Prospects for Corn Ethanol in Argentina

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Executive Summary

Countries that export biofuel feedstocks such as grain or sugar and that are also importers of motor fuels will have a natural competitive advantage over other countries in the production of biofuels. Argentina is one of a very few countries that both export potential feedstocks and import gasoline and diesel. This combination means that an Argentine ethanol plant will pay less for feedstock and receive a higher price for ethanol than an ethanol plant located in a country that imports feedstocks and exports motor fuels.

Argentina is the world's second-largest exporter of corn. This export status, when combined with high internal transportation costs, lowers the price of corn in the major production areas of Argentina. In addition, Argentina's farmers need to plant more corn to create a more sustainable balance between corn and soybeans. In particular, in Argentina's northern production regions, the large amount of crop residue from increased corn plantings is needed to help build soil quality. Thus there is significant potential for expansion of corn in Argentina, which makes corn an even better feedstock for ethanol.

The variable or direct cost of converting a ton of corn into ethanol in Argentina is comparable to conversion costs in the United States, with the exception that natural gas costs more in Argentina. For a plant that does not dry distillers grains, conversion costs would be approximately $40 per ton of corn processed. Drying distillers grains adds about $10 per ton. The domestic price of corn in Argentina not only reflects the cost of transporting corn from the interior to Rosario, but it also reflects the effects of export taxes and the need to obtain government permission to export. Over the period from October 2010 to March 2012, the cost of corn to an ethanol plant in the state of Iowa in the United States averaged $110 more per ton than the local price of corn paid to farmers in Córdoba over the same period, and $140 more per ton than the Salta corn price.

Argentina also has a large livestock sector that can readily use distillers grains from corn ethanol plants. Plants that are located close to cattle operations can sell wet distillers grains to these operations thereby saving the cost of drying. Plants that have dryers installed can export distillers grains. Livestock producers in many countries have learned how to use imported distillers grains from US ethanol plants over the last few years, so Argentina would have the ability to export dried distillers grains.

Combining the cost and revenue projections for prospective ethanol plants in Argentina shows that over a range of corn prices (FOB Argentina) from $150 to $300 per ton, and over a range of ethanol prices of 60 to 90 cents per liter, operating margins (revenue minus variable production costs) range from 18 to 70 cents per liter of ethanol produced for a plant in Córdoba, and from 24 to 76 cents per liter for a plant in Salta. The cost of building an ethanol plant in Argentina varies widely, but 60 cents per liter of ethanol production capacity is representative. This implies that at current world corn prices and current Argentine ethanol prices, cash flows from plant operation for a year would be about equal to the cost of constructing a new plant. Thus there is currently a large profit incentive to build corn ethanol plants in Argentina.

The high operating margins for corn ethanol in Argentina would be expected to continue until the size of the ethanol industry saturated the domestic demand for ethanol, thereby lowering the ethanol price, or until Argentina became a net importer of corn, thereby raising the corn price. Based on historical corn export levels, Argentina could produce between 4,000 and 6,000 million liters of ethanol before its status as a corn exporter were threatened. This level of production far exceeds the potential demand for ethanol in Argentina. With a projected blended gasoline demand of 6,000 million liters in 2015, and accounting for the lower energy content of ethanol, a 25 percent blend ratio of ethanol to gasoline implies a maximum domestic demand of about 1,600 million liters. Production beyond this level would need to be exported at a likely lower ethanol price with resulting lower profit margins.

Neither the world price of corn nor the domestic price of corn in Argentina will be greatly impacted by expanded corn ethanol production in Argentina as long as Argentina remains a net exporter of corn. If a region in Argentina such as Salta expanded ethanol production beyond its level of corn production, then local prices in the region would increase to ensure that corn from other regions was shipped in. This, in turn, would stimulate local corn production and a local demand would balance local supply on average.

Keywords: Argentina ethanol industry, ethanol, prospective industry output.

PROSPECTS FOR CORN ETHANOL IN ARGENTINA

I. Introduction

The same conditions that induce investment in ethanol plants also cause investment in any other commodity—a high commodity price outstripping production costs so that returns to investment are high. Two primary factors determine the market price of ethanol: (*a*) the price of gasoline for which ethanol substitutes, and, (*b*) in certain countries, government policy. Feedstock prices are the primary determinant in the costs of producing ethanol. Because ethanol and the primary ethanol feedstocks, grains and sugar, are tradable commodities, prices of both ethanol and ethanol feedstocks will tend to be similar across countries that trade. Price differences between countries arise because of transportation costs and trade policies such as tariffs and quotas. Feedstock costs will be lower in countries that export grains or sugar than in countries that import these feedstock, because feedstock prices in the importing country will reflect the cost of transportation and in many cases import tariffs. Ethanol prices will tend to be higher in countries that import gasoline and/or ethanol for the same reason. Thus returns to investment in ethanol plants will tend to be highest in countries that import gasoline and export feedstock. Returns to investment will tend to be lowest in countries that export gasoline and import feedstock. Because the value-to-weight ratio of ethanol is higher than that of ethanol feedstock, countries that export feedstock and gasoline will tend to have higher returns to investment than countries that import feedstock and gasoline.

