A look at US–Brazil ethanol trade and policy

Brazil and the USA are experiencing an ‘ethanol investment boom’. Agriculture in both countries is being reorganized to boost biomass production, but duties and tariffs may finally dictate the way the nations adjust to increasing demand, says Paul W. Gallagher. © 2007 Society of Chemical Industry and John Wiley & Sons, Ltd

Published online in Wiley InterScience (www.interscience.wiley.com); DOI: 10.1002/bbb.9; Biofuels, Bioprod. Bioref. 1:9–13 (2007)

Mainstream agriculturalists, investors and even petroleum processors realize that biofuels have now become competitive energy products. Biofuel demand has grown, and there is an ethanol investment boom in the United States and Brazil. In the USA, it may be some time before production and import growth match new demand. So US ethanol policies, especially the import duty and excise tax rebate, are scrutinized—because fuel marketing firms envisage higher sales volume, because Brazil’s government sees expanding ethanol sales to the USA, and because US livestock industry advocates are interested in cheaper feed.

The ethanol subsidy and tariff policies, designed to encourage consumption and protect an infant corn processing industry, should eventually evolve toward open trade with domestic production and consumption incentives that are aligned with environmental benefits. Then American consumers would receive fuel and food at the lowest social cost. But for now, US interests in an efficient biofuels industry and energy security are best served by maintaining the present trade policy. After the fate of biomass fuels in the USA is known, bilateral negotiations with Brazil or multilateral negotiations in the World Trade Organisation (WTO) could begin removing distortions from ethanol and related agricultural markets, in a fashion that avoids unwarranted competitive disadvantage, mitigates short-term adjustments that must eventually be reversed, and promotes energy security in the USA.

For demonstration, I first review the adjustments in both countries, including the implications of biomass fuel production for the reorganization of agriculture in the Americas. Then trade distortions in the US–Brazil ethanol trade and related agricultural markets are identified. Finally, resource misallocations that could be avoided with a balanced deregulation are discussed.

Ethanol and agricultural trade adjustments

The ethanol investment boom has three distinct phases. First, US capacity has expanded from 1.9bn gallons in 2001 to 4.9bn gallons in the 2005 crop year (Figure 1). According to the US Renewable Fuels Association, planned capacity is now 12.1bn gallons, which analysts expect in production within five years.1 Second, sugar-based ethanol processing in Brazil increased from 3.1bn gallons in 2001 to 4.2bn gallons in 2005. Planned capacity should bring production to at least 9.5bn gallons by 2012.2 The third phase is just starting in the USA with the construction of six government-supported commercial scale biomass fuel enterprises.3,4 This large-scale processing experiment is spurred by technically feasible
biomass processing that is potentially competitive with corn and sugar processing. However, most are uncertain about the degree of success and the timeframe for achieving it.

Further expansion of biofuels sectors is possible, mostly because the resource base can extend beyond high quality cropland. In the USA, 85m acres of grazing quality land could be attracted to energy crop production, mostly by diverting land from grazing. In Brazil, there are 121m ha with high or medium potential for sugar production; much of this land is used presently for livestock grazing, some of it for other crops. There is one important difference between Brazil and the USA relating to the conversion of grazing land to energy crops: Brazil can proceed using sugar now, whereas the USA will require biomass processing technology and crops such as switchgrass, willow, and poplar to use lower-grade land resources for fuel production.

Thus, the biofuels markets and the supporting agricultural industries will evolve in different directions, depending on the success of the biomass processing experiment in the USA. With efficient biomass processing, a contraction of the US cattle and beef industry in the eastern USA could occur, as fuel-based demand for lower quality land expands, and displaces some cattle grazing. With free trade in the Americas, this would create an opening for Brazil to use pasture quality land to expand its cattle industry and supply beef to the USA. Without biomass processing and with the existing beef and sugar import policy for the USA, Brazil would likely convert additional land to sugar production and supply ethanol to the USA, while the USA maintains the status quo regarding grazing land practices and the sugar industry.

