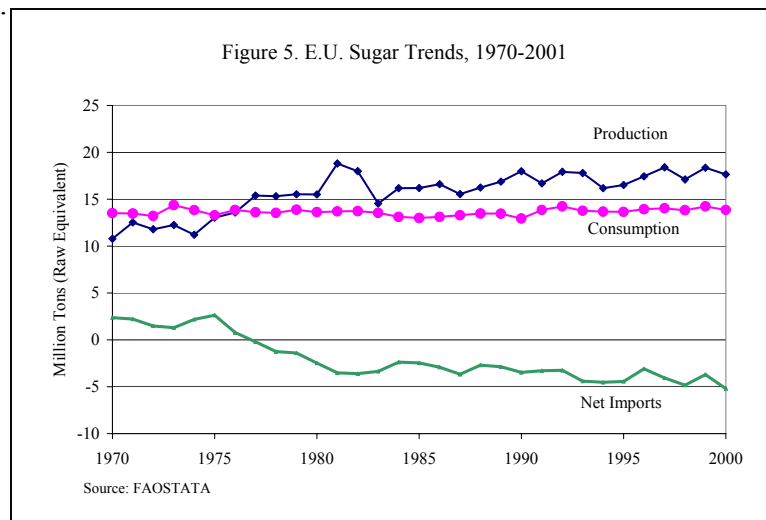
[9] An additional 1.8 million tons of sugar is imported under the ACP/EU Sugar Protocol and re-exported with subsidy after processing.

The Uruguay Round commitments which came into force on July 1, 1995, had little initial impact on the E.U.'s sugar regime. The variable import levy was replaced by a fixed duty plus the safeguard clause allowing for a variable additional duty with minimal impact on protection to sugar beet producers. The E.U. agreed to reduce both the amount spent on export refunds and the volume of sugar exported with subsidy. Export refunds are also payable on sugar exported in the form of processed goods such as sugar confectionery, chocolate, biscuits, cakes, ice cream, soft drinks, etc. The E.U. amended legislation to allow changes in sugar production quotas on an annual basis (rather than the previous five-year basis) to ensure that the limits on exports were met. The limits on expenditures and volumes were phased in from 1995 to 2000/01. The commitment is to reduce only the subsidized exports net of preferential imports. This is a small proportion of total exports of 5 million tons, and amounted to only .34 million tons from the 1986-90 base of 1.612 million tons per year. The E.U.'s Uruguay Round commitment was altered by the accession of Austria, Finland and Sweden in 1995.

Preferential access to the European Union's sugar market and its high prices have been used as development assistance since the 46 countries from Africa, the Caribbean, and the Pacific (ACP) signed the first Lomé Convention in 1975 and became eligible to sell sugar to the E.U. at internal prices. The Sugar Protocol (SP) of the Lomé Convention provided for imports of specified quantities of cane sugar, raw or white, which originate in the ACP states at guaranteed prices. Unlike most Articles of the Lomé Convention, the Sugar Protocol does not expire and cannot be changed unilaterally. The original quantities specified were 1,294,700 tons of white sugar equivalent, and an additional amount was allotted to India (see Table 6). The total import commitment was for 1,304,700 tons and this amount has remained constant with reallocation of quotas among existing members when a country did not fulfill its quota. The sugar imported under the Lomé Convention is know as 'Preference Sugar' or 'SP' sugar. An additional import allocation was made of between 200,000 and 350,000 tons of sugar to primarily ACP countries in 1995. This sugar was called 'Special Preference Sugar' or 'SPS' sugar, but unlike SP sugar, this allocation was not permanent, the quantity could vary based on import needs, and the price paid for SPS sugar was 85 percent of the SP guaranteed price. In addition, the E.U. took over the WTO import commitments of the new members joining the E.U. in 1995. These included a tariff quota of 85,500 tons, mainly from Brazil, with a within quota tariff rate of 98 ECU per ton. The E.U. has also granted several countries in the Balkans temporary access to its sugar market and imports under this program totaled about 100,000 tons in 2001/02. In total, the E.U. permanent commitment is 1.39 million tons (white sugar equivalent) plus additional quantities of up to 450,000 tons of temporary imports. This commitment was expanded by unspecified amounts by the Everything But Arms initiative (EBA) in 2001.

The EBA initiative allows duty-free access to the E.U. sugar market to the 48 least developed countries (39 are ACP countries), and could become the largest of the E.U.'s commitments (see Appendix Box 1 for a description of the Initiative). Initially EBA imports will be limited by quotas, and the sugar imported under the EBA agreement will be counted against the SPS sugar quota. The EBA quota will increase annually until full duty-free access for white and raw sugar is allowed in 2009. There are safeguard clauses in the EBA initiative which could be used to limit imports, but this would be difficult for the E.U. to impose because it would be seen as a policy reversal by the least

developed countries. The imported sugar will eventually displace domestic E.U. production and could severely strain the E.U. sugar regime. The European Commission (2000) estimated the possible impact of the EBA on the E.U. sugar regime, and concluded that sugar imports could increase by an additional 2.4 million tons and cost the E.U. budget about 1.05 billion euros. These imports would have to be offset by reduced domestic production quotas or be used in non-food programs such as Ethanol.

An additional longer-term threat to the E.U. sugar program is a Commission plan to offer, all 77 ACP countries the same conditions as the EBA countries under the Economic Partnership Agreements (EPAs). Negotiations began in September 2002 and are expected to take 5 years. Under the Agreements, all ACP countries would have duty-free access to the E.U. market for all goods except arms. These countries currently produce 6.2 million tons of sugar (F.O. Licht, 2002, page 443) and they could provide all of it to the E.U. at short notice while covering their own demand from the world market. Taken together, EBA and ACP supplies could total 8.6 million tons. This is 60 percent of current E.U. production, and would force major change to the E.U. sugar program. However, the program would likely be phased in over a number of years beginning in 2008.

Table 6. E.U. Preferential Sugar Quotas to ACP Countries and India.

Country	1975/76-76/77	1984/85-85/86	1995/96-99/00
	(tons white sugar equivalent)		
Barbados	49,300	50,049	50,312
Belice	39,400	40,104	40,349
Congo	10,000	10,000	10.186
Côte d'Ivoire		10,000	10,186
Fiji	163,600	164,862	165,348
Guyana	157,700	158,935	159,410
India	25,000	10,000	10,000
Jamaica	118,300	118,300	118,696
Kenya	5,000	5,000	0
Madagascar	10,000	10,573	10,760
Malawi	20,000	20,618	20,824
Mauritius	487,200	489,914	491,031
St.Kitts/Nevis/Anguilla	14,800		
St. Christopher/Nevis		15,394	15,591
Surinam	4,000	0	0
Swaziland	116,400	117,450	117,845
Tanzania	10,000	10,000	10,186
Trinidad & Tobago	69,000	43,500	43,751
Uganda	5,000		
Zimbabwe		30,000	30,225
Total	1,304,700	1,304,700	1,304,700

Source: European Commission.

The E.U. does not have a biofuel program, but individual member countries do. The dependence of the E.U. on imports for half of its energy use and the environmental advantages makes biofuels an attractive option for the E.U. and provides a possible outlet

for surplus sugar production. At present, biofuels account for 0.2 to 0.3 percent of E.U. fuel use from national programs in France, Spain, and Sweden. France is the European leader in bioethanol production, which is converted into ethyl tertiary butyl ether (ETBE) and blended with gasoline in concentrations of up to 15 percent for use without modification in vehicle engines. About 70 percent of the ethanol produced for ETBE comes from sugar beets and the remainder comes from grains. The support to ethanol dates to 1992 when ethanol in France was partially exempt from the tax on petroleum products. The tax rate for unleaded petrol in France was FRF284.23 per hl, while the tax rate for biothanol was FRF54.37, giving a tax concession of FRF229.50. (F.O. Lichts, November 23, 2001, p552). An E.U. biofuel program was proposed in November 2001. The proposal calls for biofuels and other substitute fuels to account for 20 percent of total fuel consumption by 2020, with an increasing requirement from 2005. Biofuels would be required to account for 2 percent of fuel use in the transportation sector and reach 8 percent by 2020. Tax incentives would be decided by member states.