Table 1 classifies prospective market returns to ethanol investment in different countries for different feedstocks. The classifications are based solely on whether a country is an importer or exporter of gasoline and feedstock. No consideration is given in Table 1 for the role that government policy plays. Countries that export feedstock and import gasoline are categorized as “High” return countries. Countries that import feedstock and export gasoline are categorized as “Low” return countries. Countries that export both feedstock and gasoline are categorized as “High Intermediate.” And countries that import both gasoline and feedstock are categorized as “Low Intermediate” countries.

TABLE 1. Potential Competitiveness of Ethanol Producers

	Feedstock type	Feedstock Exporter?	Gasoline Importer?	Ethanol Returns
US	Corn	Yes	No	High Intermediate
US	Sugar	No	No	Low
China	Corn	No	Yes	Low Intermediate
Brazil	Sugar	Yes	Yes	High
Brazil	Corn	Yes	Yes	High
EU	Feed Wheat	No	Yes	Low Intermediate
EU	Corn	No	Yes	Low Intermediate
Canada	Wheat	Yes	No	High Intermediate
Canada	Corn	No	No	Low
Argentina	Corn	Yes	Yes	High
Argentina	Feed Wheat	Yes	Yes	High
Argentina	Sugar	Yes	Yes	High

Until recently, the United States was both a corn exporter and a gasoline importer, which made it a High return country for corn ethanol. But now that it is a gasoline (and ethanol) exporter, returns have dropped from the High category to the High Intermediate category. Because the United States is a sugar importer, it is a Low return country for sugar ethanol. Brazil is both a feedstock exporter (corn and sugar) and a gasoline (and ethanol) importer, so its returns are High for both sugar and corn ethanol. If development of its oil resources causes Brazil to become a gasoline exporter, then it will be in a similar situation as the United States. Table 1 uses feed wheat as a feedstock rather than high protein wheat because the price for high protein wheat is usually much higher than the price of feed wheat. The EU imports feed wheat in most years so it is a Low return country. Most EU countries export gasoline because of high diesel consumption which places the EU firmly as a Low return country. Canada imports corn but exports wheat. But because Canada imports corn from the United States, its feed wheat prices reflect the price of imported corn so its status as a wheat exporter does not allow it to take advantage of its exporter status, so Canada is a Low return country. Argentina imports gasoline and exports corn, sugar and wheat. Thus Argentina is a High return country for all three feedstock.

What Table 1 immediately shows is that based on their market positions, Brazil and Argentina are the only two High returns countries of those considered. Thus, they should

be the countries that should be receiving attention from ethanol producers. Of course, there are other considerations that come into play when determining the profitability of investing in a country, including the projections of its future export status, government policies, investment climate and operating margins of a new plant. But what Table 1 tells us is if operating margins are positive somewhere in the world, then they are likely to be highest in Brazil and Argentina.

Because ethanol made from corn, wheat, or sugar is chemically identical, the choice of which feedstock a plant should be designed to run on depends on which feedstock generates the highest operating margin. Because of current high sugar prices, it appears that corn ethanol and feed wheat ethanol have higher returns than sugar ethanol. This implies that if ethanol investment is likely to occur using current prices, then new corn ethanol plants in Argentina and Brazil will likely occur.

The recent announcement by the state bank of Brazil that they will be loaning money to expand Brazilian sugarcane production to allow it to meet its growing demand for ethanol shows that Brazil is committed to continued investment in sugar ethanol. Argentina's ability to expand sugarcane production is limited in part by suitable land.[1] Thus if ethanol production is to increase in Argentina, it will likely be based on corn.

The factors shown in Table 1 are not the only basis for the profitability of investments in energy projects, such as expansion of ethanol production. The purpose of this study is to conduct a detailed examination of the case for investment in corn ethanol plants in Argentina. Factors that will be considered are the domestic demand for ethanol, the domestic supply of corn, the cost and availability of natural gas, the potential demand for distillers grains, current government policies regarding ethanol production and agricultural trade, and the prospects that these policies might change in the future. The study is based on data and conversations with approximately 25 Argentines that took place during a week-long trip to Argentina in March. While one week talking to people does not make one an expert on the Argentine situation, it did allow for a better

[1] In addition to constraints on the amount of land suitable for sugar cane production in the northern part of Argentina, costs associated with handling vinasse, an effluent of ethanol production from sugar cane, was often cited as a constraint on production.

perspective to be gained about the potential for investment in corn ethanol plants in Argentina than if the visit had not been made.