Potential trade distortions

All trade barriers listed below have an important effect on the US–Brazil biofuel trade. Some directly raise the price or restrict entry for ethanol in the importing country. Others indirectly give one of the countries an unwarranted competitive advantage or disadvantage, by moving processors’ input prices (corn, sugar, biomass) away from the free trade reference price:

1. The US ethanol tariff quota is the most visible biofuel trade barrier. The tariff rate is $.57/gallon. The quota specifies that up to 7% of US domestic ethanol consumption can enter duty free; below-quota tariff-free imports are granted to Canada, Caribbean Basin countries, and certain African countries. During the 2005 crop year, US imports exceeded the quota level (Figure 2).
2. Brazil also has an import duty on ethanol. US ethanol flooded Brazil during the 1990s, due to high sugar prices, low corn prices, and low ethanol demand in the USA. Brazil initiated its import duty to stem the flood of US imports. Brazil’s import duty is suspended temporarily, but could be reinstated in the right circumstances.
3. Recently, Brazil has taken some steps to shed its history of sugar market intervention to support domestic consumers. Until 1998, Brazil had an export tax on sugar. Then, in 1998, Brazil replaced its export tax with a marketing board that has the authority to set local sugarcane prices. During the 1997–1998 marketing period, Brazil demonstrated to the World Trade Organization (WTO) that its domestic pricing arrangements involved minimal domestic support or market distortion.

However, subsequent performance in competitive sugarcane pricing has been mixed. Comparing the world price of raw sugar to the sugarcane price in the dominant Sao Paulo region of Brazil (Figure 3) reveals the extent of the export tax during the 1990–1998 period.* The sugar equivalent price for Brazil was below the world price by $.026/lb. In contrast, the Brazil and world prices were nearly identical during 1998–2000. However, the spread between world and Brazil prices has returned since 2004, with an average of $.014/lb sugar. The implicit cost of production subsidy for Brazil’s ethanol producers averaged $.38/gallon before 1998, zero during 1998–1999, and $.20/gallon since 2004.

The reasons for this mixed performance deserve investigation. At best, the marketing board’s pricing procedures need revision for the bioenergy era. Local cane prices are supposed to be set based on refined sugar prices and ethanol prices in Brazil. But regulated ethanol prices in Brazil are considerably less than ethanol prices elsewhere in the world. At worst, Brazil may need to reconsider the board’s discretion in setting local prices.

4. All of the major sugar-consuming countries (USA, EU, India, Japan) protect domestic sugar markets for the sake of their producers, keeping domestic prices at nearly twice the world price level. In the EU, producer support has been so generous that it became a net sugar exporter. The EU is scheduled to remove some of its domestic support, which will begin to increase world sugar prices in a few years. But protection in the other countries remains. Further, a recent study estimates that the world sugar price would increase by 43% in the event that protection in the sugar market ended; as domestic prices fall with free trade in these consuming countries, their producers would produce less and their consumers would consume more, in turn elevating the world price level. A 43% increase in the world sugar price, evaluated at a baseline sugar price of $.08/lb, translates to an increase in the cost of ethanol production from sugar of $.50/gallon. Hence, sugar-based ethanol producers everywhere receive a very generous indirect subsidy from the sugar-consuming countries.

5. The USA has a tariff quota on beef imports. Below-quota imports are subject to a modest tariff of 2.5%. But the over-quota tariff is 27.2%. The quota amounts to about 5.5% of US beef production. Further, a recent study estimates that the world sugar price would increase by 43% in the event that protection in the sugar

*The free on board price at Caribbean ports is taken as the world sugar price. The Sao Paulo cane price is converted to raw sugar equivalent using 14.1% sugar content in cane, a sugar refining cost of $.0134/lb sugar, and a transport charge of $.0081/lb from Brazil to Caribbean ports.
Removing the US beef duty would be convenient for the USA in the event that expansion of the biomass fuel sector is technically and economically advantageous in the intermediate future. Reduced domestic beef production in the USA would entail reduced grazing land demands. In fact, biomass fuels extend the land base to crops that can be produced on land that was formerly used only for grazing. So the fuel industry might increase land demand and rents even though grazing is contracting.