E.U. enlargement may create new problems for the E.U. sugar regime. Most of the countries scheduled to join the EU are sugar producers and expect the same level of support as currently received by E.U. sugar producers. The ten countries scheduled to join in mid-2004 are: Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic, the Czech Republic, and Slovenia. Bulgaria and Romania will likely join shortly thereafter, and the last of the current round of accession countries, Turkey, will probably join several years later. Poland is the largest sugar producer of the ten countries scheduled to join in 2004, with nearly a 60 percent of the group's total production. The first ten accession countries are shown in Table 7 as AC-10 and the sugar sectors of these countries are compared with the sugar sector in the E.U. These countries

Table 7. Comparison of E.U. and Accession Countries Sugar Sectors, 1995-2000.

Group	-----------------Sugar Beets----------------				------------Sugar (Raw Equivalent)------------			
	Yields Tons/Ha	Area Mil Ha	Production Mil Tons	Recovery Rate	Production Mil Tons	Consumption Mil Tons	Per Cap Cons Kilograms	Net Imports Mil Ton
				Average 1995-2000				
AC-10	37.6	0.6	24.3	16.0	3.6	3.3	43.3	-0.2
AC-12	35.0	0.7	26.2	15.8	3.8	3.8	38.0	0.4
AC-13	36.7	1.1	42.7	14.6	5.9	5.9	35.2	0.3
EU-15	56.8	2.1	115.0	18.3	17.6	13.9	37.1	-4.2
			Accession Group as Percent of EU-15					
AC-10	66.2	31.2	21.1	87.6	20.2	23.3	116.6	3.6
AC-12	61.7	36.1	22.8	86.3	21.4	27.1	102.5	-10.2
AC-13	64.6	56.5	37.2	79.7	33.5	42.3	94.7	-6.9

Source: Based on FAOSTAT data.

produce about one-fifth as much sugar as the E.U., have higher per capita consumption, lower yields, and lower recovery rates than the E.U. They agreed to an A and B quota of 2.958 million tons, with 2.829 million tons of A quota and .129 million tons of B quotas (EU Commission, 2003). They also agreed to an isoglucos quota of .206 million tons.

Producers will likely also produce C sugar, as is done by current E.U. producers, to ensure that they have adequate production to fill their quotas and to export at world market prices. Further adjustments will be needed when Bulgaria and Romania join the E.U. (AC-12), and when Turkey joins (AC-13) since it is a large sugar producer.

A 1998 E.U. Commission study of the 10 accession countries concluded that the group would add at least 200,000 tons to the E.U.'s export surplus. This was supported by an analysis of the exports of the 10 accession countries, that would have occurred from 1998-2000 if these countries had already joined the E.U. This analysis found that E.U. exports would have been 210,000 to 230,000 tons larger due to the accession countries. The data in Table 7 shows similar results, that accession countries' production exceeds consumption by about 300,000 tons. Among the unknowns, are the response of consumers in the accession countries to the expected increase in sugar prices once they join the E.U. According to F.O. Licht, retail sugar prices in the accession countries ranged from 0.48 to 0.68 Euros per kilogram compared to 0.80 in the EU-15. This would cause consumption to drop by roughly 4-8 percent if prices were equalized and that would increase the production surplus by about 120,000-240,000 tons. Thus, it seems likely that the accession countries will add to the exports of the E.U. by about 200,000 tons.

Pressures for change to the E.U. sugar regime come from a number of sources. Processed food manufactures would like to see reduced sugar prices because they find it difficult to export products containing sugar due to WTO limits on subsidized exports. Sugar exporters, such as Australia and Brazil, would like to see exports reduced because they contend that they depress world prices, and reduce export opportunities. Enlargement adds new pressure because it could add to surplus sugar production, which cannot be exported with subsidy because of WTO commitments. The potential increase in imports under the EBA initiative could force sharp declines in production quotas or intervention prices, and the Economic Partnership Agreements cannot be accommodated without major changes to the E.U. sugar program. However, efforts at reform also face numerous obstacles. If intervention prices are reduced, E.U. sugar producers would likely expect compensation and this would violate the Agenda 2000 budget agreement. Lower intervention prices would also affect ACP countries that currently supply sugar to the E.U. on preferential terms, and prompt requests for new forms of development assistance. Reductions in quotas will be opposed by E.U. sugar producers. The problem will become more acute over the next decade as new countries join the E.U. and EBA imports increase.

The current E.U. sugar regime runs until June 2006, and the European Commission opened discussions on reform to the E.U. sugar regime on September 23, 2003. However, unlike the other commodities scheduled for reform discussions; cotton, olive oil and tobacco, reform proposals were not offered for sugar. Rather, three scenarios for reform were offered, which ranged from an extension of the present sugar regime beyond 2006 to complete liberalization of the present regime. Complicating the reform discussions is the WTO investigatory probe launched on August 29, 2003, in response to complaints by Brazil, Australia and Thailand that the E.U. sugar regime illegally subsidizes the industry and depresses world prices. The WTO challenge alleges breaches of the WTO Agreement on Agriculture Subsidies and Countervailing Measures Agreement and GATT 1994, and thus the proceedings will be subject to accelerated

review. In addition, a negative finding by the WTO Dispute Settlement Body would be liable to swift implementation, i.e. "withdrawal of subsidies without delay." Further, Brazil and Australia have declared that they reserve their right to raise other claims and factural and legal issues during the consultation. This could threaten the waiver which the ACP-EU Cotonou Agreement was given in November 2001 by the 4th WTO Ministerial Conference in Doha according to F.O. Lichts (F.O. Lichts International Sugar and Sweetener Report June 27, 2003, page 335). The probe is expected to take 18 months.

Japanese Policy

Japan is the third largest net sugar importer, following Russia and Indonesia, with average annual net imports of about 1.6 million tons of raw sugar during 1999-2001 (Figure 6). Imports supply about two-thirds of domestic sugar consumption and the remaining one-third is supplied by highly subsidized beet and cane producers. Domestically produced HFCS accounts for about 40 percent of total caloric sweeteners. Sugar beet production is concentrated on the island of Hokkaido, and sugar cane is grown on the smaller southern islands. The government intervenes in the sugar market by establishing guaranteed minimum prices for sugar beets and cane, controls on raw sugar imports, prohibitive duties on refined sugar imports, high tariffs on imported products containing sugar, and quotas, tariffs and other controls on sugar substitutes. The system results in retail sugar prices which are among the highest in the world ($.89 per pound in Tokyo in 2000) and producer prices for sugar beets and sugar cane which are roughly 10 times world market levels. Sugar consumption is gradually declining due to competition from HFCS, high sugar prices, slow economic growth, and dietary changes away from sweeteners. However consumption may actually be higher than reported because sugar contained in imported products is not reported and is estimated to account for as much as an additional 10 percent of sugar consumption.