The remaining sections of this report present data and information about the important factors that influence the profitability of corn ethanol investment in Argentina. We find that the fundamental prospects for corn ethanol production in Argentina are favorable. Crude oil prices are high and the prospects are that they will continue to be high. High crude oil prices lead to high gasoline prices, so the demand for gasoline substitutes such as ethanol is strong. Argentina is the world's second-largest corn exporter so it has surplus corn that could be used for ethanol production. In addition, Argentina has abundant room for expansion of corn production because it plants so little corn relative to soybeans. This imbalance in the ratio of soybean-to-corn acreage puts pressure on soybean yields because of increased disease and insect pressure. Argentina also has large dairy and beef cattle herds so there is a large potential domestic market for distillers grains.

The remainder of the reports is organized as follows. Section II provides background about corn production in Argentina and explains why expansion of corn production has so badly lagged soybean production despite high world prices for corn. Section III presents an economic analysis of the profitability of producing corn ethanol in Argentina. Section IV examines the potential size of the corn ethanol industry in Argentina. The report concludes with a discussion of the risk factors that any potential investor in a corn ethanol plant in Argentina will face.

II. The Plight of Corn in Argentina

While soybeans have seen strong growth in planted area in the last 15 to 20 years, the planted area of corn has stagnated. Specifically, the area of soybeans increased threefold since the mid-1990s, whereas that of corn has remained about roughly constant (see Figure 1).

Figure 1 has implications from a sustainability standpoint because corn is losing ground as a participant in the summer crop mix. The magnitude of the soybean area increase is a signal of the expansion of crops as a user of land. Furthermore, it should be noted that soybeans are responsible for most of the summer area expansion of grains and

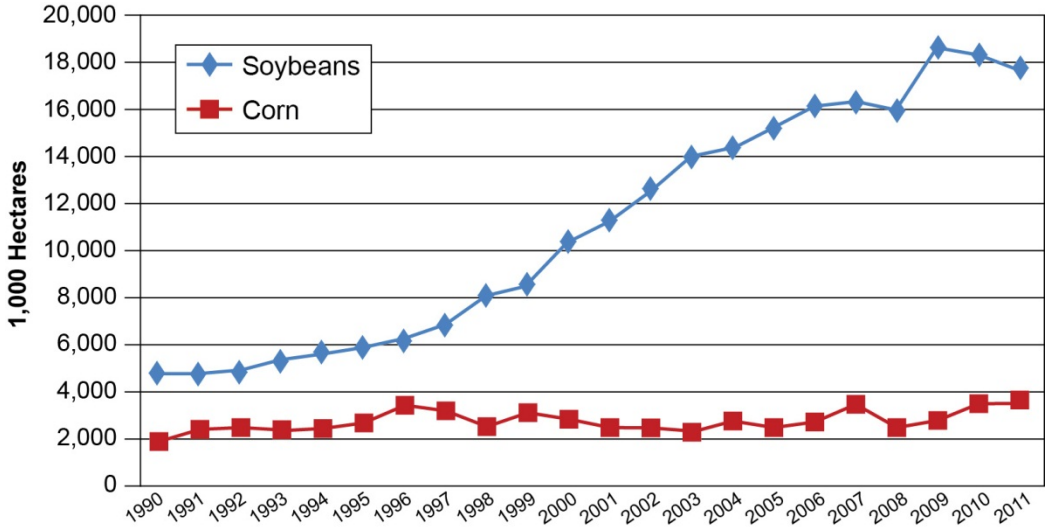

FIGURE 1. Evolution of corn and soybean harvested areas in Argentina.
Source: Calculated by authors based on USDA/PSD data

oilseeds (see Figure 2). The area dedicated to these activities increased by 13.9 million hectares between 1990 and 2011. Soybeans are responsible for 97 percent of that growth.[2] This growth in soybean area implies that rotations are becoming increasingly tilted towards soybeans, which increases pest pressure and decreases crop residues. Residues are important to control soil erosion and to maintain or build soil quality. The area planted to corn was approximately 32 percent of the total area planted to corn and soybeans from 1990–92. This percentage has declined 15 percent in the 2009–11 period. That is, producers are harvesting now one hectare of corn every 6.7 hectares of soybeans. This is equivalent to rotations including a crop of corn for every six to seven crops of soybeans. The growing imbalance and its potential negative agronomic impacts are widely acknowledged and is a source of worry for producers in Argentina. However, while producers point to the need to incorporate additional areas of corn into their rotations, they also highlight the risks associated with doing so in the current policy environment.