**Economic security and US biomass fuel supplies**

US energy security is improved directly when the fuel market disruption associated with a political event in the Middle East is partially or completely avoided with a stable supply. An annual gain to the US economy that includes a disruption offset is $3.2bn, with domestic ethanol in the USA using just the corn stover resource. Multiples of this benefit could likely be gleaned from all biomass fuels, since stover represents about 20% of biomass supplies in the USA.

A few countries import a strategically important commodity from diverse sources of foreign supply as part of an energy or food security strategy. But for the USA, relying on Brazil fails the diversification criteria. Furthermore, an instability substitution of Latin American politics for Middle East politics is only a small step forward. In the USA, policymakers should also be mindful that Brazil remained loyal to domestic consumers instead of the world market through sugar shortages in the 1970s and 1990s.

A larger step forward on the energy security front could occur if profitable conditions for biomass fuel adoption are maintained in the USA. Critics still doubt that commercial biomass fuels will be important within the next decade. But construction of commercial processing is beginning. The situation will be clear in a few years, after completing the construction schedule of these plants. A very substantial biomass fuel sector could operate within a decade if the commercialization experiments are successful and capacity expansion proceeds at a rate comparable to recent corn-based ethanol growth.

The food versus fuel inconsistencies could be improved by removing the US beef import duty as the US biomass fuel industry expands. Additional foreign beef supplies could replace domestic production and reduce US demands on inputs such as corn. Hence, food prices to US consumers would fall. At the same time reduced input prices for corn would decline and cause ethanol production costs to fall.

In effect, the USA may soon have the opportunity to substitute beef imports from Brazil for petroleum imports from the Middle East, and still improve energy security through increased biofuel production. Truly, the cusp of international supply uncertainty for the USA would include some US beef supplies but less fuel. That would be a step forward, in my view—better to give up an occasional prime rib dinner than a stable fuel supply.

**Conclusion**

There are three reasons why the USA should maintain its current policy posture in the ethanol market, at least until the fate of the biomass ethanol industry in the USA is determined, and until a balanced reduction in all trade barriers can be negotiated. First, the indirect distortions in world sugar and beef market have indirect effects that place US ethanol producers at a cost disadvantage—these indirect effects more than offset the direct protection received from the ethanol import tariff in the USA. Second, a policy of removing only the US ethanol tariff would further distort international markets by encouraging overexpansion of Brazil’s sugar industry, and diverting grazing land to sugar production. The opposite adjustment would occur with the US beef tariff gone and a successful biomass fuel industry in the USA, because lower cost beef would be available to US consumers, and because some domestic beef producers would experience increased costs when biomass fuel processors bid to convert grazing land to energy crops. Third, immediate and partial deregulation of the ethanol industry would thwart the domestic investments in biomass fuels that could improve US energy security.

The USA may eventually import sugar, beef, and biofuel products from Brazil, a country with an extensive agricultural resource. However, the USA has substantial resources of its own, and is among world leaders in biotechnology. US interests are to jointly promote energy security and low-cost food through an open trading system on world agricultural markets. These objectives dictate that in the short run the US avoids revising trade policy that further distorts incentives.
for the domestic corn-based ethanol industry and tramples the biomass ethanol industry before we determine if it will work.

References

4. Staff, Biofuel Ventures in Other States, Des Moines Register, p6 ET, 18 March 2007.

Dr Paul W. Gallagher, Iowa State University

Dr Paul W. Gallagher has published 21 articles and given 34 presentations about various aspects of bioenergy markets and industry during the past 9 years. Dr Gallagher has also published 22 articles and given 23 presentations about agricultural trade and policy. Dr Gallagher received his Ph.D. in Agricultural Economics from the University of Minnesota. He is currently employed by Iowa State University in the Economics Department (Associate Professor), where he teaches Agricultural Trade, Policy Analysis and Econometrics.