Figure 6. Japanese Sugar Trends, 1970-2000

Source: FAOSTAT
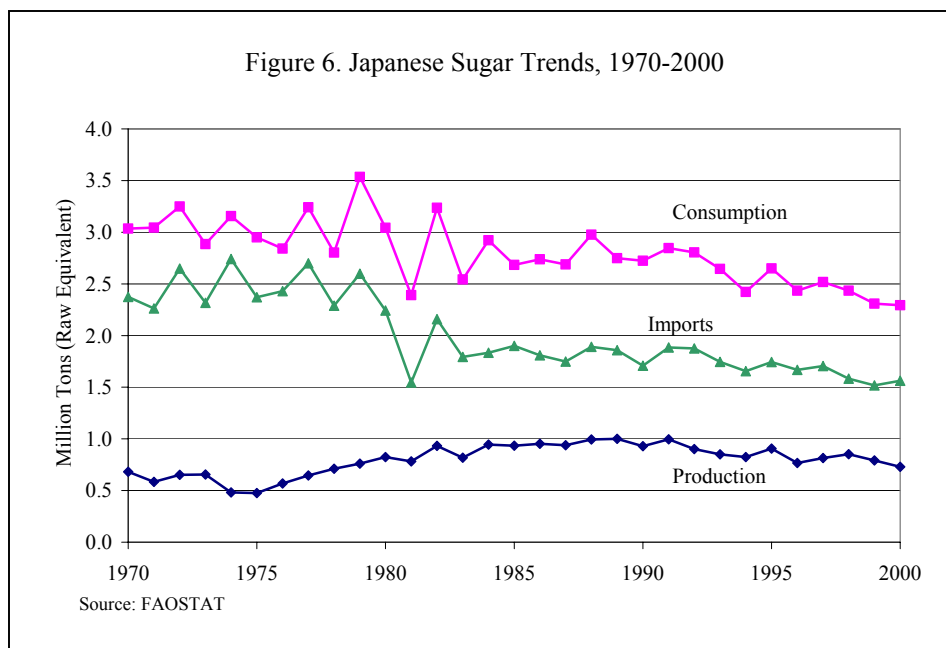
Japan's Ministry of Agriculture, Forestry, and Fisheries (MAFF) sets guaranteed minimum prices for sugar cane and sugar beets according to the Sugar Price Stabilization Law of 1965 and the Revised Sugar Price Adjustment Law of 2000 (Fukuda, Dyck and Stout, 2002). The minimum producer prices are set based on a formula comparing current agricultural input prices and consumer goods relative to prices that prevailed in 1950 and 1951. The minimum producer price for sugar beets during 1990-95 averaged $149/ton while the minimum producer price for sugar cane was $174 per ton. By comparison, U.S. sugar beet and cane producers received an average of $29/ton and $40/tons, respectively, during the same period (USDA). U.S. producers receive prices which are more than double world market prices, and thus, Japanese beet and cane producers received at least 10 times world market prices.[10] For the 2001 marketing year, the minimum price for sugar beets was 17,040 yen/ton ($131/ton) and 20,370 yen/ton for sugar cane ($157/ton). Australian sugar cane producers, who receive no government price supports, received $16/ton in the 2001 marketing year (Sheales, 2002). The MAFF also sets the raw sugar price for domestic refiners, known as the "domestic sugar rationalization target price", at a level intended to allow restructured sugar refining firms to pay the guaranteed minimum price to sugar cane and beet producers and still recover costs. A subsidy is provided to sugar refiners to cover the difference between the domestic market price and the "target price". In marketing year 2001, the target price for raw sugar was 151,800 yen per ton ($1,168 per ton or $.53 pound) while the resale price on imported raw cane sugar was about $.22 per pound (Fukuda, et. al, 2002, page 7). The difference was made up by a subsidy provided by a surcharge on imported sugar, other surcharges, and funds from Japan's national budget. The current subsidy to refiners is 90 billion yen ($692 million) according to the MAFF (Fukuda, et. al, 2002, page 3).

The government regulates the production and price of HFCS in order to limit competition with sugar and obtain funds to partially pay for the high support to sugar beet and cane producers. HFCS production targets are established by the MAFF for each producer and a surcharge is paid to the government on production up to that level. An additional surcharge is added on production which exceeds targets, which effectively establishes production quotas on HFCS and prevents the balance between sugar and HFCS from changing. HFCS producers are required to use a minimum share of domestically produced potatoes and sweet potatoes in addition to imported maize. In addition to controlling HFCS production and prices, high tariffs are imposed on imported HFCS and tariff-rate quotas are imposed on starch imports. Food manufactures are prevented from circumventing the high barriers to imports of sugar and HFCS by higher tariffs on intermediate or final products that contain added sugar. Partly as a result of high sugar prices, some food manufactures have moved offshore so that finished products containing sugar can be imported at lower overall tariffs than the raw sugar.

Full liberalization of Japan's sugar and sweetener market would likely reduce domestic sugar production drastically—perhaps completely eliminating domestic production. Consumption would increase as consumers faced lower sugar prices and imports would increase to meet consumer demand. HFCS consumption would likely

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[10] There appears to be an anomaly between the OECD's estimate of producer support in Table 3 and the prices received by sugar beet and sugar cane producers in Japan. If sugar beet and cane producers in Japan receive five times the prices in the U.S., then it appears the PSE percentage should be higher rather than lower as reported in Table 3.

increase without current controls, but would not necessarily increase under full liberalization of the sugar and sweetener markets because of competition from imported sugar. The Australian Bureau of Agriculture and Resource Economics (ABARE) estimated in a 1999 study that sugar imports would rise by 500,000 tons if Japan eliminated its tariffs, surcharges and levies on sugar imports. The study assumed that domestic production would only decline 22 percent because of other means of government support. The Economic Research Service of USDA estimated that production would decline by 40 percent if Japan were to eliminated all border protection and domestic support which is trade distorting. Consumer and producer prices in Japan would fall by 70 percent under their scenario, and imports would rise by as much as 735,000 tons (Fukuda, et al. 2002, page 8). Borrell and Pearce (1999) estimated that sugar prices would decline by 65 percent, production would decline by 44 percent, and net imports would increase by about 1.5 million tons.

U.S. Sugar Policy

U.S. sugar policy began with the Sugar Act of 1934, when sugar was first included as a basic agricultural commodity under the Agricultural Adjustment Act. The sugar policy was in response to declining sugar prices following a surge in domestic sugar production and imports, and a decline in consumption due to the Great Depression (USDA, 1935). At that time, 89 percent of U.S. sugar production was from sugar beets and only 11 percent was from sugar cane. Thus, the act was mostly designed to protect sugar beet producers from falling prices. Imports accounted for 77 percent of total sugar consumption. The basic provisions of the 1934 Sugar Act remained in effect through subsequent legislation until 1974, when the Sugar Act was not renewed because of high world market prices (Lord, 1995). World prices soon fell, and sugar policy resumed when sugar was included in the Food and Agriculture Act of 1977. The 1977 legislation provided for government loan rates for sugar beets and cane.[11] The 1981 Act mandated a raw cane sugar loan rate of 18 cents per pound by 1985. Subsequent legislation, including the most recent 2002 farm legislation, maintained the sugar program in much the same form as in the 1981 Act. A Refined Sugar Re-export Program was introduced in 1983 that allowed sugar cane refiners to purchase raw sugar at world prices, without duty, and export a like amount within 90 days. A similar program was created for manufacturers of sugar-containing products. In the 1985 Act, a no-cost provision was added that required the Secretary of Agriculture to make every effort to operate the sugar program in a way which avoided forfeiture under the loan program. In order to avoid forfeitures, it was necessary to keep the domestic sugar price above the world market price. This was done by restricting sugar imports, first by quotas introduced in May 1982, and then by tariff-rate quotas in 1990 following a successful GATT challenge. Import duties of 0.625 per pound, raw value, were charged for countries granted Most-Favored Nation status by the

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[11] Non-recourse commodity loans are used by the government to support prices of many crops. Under the program, farmers who comply with the provisions of each commodity program are allowed to pledge their commodity as collateral and obtain a loan from the USDA's Commodity Credit Corporation (CCC) at the specified loan rate per unit for the commodity. The borrower may elect to repay the loan with interest within a specified period and regain control of the commodity, or default on the loan as payment of the loan and interest. The farmer will normally default on the loan if the market price is below the level necessary to repay the loan and interest. Thus, the loan rate becomes the effective floor price.