Planting soybeans has several advantages over planting corn in Argentina. The costs of producing corn are higher than those of soybeans and require larger investments per

[2] The area change was calculated as the average for the 2009–11 period minus the average of 1990–92. Averaging over years was performed to reduce the impact that a single year may have on this figure.

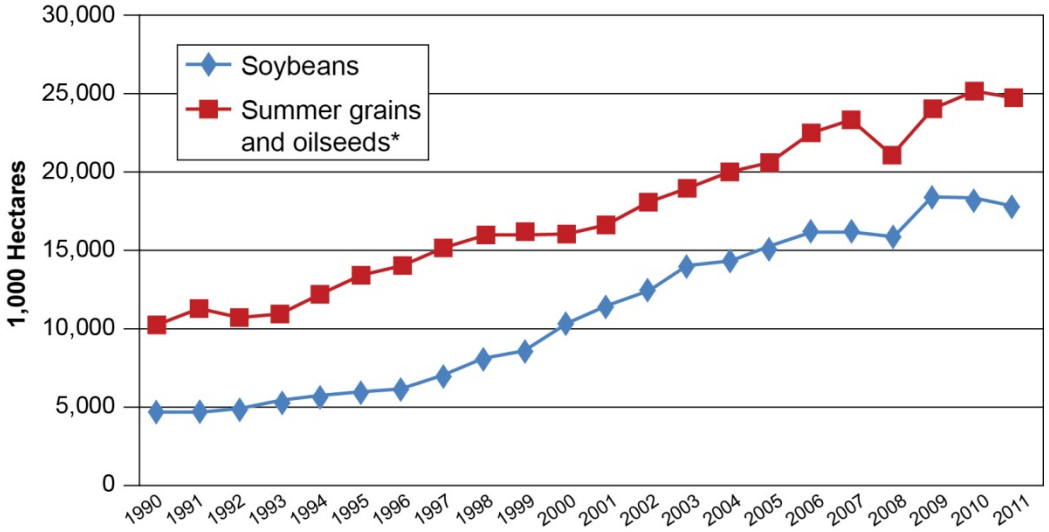

FIGURE 2. Evolution of soybeans and total summer crop harvested areas in Argentina
* Includes soybeans, cottonseed, sunflower, corn, and sorghum.
Source: Calculated by the authors based on USDA data.

hectare at the beginning of the planting season. Although corn's revenue potential is larger also, the yields of corn are much more variable than that of soybeans, making corn a riskier proposition for farmers.

Another factor that adds to the risk of planting corn is the uncertain and variable distortions to the corn market caused by periodic interruptions of export flows by the government. Through the Registros de Operaciones de Exportacion (ROEs) the government regulates the pace at which it will allow corn exports. The objective of these export restrictions is to lower domestic corn prices thereby lowering the cost of feeding domestic livestock. The interruption of exports breaks the links between domestic and international markets, leaving domestic corn producers without an external price reference that acts as a backstop or minimum price. Figure 3 shows the daily Rosario spot price for corn and soybeans between January 2008 and May 2012. The Rosario market is a good measure of export transactions. Clearly, corn exports have been allowed only sporadically in the last few years. In contrast, Figure 3 shows that there has been a reference price for soybeans almost on a daily basis. The lack of corn reference prices in early 2009 can be explained by the drought-stricken crop of 2008–09, which reduced

