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Policy and Competitiveness of U.S. and Brazilian Ethanol

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Increased interest in biofuels can be attributed to environmental, economic, and geo-political factors. Harmful emissions, high crude oil prices, and the growing dependency on foreign oil supplies all provide incentives for pursuing alternative fuel sources. However, the rising importance of ethanol can also be attributed to the desire by countries to develop new markets for agricultural products. This push is currently policy driven, for example, in the United States through the U.S. energy bill. Even Brazil, an established producer and consumer of ethanol, used mandates to encourage the use of ethanol when it launched its ethanol program, the National Alcohol Programme (PROALCOOL), in the mid-1970s.

Ethanol can be produced from a variety of feedstocks, such as cereals, sugarcane, and cellulosic material. The value of feedstock is an important component in total production costs for ethanol. Ethanol in Brazil is produced from low-cost sugarcane and therefore can compete on a production-cost basis with gasoline without any subsidies. However, in general, renewable fuels are still more expensive to produce than fossil-based fuels, and so both production and consumption have been encouraged for the most part by government policy intervention through either mandates or market incentives.

Many countries are taking an increased interest in ethanol as an alternative fuel, with the United States and Brazil currently leading the way. Ethanol production in both countries has been increasing rapidly in recent years, as seen in Figure 1.

The U.S. Ethanol Market
The Energy Policy Act of 2005 mandates a minimum renewable fuels consumption of 4 billion gallons in 2006, increasing to 7.5 billion gallons in 2012. The majority of the mandate most likely will be met by ethanol.

In 2005, U.S. ethanol production capacity was 4.3 billion gallons from 95 ethanol refineries. Capacity expansion totaled 0.2 billion gallons, while capacity under construction was 1.8 billion gallons. Ethanol production consumed 1.6 billion bushels of corn (about 14 percent of U.S. corn production) in 2005; 2.6 billion bushels of corn are expected to be used by 2010 (about 22 percent of an 11.9 billion bushel crop). Thus, ethanol production has already exceeded the 2006 target of the renewable fuel mandate. A federal tax credit of 51¢ per gallon on all ethanol, available to ethanol refiners, has also contributed to increased ethanol production. Despite the rapid increase in production, consumption of ethanol has been outpacing production for the past few years, which has led to increased imports in the United States, as shown in Figure 2.

U.S. trade policy on ethanol includes an ad valorem tariff of 2.5 percent as well as an import duty of 54¢ per gallon. The tariff is meant to ensure that the benefits of the domestic U.S. ethanol tax credit do not accrue to foreign producers. The other important trade policy that affects ethanol is the Caribbean Basin Recovery Act (CBERA) that groups Central American countries with Caribbean countries. This Act created the current import rules for ethanol under the Caribbean Basin Initiative (CBI).

Under this agreement, if ethanol is produced from at least 50 percent agricultural feedstock grown in a CBERA country, it is admitted free of duty. If the local feedstock content is lower, limitations apply on the quantity of duty-free ethanol. The amount of ethanol that can be imported duty-free that is produced from non-CBERA agricultural feedstock is restricted to 60 million gallons or 7 percent of the U.S. domestic ethanol market, whichever is greater. In this case, ethanol must be dehydrated in a CBI country. Dehydration plants are currently operating in Jamaica,
Costa Rica, and El Salvador, where hydrous ethanol produced in other countries, historically Brazil or Europe, can be dehydrated. Table 1 shows the tariff rate quotas (TRQs) and fill rates for ethanol imports from CBI countries. The TRQ for 2006 is 268.1 million gallons.

**The Brazilian Ethanol Market**

Brazil is currently the world’s largest producer of ethanol. The Brazilian government provides support to ethanol production through both market regulation and tax incentives. In terms of market regulations, an official blending ratio of anhydrous ethanol with gasoline of between 20 and 25 percent in transport fuel is imposed. There are also credit provisions for ethanol storage, in the form of a lower excise tax for ethanol than for gasoline and through the use of strategic reserves. Imports of ethanol to Brazil are subject to an ad valorem duty of 20 percent.

In 2005, production of sugar and ethanol in Brazil totaled 28.7 million metric tons and 4.8 billion gallons, respectively, continuing a record trend for the past few years. The record production has resulted in sugar exports of 18.2 million metric tons and 0.6 billion gallons of ethanol in 2005. In Brazil, a large number of plants are dual plants and can switch easily between the production of sugar and ethanol based on relative prices. Thus, sugar and ethanol prices tend to move closely together, whereas in the United States, movement in ethanol prices is affected primarily by gasoline and government regulations.

In the past few years, relative prices of sugar and ethanol have favored more sugarcane diverted to ethanol production rather than to sugar. With the increased demand in ethanol both domestically and internationally, the share of sugarcane used in ethanol production is expected to rise steadily.

Increased demand for ethanol in Brazil has been driven by the popularity of flex-fuel cars that can run on gasoline, ethanol, or a combination of the two. Ethanol and flex-fuel vehicles enjoy some tax incentives not offered to gasohol cars that run on blended gasoline. The sale of flex-fuel cars has increased dramatically (by 585 percent in 2004) since their introduction in 2003. The share of flex-fuel cars reached 22 percent in 2004, 40 percent in 2005, and is expected to rise to 60 percent in 2006.