United States, but most quota suppliers were exempt through the Generalized System of Preferences or the Caribbean Basin Initiative.

The 1990 legislation established minimum import levels to allay concerns of quota-holding countries and cane processors. It also provided for marketing allotments on domestically produced sugar if estimated imports were less than 1.25 million tons, raw value. The 1990 legislation did not change the loan rates, but it provided for an assessment on all sugar processed of 0.18 cents per pound of raw cane sugar and 0.193 cents per pound of refined beet sugar in an effort to 'effectively' reduce the loan rates. Marketing allotments were introduced in 1990 on domestically produced sugar if estimated sugar imports were less than 1.25 million tons, raw value. The allotment can be imposed at the discretion of the Secretary of Agriculture and are to be allocated between beet and cane producers based on past marketing, processing and refining capacity, and ability to market. Marketing allotments were imposed in fiscal 1993 and 1995, but have been controversial and subjected to legal challenges.

The 2002 legislation changed the marketing allotments program to allow the Secretary of Agriculture to impose marketing allotments in order to balance markets, avoid forfeitures, and comply with import commitments under WTO and NAFTA. The allotments can only be used when sugar imports, excluding imports under the re-export program, are less than 1.532 million tons.[12] A sugar Payment-in-Kind (PIK) program was used in 2000 and 2001 to reduce CCC inventories in exchange for farmers not harvesting planted acreage. The program allowed produces to bid for the amount of CCC inventory they would accept in exchange for forgoing harvest of a farmers-specified number of planted acres. This program is extended in the 2002 legislation and includes a product-for-production, pre-planting crop diversion program. The USDA has used the new authority provided by the 2002 legislation and announced flexible marketing allotments for sugar for the 2002/03 marketing year (Haley and Suarez, 2002). The USDA is required to adjust allotment quantities to avoid forfeiture of sugar to the CCC.

The Farm Security and Rural Investment Act of 2002 continues the essential elements of the previous sugar program, but with some changes which increase support to sugar producers and processors. The non-recourse loan program is reauthorized through FY 2007 at 18 cents per pound for raw cane sugar and 22.9 cents per pound for refined beet sugar. The Act continues to require the USDA to operate the sugar program, to the maximum extent possible, at no cost to the government by avoiding forfeiture to the CCC under the loan program. Program changes which benefit the sugar industry include: the termination of the marketing assessment on all sugar processed (between 1.375 and 1.47 percent of the raw sugar loan rate), the termination of the forfeiture penalty on cane ($0.01 per pound) and beet processors ($0.0107 per pound), and reduced interest rate on CCC sugar loans by one percentage point. The payment-in-kind (PIK) program was continued. An inventory management authority was provided to the Secretary of Agriculture to impose marketing allotments in order to balance markets, avoid forfeitures and comply with the U.S. sugar import commitments under WTO and NAFTA. The tariff-rate-quotas are continued under the 2002 Act.

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[12] This seems the opposite of what is required, but the logic is apparently that if imports exceed this amount then the sugar program has lost its ability to control imports and U.S. producers should be given unrestricted freedom to produce.

In the Uruguay Round Agreement on Agriculture, the United States agreed to maintain minimum imports of 1.139 million metric tons of raw value sugar imports (1.256 short tons). Of this, 22,000 metric tons was reserved for refined sugar. The raw cane sugar tariff-rate quota (TRQ) was allocated to 40 quota holding countries based on their export shares during 1975-81 when trade was relatively unrestricted. The duty of 0.625 cents per pound, raw value, continues on quota imports. Most countries continue to avoid the duty because of GSP or CBI programs. The duty on raw sugar above the tariff-rate quota was 17.62 cents per pound beginning in January 1995 and lowered by 0.45 cents per pound each year until it reached 15.36 cents per pound in 2000. The refined sugar above rate tariff was 18.62 cents per pound in 1995 and declined by 0.48 per year through 2000 to 16.21 cents per pound. The over-quota tariff will remain prohibitive at a world price of about 5 cents per pound (assuming a U.S. raw sugar market price of 22 cents per pound and a transportation price of 1.5 cents per pound).

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 eliminated over the subsequent 15 years (Polopolus, Alvarez, and Messina 2002). The NAFTA sugar provisions were altered by a side-letter agreement prior to the start of the NAFTA Agreement. 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 less consumption of sugar and high-fructose corn syrup. From FY 2001 through 2007, Mexico is to have duty-free access to the U.S. market for the amount of its surplus, up to a maximum of 250,000 metric tons raw value. Beginning in FY 2008, Mexico is to have duty-free access with no quantitative limit. The validity of the side-letter agreement is disputed by the Mexicans, while the United States maintains that the side-letter provisions are valid. Starting with the 2000/01 sugar crop and continuing through the 2007/08 sugar crop, Mexico can export up to 250,000 tons of surplus sugar duty-free to the U.S. In 2001/02, Mexico shipped 148,000 tons of sugar, and other exporter's quotas were reduced to accommodate the larger quantities. The question arises as to how future increases in Mexico's exports will be accommodated. And, how will unlimited duty-free access be accommodated in 2008/09? Table 8 shows current U.S. sugar import quotas. The countries with the largest quotas, and therefore the most to lose, are Brazil, Dominican Republic and Philippines.

The side-letter agreement did not change other NAFTA provisions such as the phased reduction in the U.S. over-quota tariff of 16 cents per pound by a total of 15 percent during the first 6 years, and then in a straight line to zero in calendar year 2008. The raw sugar over-quota tariff was 9.07 cents per pound in 2002 and it drops about 1.5 cents per pound each year. For example, if the world raw sugar prices is in the range of 7 cents per pound and U.S. raw sugar prices are about 18 cents per pound, Mexican producers would benefit from exporting to the U.S. instead of the world market (USDA, 2002). Currently, Mexico does not have a large surplus of sugar to export but this could change due to increased production or reduced sugar consumption from imports or production of HFCS (which currently has a 20 percent import duty). In future years, the over-quota tariff will continue to decrease and could lead to large imports. A provision of the U.S. sugar legislation removes production quotas if imports exceed 1.5 million tons—a free-for-all if imports increase beyond certain limits. Under this alternative, the U.S. government could end up holding large stocks defaulted under the sugar loan program