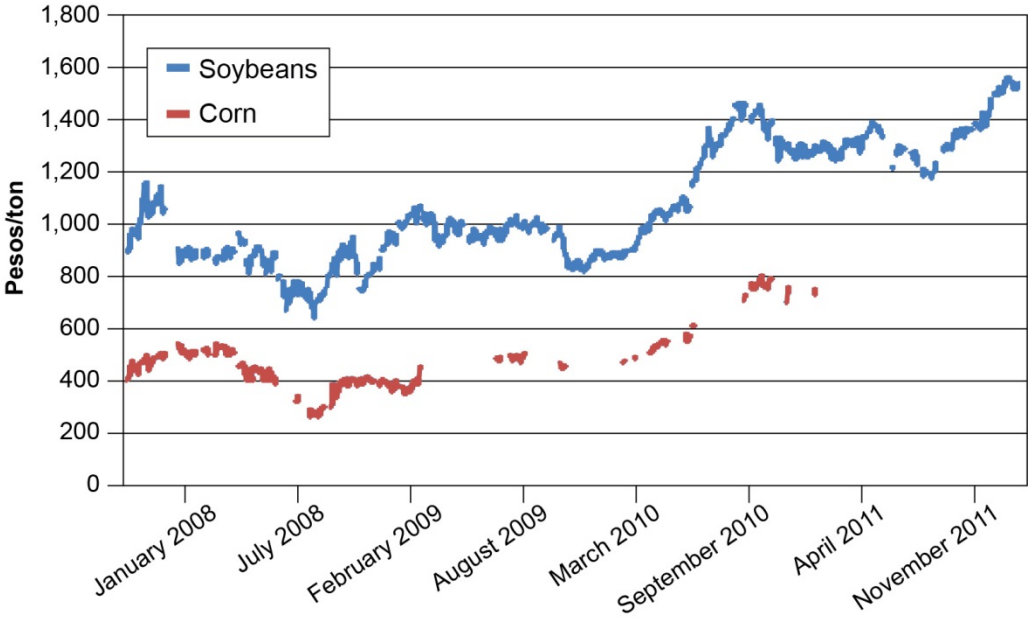

FIGURE 3. Spot prices of corn and soybeans in the Rosario market.
Source: Calculated by the authors based on Bolsa de Comercio de Rosario data.

exports by about seven million tons. The chart shows only a handful of reference prices since export restrictions were put in place more systematically in about June 2010. Imposition of export restrictions in the presence of a large excess supply of corn in Argentina, results in buyers not having to aggressively compete for the product.

Producers cite the lack of a reliable, transparent, and liquid market as one of the main drawbacks for planting corn. Producers indicated it is difficult to find consistent buyers, especially in the interior of the country. As of April of 2012, when the new crop was beginning to be harvested, there were still sizeable quantities of the 2011 crop unsold, stored in plastic bags (called silobags in Argentina) in the fields. While producers are well aware of the need to increase the area of corn in order to sustainably continue their high levels of soybean production, they are reluctant to plant the crop as the economics and additional distortions introduced by policies make it very unattractive. Some producers indicated they are still planting it because of rotational needs, without which they would not consider to include corn in their production system.

Producers' desire to obtain the agronomic benefit of including more corn in crop rotations, combined with the current surpluses of corn and associated depressed domestic

corn prices, enhances Argentina's advantage as a country well-positioned for expanded ethanol production. In particular, low priced corn implies a low feedstock cost for an ethanol refinery, which is one of the keys to success in this industry. This, together with the desire of corn producers to increase domestic demand, is leading corn producers and other potential investors to evaluate the possibility of investing in corn ethanol production in Argentina. Next, we present a detailed assessment of the potential profitability of ethanol production and a comparison with the profitability in the United States.

III. Profitability of Corn Ethanol Production in Argentina

The price of ethanol and the price of corn are the primary determinates in the profitability of ethanol production in any country. The revenue generated from the sale of distillers grains and the costs of energy to run the plant are also important profit contributors. Other factors that influence profits are capital costs and other operating costs. A simple profit equation that captures these factors is

$$\pi = R_{ethanol} + R_{distillers} - C_{corn} - C_{NG} - OVC - FC$$

where π is total profit, R_e and $R_{distillers}$ are revenue from ethanol and distillers grains respectively, C_{corn} and C_{NG} are the cost of corn and natural gas, *OVC* is other variables costs and *FC* is fixed costs. Dividing this profit equation by the number of liters of ethanol produced or the number of tons of corn processed allows for a comparison of profit levels across different plant sizes. Many costs and prices are expressed on a per-liter or per-ton basis so in the analysis that follows all calculations are done on a per-unit basis.

Each of the revenue and cost factors in the above profit equation are estimated and discussed in this section. The section concludes with a presentation of the operating margins for a representative corn ethanol plant in Córdoba and one in Salta. Operating margins for each of these plants is calculated for various ethanol and corn prices.

Other Variable Costs

A source that is widely used for cost data is a spreadsheet-based model on a dry mill corn ethanol plant put together by Don Hofstrand and Ann Johans at Iowa State University.[3] Table 2 presents cost information taken from this model that is used to calculate profits for a dry mill plant in Argentina. All costs are expressed in US dollars or US dollar cents. We assume throughout that a dry mill plant in Argentina will be able to produce 400 liters of denatured anhydrous ethanol per (metric) ton of corn processed. In addition, each ton of corn processed yields 0.304 tons of distillers grains (10 percent moisture content).[4] As shown, this category of costs sums to 5.77 cents per liter of ethanol produced or $23.07 per ton of corn processed.