If both ethanol and sugar prices remain competitive in the near future, Brazil is expected to continue to increase sugarcane production for both ethanol and sugar. The country has enough land to easily double sugarcane area harvested. Sugar production is expected to increase by 21.5 percent between 2005/06 and 2015/16 while exports are projected to increase 22 percent during the same period. In terms of ethanol, production is expected to increase by 37.5 percent while ethanol exports are expected to nearly double by 2015/16.

**Competitiveness of the United States versus Brazil**

The cost of ethanol per gallon of fuel from sugarcane in Brazil, at $0.83 per gallon of fuel, is lower than the cost from corn in the United States, at $1.09 per gallon (see the OECD report “Agricultural Market Impacts of Future Growth in Production of Biofuels,” available at http://www.oecd.org/dataoecd/58/62/36074135.pdf). In addition to higher costs of production, there are high costs in

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**Table 1. U.S. Caribbean Basin tariff rate quota (million gallons)**

<table>
<thead>
<tr>
<th>Year</th>
<th>TRQ</th>
<th>Entered</th>
<th>Fill rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>92.3</td>
<td>59.9</td>
<td>64.9</td>
</tr>
<tr>
<td>2001</td>
<td>112.7</td>
<td>43.3</td>
<td>38.4</td>
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<tr>
<td>2002</td>
<td>120.3</td>
<td>45.5</td>
<td>37.8</td>
</tr>
<tr>
<td>2003</td>
<td>132.5</td>
<td>60.9</td>
<td>46.0</td>
</tr>
<tr>
<td>2004</td>
<td>186.9</td>
<td>69.9</td>
<td>37.4</td>
</tr>
<tr>
<td>2005</td>
<td>240.4</td>
<td>103.3</td>
<td>43.0</td>
</tr>
</tbody>
</table>

Continued on page 11
urban location allow more consumers to shop in these stores. In 2005, an estimated 40 percent of all food sold in Mexico was sold in supermarkets and 60 percent was sold in traditional markets. Within five years, these percentages are expected to be reversed, with supermarkets accounting for 60 percent of total food sales and 40 percent being sold in traditional markets.

Increased supermarket sales will guide future changes in the Mexican industry. For example, to help pull TIF-processed meat into supermarkets, the Mexican government introduced a program that rewarded processors and retailers for promoting federally inspected meat and educating consumers about its benefits in terms of quality and safety. Under this promotional program, the government provided a one-to-one match for money spent promoting meat slaughtered and processed in TIF plants. This match was available to anyone in the pork supply chain, and the promotions targeted consumers through highly visible marketing materials at meat counters and displays in supermarket meat cases.

**Overall Demand Benefits**

**U.S. Exports**

As with the movement toward TIF processing and slaughter, this type of program has potential benefits for imported product. Because U.S. live hogs must be slaughtered in TIF plants, the pork from these animals enters the Mexican retail and manufacturing sector as TIF-certified. In addition, imported U.S. pork that is cut, further processed, or fabricated at a TIF plant receives the TIF certification seal and is not differentiated from domestic product. To the extent that such promotions increase overall demand for pork in supermarkets, they benefit imports of U.S. live hogs and pork through overall increased sales and by educating consumers about the safety and quality associated with pork processed in federally inspected facilities and sold in modern retail outlets. This type of program also complements programs by the U.S. Meat Export Federation to educate Mexican consumers about the desirability and value of these same attributes in imported U.S. pork.

One result of the TIF promotional program has been that many retail outlets and TIF processing facilities now purchase meat only from TIF facilities. The resulting increase in demand for meat from TIF plants has encouraged managers of non-TIF plants to upgrade their facilities and apply for TIF certification in order to retain access to the important retail and processing sectors in metropolitan areas of Mexico. In addition, some importers who previously had not done further processing are upgrading their facilities and applying for TIF certification so they can add value to imported pork by cutting, packaging, and other processing before selling it to processors or end users.

Industry sources have indicated that the higher cost of TIF-processed pork relative to pork from non-TIF sources and to substitutable product (poultry meat for example) continues to limit retail sales and the use of TIF-certified pork in manufactured products. With an estimated 40 percent of the population living below the poverty level in Mexico, the demand for very inexpensive sources of protein throughout the country remains strong. However, the Mexican government’s support of programs to improve supply and demand of pork processed at TIF plants has encouraged the domestic industry to improve product safety and quality. Mexican consumers and the Mexican pork industry are the major beneficiaries of these programs, but U.S. pork should see some long-term benefits from overall improvements in Mexico’s pork processing and retail sectors.

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**U.S. and Brazilian Ethanol**

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the United States of transporting supply from the Midwest to major population areas. This has led to an increase in competitiveness of Brazilian ethanol imports despite the steep tariffs. Furthermore, volatility in U.S. ethanol prices, which sometimes leads to spikes, provides Brazil the opportunity to export ethanol to the United States. For example, in October 2005, the Brazilian ethanol price was $1.38 per gallon. Adding freight and the import tariff, the price for ethanol would be about $2.12 per gallon (including the 16¢-per-gallon transportation cost), which is below the $2.47 per gallon U.S. price for the same month. Consequently, Brazil was able to export 5.2 million gallons to the United States, up from zero exports in August and 2.7 million gallons in September 2005. In total, Brazil exported 86.5 million gallons of ethanol in 2004 and 65.9 million gallons in 2005, becoming the major source of U.S. ethanol imports. These imports may increase in the future, because of the projected expanding demand for ethanol in the United States.

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