Table 8. U.S. Sugar Import Quotas and Fill Rates

Country	1982/83	1990/91	2000/01
		Metric Tons	
Argentina	109,226	85,655	45,283
Australia	210,832	168,837	87,408
Barbados	17,781	14,239	7,372
Belize	27,942	22,376	11,584
Bolivia	20,321	16,273	8,425
Brazil	368,321	294,956	152,700
Canada	27,942		
Colombia	60,963	48,882	25,274
Congo	n.a.	8,030	7,258
Costa Rica	38,102	30,513	15,797
Côte d'Ivoire	14,969	8,030	7,258
Dominican Republic	447,065	358,013	185,346
Ecuador	27,942	22,376	11,584
El Salvador	66,044	52,889	27,381
Fiji	17,781	18,307	9,478
Gabon	n.a.	8,030	7,258
Guatemala	121,927	97,641	50,549
Guyana	30,482	24,410	12,637
Haiti	14,969	8,030	7,258
Honduras	25,401	20,342	10,531
India	20,321	16,273	8,425
Jamaica	27,942	22,376	11,584
Madagascar	14,969	8,030	7,258
Malawi	17,781	20,342	10,531
Mauritius	27,942	24,410	12,637
Mexico	14,969	8,030	7,258
Mozambique	33,022	26,445	13,690
Nicaragua	53,343	42,717	22,115
Panama	73,664	58,991	30,540
Papua New Guinea	n.a.	8,030	7,258
Paraguay	14,969	8,030	7,258
Peru	104,146	83,402	43,177
Philippines	342,919	321,401	142,169
St. Kitts-Nevis			7,258
St. Christopher-Nevis	14,969	8,030	
South Africa	58,423	0	24,221
Swaziland	40,642	32,547	16,850
Taiwan	30,482	24,410	12,637
Thailand	35,562	28,479	14,743
Trinidad-Tobago	17,781	14,239	7,372
Uruguay	n.a.	8,030	7,258
Zimbabwe	30,482	24,410	12,637
Total	2,624,150	2,100,083	1,389,997
Fill Rate (Percent)	91.7	96.9	89.1

Source: USDA.

and the sugar system would become more difficult to manage because of the non-net cost provision of the 2002 Farm Bill. Mexico has increased sugar production from about 3.5 million tons during 1989-91 to 5.2 million during 2000-02, while consumption hasincreased from 4.0 to 4.5 million tons (USDA). Following the end of the NAFTA phase-in period, Mexico can ship unlimited quantities of sugar to the U.S. duty-free without the condition of being a net surplus producer. This could lead to various outcomes, and will likely force changes to the U.S. sugar program. For example, Mexico could increase imports of HFCS for use in the soft drink industry which then frees sugar to export to the U.S.

The effectiveness of the U.S.'s sugar program at keeping domestic prices above world prices can be seen in Figure 7. During this period, world prices have fallen sharply, but U.S. producers were protected. However, the sugar program faces new challenges in the near future which could bring into conflict the no-cost provision of the sugar program, the minimum import commitment under the WTO, and the duty-free access provision to Mexican imports in FY 2008. The more rapid growth of sweetener production compared to consumption could also destabilize the program. The growth rate of sweetener production during 1985-2000 was 3.2 percent compared with the growth of consumption of 2.1 percent over the same period. If these growth rates are extended to 2010 (Figure 8), the imbalance between production and consumption becomes significant and marketing allotments would be needed to prevent stock building. The problem is further exacerbated by the Uruguay Round Agreement to import 1.139 million tons of sugar, raw value, per year. The U.S. sugar program, like that of the E.U. almost certainly will have to change.

The U.S. sugar program benefits just 9,000 sugar beet producers and 1,000 sugar cane producers (Orden 2003). However, opposition to policy reform is strong, especially from sugar cane producers. Florida accounts for one-quarter of U.S. sugar production and two large corporations account for nearly 80 percent of the cane acreage in Florida. Such concentration of production suggests that reforming the U.S. sugar program will likely require compensation of existing producers, and a model to consider is the recent reform of the U.S. edible peanut program (Orden, 2003). Like sugar, the edible peanut program had domestic prices supported at about double world prices, quotas to limit production, and TRQs to limit imports (Diop, Beghin and Sewadeh, 2003). And, like sugar, the edible peanut program faced the threat of increased imports due to WTO and NAFTA agreements. In the 2002 U.S. farm bill, the loan rate for edible peanuts was cut by half compared to the mid-1990s, production quotas were eliminated and direct cash payments were made to producers. The payments consisted of deficiency payments if prices fell below the new lower loan rates, decoupled direct payments, and counter-cyclical payments. In addition, quota holders were compensated for their loss of quota rights with direct payments. A similar program for sugar would be complicated by the loss of benefits of HFCS producers who benefit from high sugar prices. However, reform of the sugar program may also require compensating the industries which now depend on distorted sugar policies.

Figure 7. U.S. Sugar Loan Rates, Prices and World Prices

Figure 8. U.S. Sweetener Production and Consumption and Sugar Imports
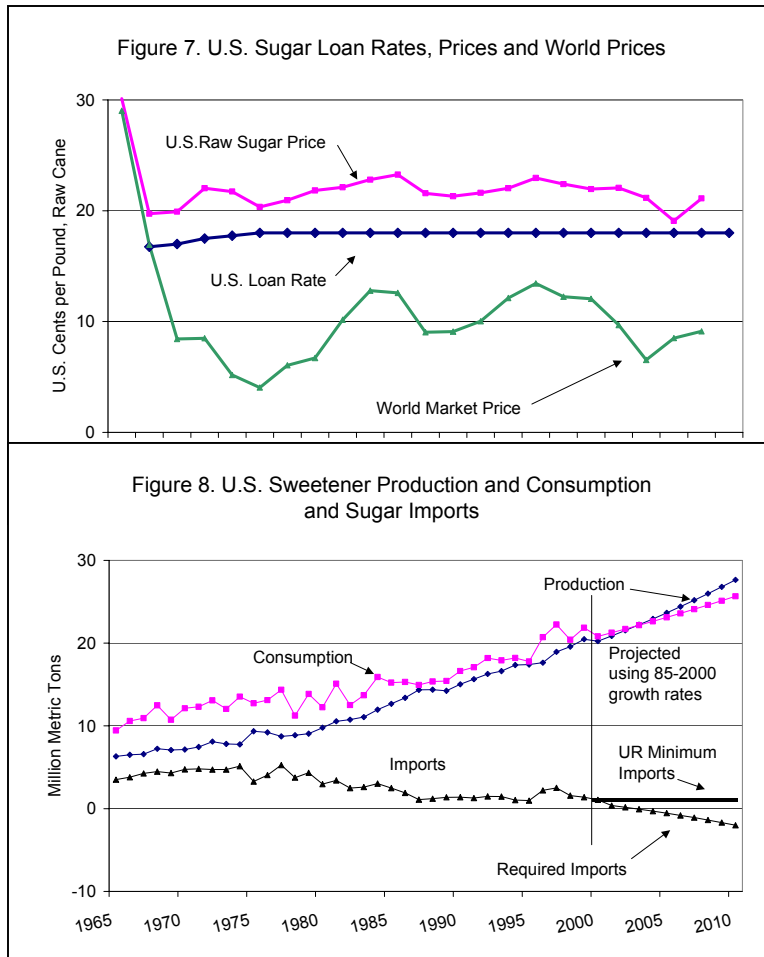
VI.   Summary and Conclusions

Sugar cane is an almost ideal commodity for some developing countries to grow for domestic consumption and export. It can be produced efficiently in tropical climates under a wide range of technologies from low-input labor-intensive to high-input fully-mechanized. Sugar is locally consumed in all producing countries, and provides a substantial part of total calories in many countries. Processing can be varied to meet the needs of low-income domestic or high-income foreign consumers. Raw cane sugar stores well after initial processing. There are few problems in meeting sanitary and health standards because sugar cane juice is boiled during initial processing and raw cane sugar is boiled again when refined to produce white sugar. The biggest problem for producers of this almost ideal commodity is the limited world market export opportunities and low world prices, which are caused largely by policies in OECD countries.

The E.U., Japan, and the United States are among the worst offenders. They provide domestic producers with price supports that are at least double world market levels. Such high prices have reduced the rate of growth of domestic consumption, encouraged production of alternative sweeteners, and led to high production by local

producers who would not be competitive at world market prices. Imports have been limited by quotas and tariffs and surplus production has been exported with subsidies or disposed of at world market prices to avoid storage. The impact of such policies has been to depress world market prices by about one-third, according to several estimates, and limit the growth of imports. Such policies have converted these countries from importers of half of the world's internationally traded sugar in the early 1980s to net exporters on balance during the past two decades. The recent Uruguay Round Agreement on Agriculture has done little to change the situation.