Natural Gas Costs

If the ethanol plant dries its distillers grains, it is assumed to use 7,600 BTUs of natural gas per liter of ethanol produced, or 3.04 million BTUs per ton of corn processed. If the

TABLE 2. Other Variable Cost for Argentine Corn Ethanol Plant

	Cents/liter ethanol	$/ton corn
Item		
Enzymes	0.96	3.86
Yeasts	0.55	2.20
Chemicals	0.41	1.65
Denaturants	0.99	3.97
Repairs	0.69	2.76
Transportation	0.21	0.83
Water	0.34	1.36
Electricity	1.06	4.24
Labor	0.75	2.99
Other	0.55	2.20
Total	6.51	26.05

Note: Hofstrand and Johans assume that 417.2 liters of ethanol will be produced per ton of corn processed. Here we assume that 400 liters will be produce per ton. To account for this difference in assumed conversion efficiency, the Hofstrand and Johans per-liter costs were increased by 4.3 percent (.043 = 417.2/400 - 1).

[3] http://www.agmrc.org/renewable_energy/ethanol/ethanol-profitability/

[4] For plants without a dryer, each ton of corn processed yields 0.784 tons of 65 percent moisture distillers grains.

plant does not dry the distillers grains, then natural gas usage is assumed to be reduced by 40 percent.[5]

The price of natural gas in Argentina varies dramatically across users. Residential users pay a lower price than do industrial users; and new industrial users pay a higher price than established users. According to information gathered in a visit to Argentina, new corn ethanol plants will pay a price of natural gas that reflects the price paid for imported natural gas from Bolivia.[6] This Bolivian natural gas will be delivered to ethanol plants via pipeline. Estimates of the cost of this imported natural gas range from $7.00 to $9.00 per million BTUs.

Table 3 presents the resulting cost estimates for natural gas for this range of prices for a plant that dries distillers grains and for a plant that does not dry distillers grains. As shown in Table 3, the cost of natural gas is a significant expense, especially for a plant that dries distillers grains. The reliability of natural gas supplies in terms of availability during winter months is a topic that is taken up elsewhere in this report.

The Cost of Corn

The cost of corn to an ethanol plant will be the local prevailing price of corn in the immediate area of the plant. This study considers two areas for corn ethanol plants—Córdoba and Salta. Argentina is a corn exporter, so the prevailing price of corn in the

TABLE 3. Natural Gas Cost for Argentine Corn Ethanol Plant

	Natural Gas Price ($ per million BTU)		
	7.00	**8.00**	**9.00**
Plant that dries distillers grains			
cents per liter of ethanol	5.32	6.08	6.84
dollar per ton of corn	21.28	24.32	27.36
Plant that sells wet distillers grains			
cents per liter of ethanol	3.19	3.65	4.10
dollar per ton of corn	12.77	14.59	16.42

[5] The U.S. Environmental Protection Agency in their analysis of the greenhouse gas emissions from corn ethanol plants, conducted for the U.S. Renewable Fuels Standard, estimated that drying distillers grains accounts for 40.3% of natural gas consumption in a corn ethanol plant. EPA-HQ-OAR-2005-0161-2648.

[6] The authors spent a week in Argentina in March of 2012 talking with various groups interested in the potential for producing corn ethanol in Argentina.

interior of Argentina depends on world market prices, the level of export taxes in Argentina, any effects of export quotas in Argentina, and the cost of transporting corn from an interior area to the export port. The major export port in Argentina is Rosario. The world market price is readily measured by the export price of corn in the United States. The export price is generally quoted as the Gulf FOB price. If the cost of transporting Argentine corn to major corn importers equals the cost of transporting US corn to the same market, then the Argentina FOB price should equal the Gulf FOB price.

Export taxes are assessed on FOB prices. Thus in the absence of export quotas, and with equal Gulf and Argentina FOB prices, the FAS price at the port in Rosario would equal the Gulf FOB price multiplied by one minus the percentage export tax, minus fobbing costs. With the current export tax of 20 percent, if the Gulf FOB price is $275 per ton, then the FAS Rosario price would be $275*(1 - 0.2) = $225 per ton minus fobbing costs. This price is often referred to as the theoretical price (FAS Teórico) at the port before the corn is loaded onto a ship, and before any other expenses are paid which are needed for export. Given a competitive transportation sector, the corn price in the region around an ethanol plant would equal this theoretical price minus transportation costs. Thus if transportation cost and fobbing costs equal $50 per ton, a $275 Gulf FOB price translates into an interior price of $170 per ton.