The reason for the high support to producers in these countries relates partly to the un-competitiveness of sugar beets compared to sugar cane. According to cost of production estimates, the average cost of producing sugar from beets is nearly twice the average cost of producing sugar from cane. Sugar beets account for half of U.S. sugar production, 80 percent of Japanese production, and nearly all of E.U. production. Without such support, sugar beet production would decline sharply in the E.U. and U.S. and probably be eliminated entirely in Japan.

Support for current sugar policies among program beneficiaries is obviously strong, but problems are emerging that make change inevitable. In the E.U., WTO limits on subsidized exports are forcing production quotas to be reduced and food processors out of international markets. The enlargement of the E.U., which is scheduled to admit 10 countries in 2004, will further strain the sugar regime as new members gear up to produce under high support prices. The Everything But Arms initiative allows unlimited duty-free access to 48 least developed countries by 2009 and could lead to sharply higher imports and further cuts in production quotas. A plan to offer all 77 ACP countries the same conditions as the EBA countries from 2008 under the Economic Partnership Agreements could further threaten the E.U. sugar program. A review of the E.U.'s sugar regime is scheduled for 2004 and this could lead to changes in the sugar regime. In Japan, sugar beet and sugar cane producers receive 10 times world market prices. Food manufactures are moving production offshore in order to avoid high sugar prices and then importing processed foods into Japan at lower tariff rates than for sugar. Pressures for reform are, however, limited. In the U.S., high sugar prices have encouraged rapid production increases and current trends suggest sugar stocks could begin to build almost immediately because of minimum import commitments made under the Uruguay Round Agreement on Agriculture. This conflicts with the U.S. sugar program mandate to operate under a no-cost provision and will force prices lower or lead to marketing allotments. By 2009, Mexico has unlimited duty-free sugar access to the U.S. sugar market under the NAFTA sugar agreement and is expected to increase exports substantially. The U.S. is currently negotiating a free-trade agreement with five Central American countries, and these countries are large sugar producers and exporters. Unless sugar is excluded from the agreement, this could further destabilize the U.S. sugar program.

The benefits of sugar policy reform are substantial, and the gains are greatest under multilateral reform. According to recent studies of the global sugar and sweetener markets, the global welfare gains of removal of all trade protection are estimated to total as much as $4.7 billion per year. In countries with the highest protection (Japan, Western Europe, the U.S., Indonesia, and Eastern Europe) net imports increase by 15 million tons per year. World sugar prices would increase about 40 percent, while sugar prices in countries that heavily protect their markets would decline. The greatest price decline

would occur in Japan, where sugar prices would fall 65 percent, followed by a 40 percent decline in Western Europe, and a 25 percent decline in the United States. Brazilian producers gain the most from liberalization, around $2.6 billion per year, but this is offset by a loss of $1 billion to Brazilian consumers who pay higher prices liberalization— leaving a net gain of $1.6 billion for Brazil.

The exporting countries which currently have preferential access to the E.U. and U.S. sugar markets gain about $0.8 billion per year (compared to world market prices) from this access through prices which average more than double the current world market price on sales to the E.U., and prices which average 80 percent more than the world market prices for sales to the U.S. However, the value of this preferential access is less than it appears, because many of these producers have high production costs and would not produce at world market prices. Further, world market prices would rise by about 40 percent after full liberalization which would partially offset the loss to producers of high prices in preferential markets. The net loss to these exporting countries from full liberalization is estimated to total $0.45 billion per year.

The nature of reforms can have very different implications for developing countries. If existing polices in the E.U. and U.S. are adjusted to accommodate higher imports from EBA and NAFTA, many low-cost producers, such as Brazil, will lose because they do not currently have large quotas and are not ACP, EBA, or NAFTA countries. A better alternative is to push for full liberalization of the world sugar market to allow efficient producers to expand production and exports and consumers in protected markets to benefit from lower prices. This also may make policy change more palatable because no country is being singled out for reform. It also has the advantage of somewhat higher world prices from coordinated liberalization to soften the adjustment for producers in protected markets such as the E.U., Japan, and the U.S. While change will not be easy, a coordinated liberalization has substantial advantages over marginal adjustments that keep existing sugar policies in place but allow larger imports.

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Appendix

Box 1: Everything But Arms

Table A1. Sugar Consumption (million tons)

Table A2. Raw Sugar Imports (million tons)

Table A3. Refined Sugar Imports (million tons)

Table A4. Raw Sugar Exports (million tons)

Table A5. Refined Sugar Exports (million tons)

Table A6. Sugar Cane Production (million tons)

Table A7. Sugar Beet Production (million tons)

Appendix Box 1: Everything But Arms

The EU approved a Regulation extending duty-free access without any quantitative restrictions to products originating in the least-developed countries. The Regulation, which applies from 5 March 2001, provides for full duty-free access for the world's 48 least developed countries (LDC) into EU markets and covers all goods except arms (and three "sensitive" products).

With respect to the three "sensitive" products (bananas, rice, and sugar), the access is restricted during the phasing-in period:
- for bananas, full liberalization from 2006,
- for sugar, full liberalization from1 July 2009
- for rice, full liberalization from 1 September 2009
- the allocation of duty-free quotas for rice and sugar during the interim period preceding liberalization. These quotas to be based initially on best figures for LDC exports during the 1990s, plus 15%. They will increase by 15% each year during the interim period
- implementation of the following tariff cuts during the interim period:
  bananas: annual reductions of 20% from January 2002
  sugar: 20% reduction on 1 July 2006, 50% reduction on 1 July 2007, 80% reduction on 1 July 2008,
  rice: 20% reduction on 1 September 2006, 50% reduction on 1 September 2007, 80% reduction on 1 September 2008.

There is a safeguard clause for the sensitive products which allows the Commission to suspend the preferences provided by the Regulations for the products concerned if the imports of the sensitive products caused serious disturbance to the Community markets and their regulatory mechanisms.

Source: EU Council Press Release, February 26, 2001.

Table A1. Sugar Consumption (million tons) and Growth Rates (percent).

	Average Consumption				Growth Rates		
	1969-71	1979-81	1989-91	1999-01	70s	80s	90s
World	69.31	95.63	105.31	127.10	3.3	1.0	1.9
Developed	34.05	35.08	30.97	30.67	0.3	-1.2	-0.1
Developing	35.26	60.55	74.33	96.42	5.6	2.1	2.6
OECD	35.80	37.89	35.10	35.22	0.6	-0.8	0.0
Australia	0.71	0.79	0.85	1.00	1.0	0.8	1.6
Canada	1.04	1.06	0.94	1.24	0.1	-1.2	2.8
EU-15	7.37	11.15	13.32	14.40	4.2	1.8	0.8
Japan	2.82	3.11	2.82	2.25	1.0	-1.0	-2.2
USA	10.11	9.33	7.79	9.11	-0.8	-1.8	1.6
Asia	11.75	21.56	33.94	45.07	6.3	4.6	2.9
China	2.20	3.83	7.45	8.68	5.7	6.9	1.5
India	3.89	6.82	11.75	17.37	5.8	5.6	4.0
Indonesia	0.83	1.84	2.36	3.10	8.3	2.5	2.8
Pakistan	0.00	0.83	2.27	3.32	n.a.	10.6	3.9
Philippines	0.67	1.16	1.41	1.92	5.7	2.0	3.1
Thailand	0.34	0.59	1.03	1.73	5.6	5.9	5.3
Africa	2.44	7.18	8.72	11.21	11.4	2.0	2.5
North AFrica	0.79	2.77	3.58	4.46	13.4	2.6	2.2
Egypt	0.46	1.19	1.54	1.97	9.9	2.6	2.5
Morocco	0.32	0.67	0.81	1.01	7.5	1.9	2.3
Iran	0.71	1.23	1.40	1.92	5.7	1.3	3.2
Turkey	0.63	1.13	1.73	2.03	6.0	4.4	1.6
Sub-Saharan Africa	0.87	3.18	3.78	5.31	13.9	1.7	3.5
Nigeria	0.00	0.73	0.47	0.70	n.a.	-4.3	4.2
Ethiopia	0.08	0.15	0.16	0.41	6.0	0.5	10.2
Kenya	0.15	0.29	0.51	0.57	6.7	5.9	1.2
Tanzania	0.10	0.15	0.12	0.22	3.9	-1.7	6.0
Rep. S. Africa	0.79	1.23	1.37	1.44	4.5	1.1	0.5
Eastern Europe	3.90	4.81	4.92	4.65	2.1	0.2	-0.6
Hungary	0.44	0.55	0.53	0.41	2.3	-0.4	-2.5
Poland	1.32	1.57	1.74	1.74	1.8	1.0	0.0
FSU							
Russian Federation	0.00	0.00	4.65	5.99	n.a.	n.a.	2.6
Ukraine	0.00	0.00	1.91	2.03	n.a.	n.a.	0.6
Latin America	9.87	15.35	18.14	22.75	4.5	1.7	2.3
Argentina	0.87	1.05	0.90	1.51	1.9	-1.5	5.3
Brazil	3.60	5.90	6.83	9.15	5.1	1.5	3.0
Colombia	0.52	0.92	1.20	1.31	5.9	2.6	0.9
Cuba	0.71	0.53	0.80	0.70	-2.8	4.1	-1.4
Mexico	1.91	3.12	4.05	4.48	5.0	2.6	1.0

Source: FAOSTAT

Table A2. Raw Sugar Imports (million tons).

	Average			
	1969-71	1979-81	1989-91	1998-2000
World	15.69	18.63	17.17	21.21
Russian Federation	0.00	0.00	0.00	4.66
United States of America	4.57	4.20	1.76	1.64
Japan	2.21	2.15	1.77	1.55
Korea, Republic of	0.23	0.72	1.13	1.40
United Kingdom	1.95	1.14	1.21	1.26
Iran, Islamic Rep of	0.00	0.04	0.02	1.07
Canada	0.94	0.91	0.78	0.87
Malaysia	0.30	0.45	0.82	0.85
China	0.44	1.00	1.14	0.68
Morocco	0.26	0.24	0.27	0.52
Egypt	0.00	0.01	0.21	0.45
United Arab Emirates	0.00	0.00	0.00	0.42
Indonesia	0.00	0.00	0.04	0.39
Saudi Arabia	0.00	0.02	0.00	0.36
Belarus	0.00	0.00	0.00	0.34
Romania	0.09	0.17	0.25	0.30
Portugal	0.17	0.25	0.32	0.30
India	0.00	0.00	0.00	0.29
Venezuela, Boliv Rep of	0.00	0.26	0.15	0.27
Ukraine	0.00	0.00	0.00	0.24
Bulgaria	0.00	0.22	0.18	0.21
Sri Lanka	0.00	0.00	0.24	0.21
Bangladesh	0.00	0.00	0.00	0.20
New Zealand	0.15	0.15	0.14	0.19
Singapore	0.11	0.12	0.14	0.18
Philippines	0.00	0.00	0.00	0.18
Kazakhstan	0.00	0.00	0.00	0.17
Mauritania	0.00	0.00	0.02	0.14
France	0.35	0.35	0.34	0.14
Tunisia	0.03	0.06	0.05	0.11
Uruguay	0.07	0.01	0.01	0.09
Haiti	0.00	0.00	0.01	0.09
Macedonia,The Fmr Yug Rp	0.00	0.00	0.00	0.08
Tajikistan	0.00	0.00	0.00	0.08
Georgia	0.00	0.00	0.00	0.07
Nigeria	0.00	0.00	0.02	0.07
Turkmenistan	0.00	0.00	0.00	0.07

Source: FAOSTAT

Table A3. Refined Sugar Imports (million tons).

		Average		
	1969-71	1979-81	1989-91	1998-2000
World	4.83	8.10	11.07	14.48
Indonesia	0.12	0.47	0.27	1.18
Algeria	0.05	0.18	0.32	0.76
Nigeria	0.10	0.63	0.34	0.71
Belgium-Luxembourg	0.01	0.07	0.21	0.58
Egypt	0.01	0.45	0.46	0.48
Syrian Arab Republic	0.03	0.13	0.25	0.46
Israel	0.13	0.20	0.32	0.43
India	0.00	0.11	0.05	0.42
Yemen	0.08	0.12	0.23	0.39
Uzbekistan	0.00	0.00	0.00	0.34
Spain	0.13	0.01	0.20	0.34
Iraq	0.20	0.27	0.42	0.32
United Arab Emirates	0.01	0.06	0.23	0.32
Peru	0.00	0.07	0.14	0.31
Italy	0.31	0.21	0.20	0.31
Sri Lanka	0.28	0.23	0.09	0.29
Russian Federation	0.00	0.00	0.00	0.26
China, Hong Kong SAR	0.09	0.11	0.19	0.26
Pakistan	0.08	0.06	0.23	0.26
Saudi Arabia	0.08	0.27	0.41	0.22
Chile	0.03	0.14	0.11	0.21
Germany	0.14	0.11	0.22	0.21
Jordan	0.06	0.09	0.15	0.17
France	0.01	0.01	0.03	0.17
Libyan Arab Jamahiriya	0.06	0.11	0.25	0.17
Somalia	0.00	0.02	0.00	0.17
Norway	0.16	0.17	0.16	0.17
Belgium	0.00	0.00	0.00	0.17
Tunisia	0.07	0.12	0.12	0.16
Singapore	0.04	0.01	0.06	0.14
Philippines	0.00	0.00	0.01	0.14
Switzerland	0.21	0.14	0.11	0.14
Macedonia,The Fmr Yug Rp	0.00	0.00	0.00	0.13
United Kingdom	0.16	0.19	0.14	0.12
China	0.00	0.01	0.12	0.12
Kazakhstan	0.00	0.00	0.00	0.12
Bosnia and Herzegovina	0.00	0.00	0.00	0.11

Source: FAOSTAT

Table A4. Raw Sugar Exports (million tons).