Since about June of 2010, Argentina has placed quantitative export restrictions on corn exports in addition to the 20 percent export tax. These restrictions are implemented by the Argentine government announcing the quantity of corn that exporters will be allowed to export during a given time period. We refer to these export restrictions as export quotas, even though the uncertain nature of the timing and the quantities allowed by the periodic announcements make them more random than a transparent export quota. By limiting exports, export quotas decrease the Rosario price further as demonstrated in Figure 4. In Figure 4, the “Export Supply” line shows that the amount of corn that Argentina would export increases as the price that exports receive increases. This export supply curve is the difference between supply (production and beginning stock, if any) and domestic consumption at any given price level. The increased export quantity would come from decreased domestic consumption or domestic stocks in the 12 months

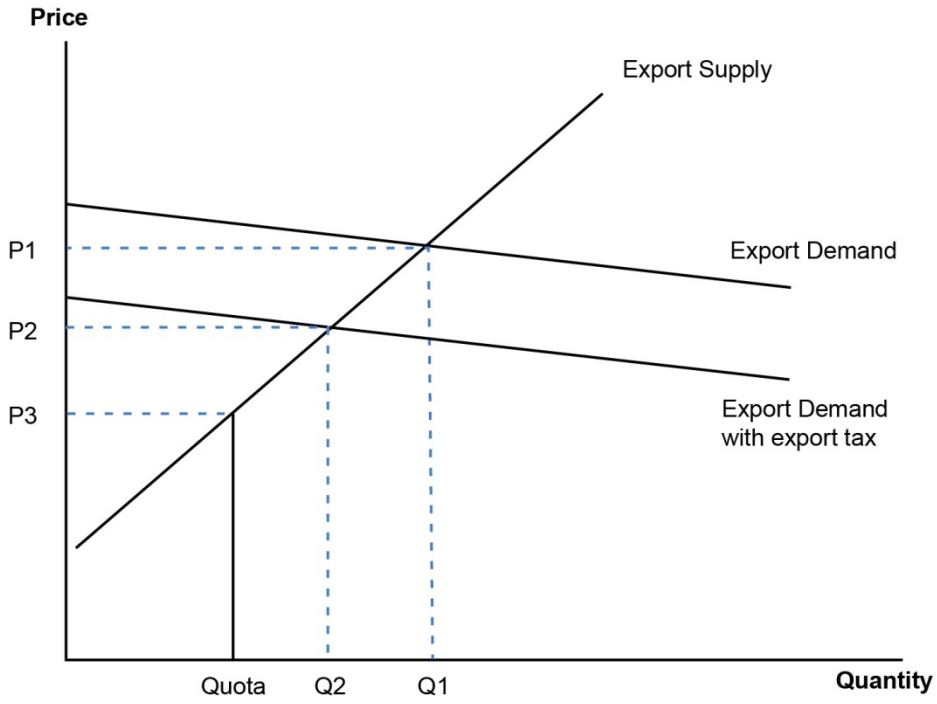

FIGURE 4. Impact on export price of an export tax and an export quota

immediately following harvest time, and from a combination of decreased domestic consumption and increased domestic corn production in the longer run. In the absence of any tax or quota, the "Export Demand" line shows how the quantity of exports that the world wants to buy from Argentina changes as the export price changes. In the absence of an export tax or a quota, the price that Argentina would receive for its exports would equal P1 and the export quantity would be Q1.

When a tax is levied on exporters, the price paid by importers for Argentina's exports must include the tax. Thus the export demand line with an export tax is shifted down by the amount of the export tax. Figure 4 shows the new demand curve, labeled "Export Demand with export tax." The impact of an export tax is to lower the domestic price of corn to P2 and to decrease the volume of exports to Q2. In the short run the lower price increases domestic use. In the longer run, the lower domestic price also decreases domestic production below what it would be without the export tax.

When a quota is also placed on exports and the export quota is set to a level that is lower than exports would be without the quota, as in Figure 4, then the domestic price is further decreased. In Figure 4 the price with both an export tax and a quota equals P3. At this low level of exports, the price that exporters are willing to pay for Argentine corn is a small amount above P2 (the point where the "Quota" quantity intersects the demand curve with the export tax). The price exporters have to pay for exports is P3. The difference between the price they have to pay and the price that they are willing to pay is called quota rent. This rent accrues to those who are allowed to export and not to the government, which only collects export taxes.

If the cost of transporting corn from the US interior where US corn ethanol plants are located to the Gulf is equal to the cost of transporting corn from the interior of Argentina to Rosario, then the price that the US corn ethanol plant would have to pay for corn is P1 minus this transportation cost. The price that the Argentine corn ethanol plant would have to pay is P3 minus this transportation cost. Thus the Argentine corn ethanol plant would pay P1 – P3 less for corn than the US corn ethanol plant because of the export tax and quota.