	Average			
	1969-71	1979-81	1989-91	1998-2000
World	15.77	18.48	17.92	19.98
Brazil	1.16	1.71	0.82	5.65
Cuba	5.03	6.00	6.64	3.04
Australia	1.64	2.18	2.75	2.84
Thailand	0.08	0.91	2.06	1.89
Guatemala	0.06	0.19	0.47	1.25
South Africa	0.59	0.75	0.74	0.78
Colombia	0.14	0.23	0.28	0.64
Mauritius	0.55	0.56	0.59	0.52
Swaziland	0.15	0.28	0.42	0.50
Fiji	0.33	0.43	0.39	0.23
Guyana	0.33	0.26	0.15	0.22
El Salvador	0.06	0.08	0.05	0.22
Dominican Republic	0.79	0.88	0.39	0.20
Mexico	0.58	0.03	0.18	0.17
Jamaica	0.30	0.15	0.14	0.17
Philippines	1.22	1.24	0.24	0.16
Costa Rica	0.07	0.07	0.08	0.15
Zimbabwe	0.12	0.16	0.10	0.13
United Arab Emirates	0.00	0.00	0.00	0.10
Belize	0.06	0.10	0.09	0.09
Argentina	0.09	0.42	0.15	0.08
India	0.18	0.00	0.05	0.08
Sudan	0.00	0.00	0.00	0.07
Trinidad and Tobago	0.19	0.07	0.06	0.06
Zambia	0.00	0.00	0.00	0.06
Panama	0.03	0.12	0.05	0.06
Barbados	0.13	0.08	0.05	0.05
Poland	0.08	0.00	0.02	0.05
France	0.06	0.19	0.02	0.05
Nicaragua	0.07	0.08	0.10	0.04
Peru	0.38	0.11	0.07	0.04
Mozambique	0.19	0.08	0.02	0.04
Malawi	0.00	0.08	0.04	0.03
Moldova, Republic of	0.00	0.00	0.00	0.02
China	0.47	0.32	0.02	0.02
Congo, Republic of	0.01	0.01	0.02	0.02
Saint Kitts and Nevis	0.03	0.03	0.02	0.02

Source: FAOSTAT

Table A5. Refined Sugar Exports (million tons).

	Average			
	1969-71	1979-81	1989-91	1998-2000
World	4.70	8.63	11.17	17.55
Brazil	0.00	0.65	0.60	3.34
France	0.80	2.24	2.55	2.83
Germany	0.21	0.94	1.27	1.40
Thailand	0.00	0.01	0.68	1.32
Belgium-Luxembourg	0.20	0.56	0.70	0.83
United Kingdom	0.21	0.06	0.30	0.68
Pakistan	0.04	0.00	0.02	0.54
Belgium	0.00	0.00	0.00	0.49
South Africa	0.03	0.00	0.17	0.46
Turkey	0.07	0.00	0.02	0.43
Mexico	0.00	0.00	0.00	0.40
China	0.13	0.18	0.44	0.40
Italy	0.02	0.15	0.12	0.36
Colombia	0.00	0.00	0.05	0.35
Poland	0.15	0.04	0.26	0.34
Korea, Republic of	0.00	0.26	0.27	0.31
Denmark	0.05	0.22	0.26	0.29
Netherlands	0.08	0.24	1.13	0.27
Belarus	0.00	0.00	0.00	0.22
Spain	0.00	0.00	0.08	0.20
Austria	0.00	0.08	0.04	0.13
United Arab Emirates	0.00	0.01	0.13	0.13
Malaysia	0.00	0.03	0.21	0.13
Russian Federation	0.00	0.00	0.00	0.11
United States of America	0.00	0.52	0.46	0.10
Australia	0.03	0.02	0.00	0.09
Argentina	0.00	0.10	0.10	0.09
Portugal	0.00	0.03	0.00	0.09
Sudan	0.00	0.00	0.03	0.08
Zimbabwe	0.00	0.04	0.05	0.08
Sweden	0.02	0.03	0.05	0.08
Ukraine	0.00	0.00	0.00	0.07
Hungary	0.02	0.07	0.04	0.06
Ireland	0.02	0.05	0.05	0.06
Czech Republic	0.00	0.00	0.00	0.06
Nicaragua	0.00	0.00	0.00	0.05
India	0.07	0.31	0.03	0.04

Source: FAOSTAT

Table A6. Sugar Cane Production (million tons).

	1969-71	1979-81	Average 1989-91	1999-2001
World	576.3	768.3	1053.6	1259.9
Brazil	78.5	147.8	258.6	333.6
India	128.7	144.9	223.2	293.7
China	19.6	33.8	63.9	76.4
Thailand	5.4	17.7	37.0	51.0
Mexico	33.3	34.4	40.8	48.6
Pakistan	23.8	29.1	36.2	48.4
Australia	17.6	23.4	24.2	35.9
Cuba	60.5	69.3	80.8	35.1
Colombia	13.2	24.7	27.4	32.8
United States of America	21.4	24.5	26.6	32.1
Philippines	25.3	31.5	25.2	25.9
Indonesia	10.3	19.5	27.6	23.7
South Africa	14.6	17.3	18.9	23.0
Guatemala	2.7	5.6	9.3	16.6
Viet Nam	1.0	3.9	5.6	16.0
Argentina	10.2	15.6	15.9	15.9
Egypt	7.1	8.7	11.3	15.5
Venezuela, Boliv Rep of	4.8	4.8	7.1	8.6
Peru	7.9	6.4	6.8	7.5
Bangladesh	7.6	6.7	7.3	6.9
Ecuador	6.5	6.5	6.1	5.9
Myanmar	1.4	1.8	2.2	5.6
Sudan	0.8	1.6	4.1	5.1
Kenya	1.6	4.2	4.7	5.0
El Salvador	1.7	2.7	3.2	5.0
Mauritius	5.4	5.4	5.5	4.8
Dominican Republic	9.0	9.7	7.1	4.5
Zimbabwe	1.7	2.9	3.3	4.3
Swaziland	1.5	2.7	3.9	4.0
Honduras	1.3	2.8	2.8	3.9
Nicaragua	1.9	2.4	2.5	3.7
Costa Rica	2.0	2.6	2.6	3.7
Bolivia	1.3	3.1	3.2	3.7
Fiji Islands	2.6	3.8	3.8	3.5
Paraguay	1.2	1.6	2.7	3.4
Guyana	4.1	4.0	2.7	3.0

Source: FAOSTAT

Table A7. Sugar Beet Production (million tons).

	1969-71	1979-81	Average 1989-91	1999-2001
World	222.9	272.8	302.6	246.7
France	18.5	30.3	29.9	30.3
United States of America	24.1	22.1	24.4	27.7
Germany	19.2	27.9	27.8	26.6
Turkey	4.5	8.9	13.5	16.5
Russian Federation	0.0	0.0	0.0	14.6
Ukraine	0.0	0.0	0.0	14.3
Poland	12.2	13.4	14.2	12.9
Italy	9.6	14.7	13.5	12.5
United Kingdom	6.8	7.5	7.9	9.3
China	2.2	5.3	13.4	9.2
Spain	5.6	6.7	7.1	7.7
Netherlands	4.9	6.2	7.8	6.8
Belgium-Luxembourg	4.7	6.6	6.5	5.9
Iran, Islamic Rep of	3.6	3.6	4.1	4.7
Japan	2.2	3.4	3.9	3.9
Denmark	2.0	3.1	3.4	3.3
Chile	1.4	0.9	2.4	3.1
Morocco	1.2	2.2	3.0	3.1
Czech Republic	0.0	0.0	0.0	3.0
Austria	1.8	2.6	2.6	2.8
Egypt	0.0	0.1	0.8	2.8
Greece	1.3	2.3	2.9	2.8
Sweden	1.6	2.3	2.4	2.7
Hungary	2.5	4.2	5.3	2.6
Yugoslavia, Fed Rep of	0.0	0.0	0.0	2.0
Ireland	1.0	1.3	1.4	1.8
Belarus	0.0	0.0	0.0	1.4
Moldova, Republic of	0.0	0.0	0.0	1.3
Syrian Arab Republic	0.2	0.5	0.5	1.2
Slovakia	0.0	0.0	0.0	1.2
Switzerland	0.4	0.8	0.9	1.2
Finland	0.4	0.8	1.1	1.1
Romania	3.6	5.6	4.9	0.9
Lithuania	0.0	0.0	0.0	0.9
Croatia	0.0	0.0	0.0	0.9
Canada	1.0	1.0	1.0	0.8
Portugal	0.1	0.0	0.0	0.5

Source: FAOSTAT.