Figure 5 shows various monthly corn prices since October, 2009, that illustrate the magnitude of the cost advantage prospective Argentine corn ethanol producers would have over US corn ethanol plants, assuming transportation costs from the interior of the countries to their ports are comparable. As shown, FOB prices in Argentina track closely to US FOB prices. The difference between the FOB Argentina and the FAS Teórico price measures the impact of the export tax, the cost of loading corn onto a ship, and any other costs associated with exports. The difference between the FAS Teórico price and the Rosario price measures the price-depressing impact of the export quota.[7] This difference for the observations that we have is shown in Figure 6. As shown the difference varies over time, likely because the scarcity of corn relative to the export quota varies. The exact amount of quota available for export is not predictable; hence the impact of the

[7] All the data points for which we have a price are shown in Figure 2. The Rosario price is not published as frequently as other prices.

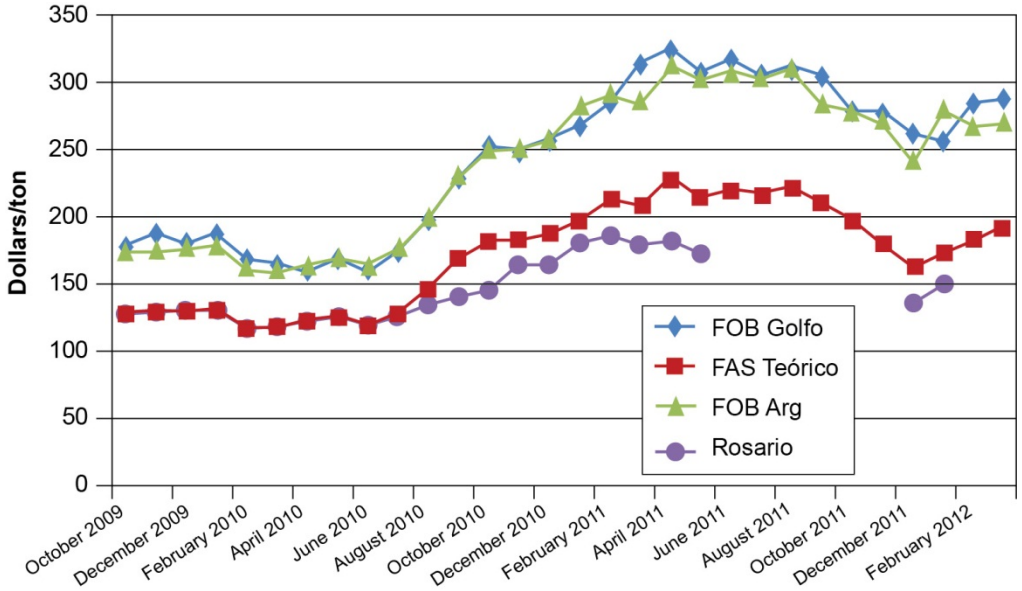

FIGURE 5. Corn prices since December of 2008

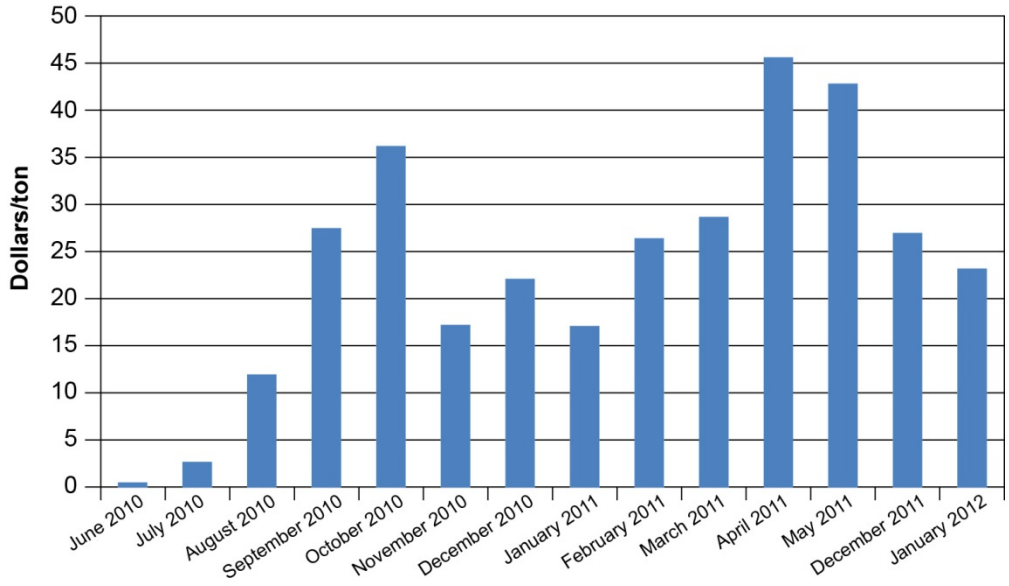

FIGURE 6. Impact of export quota on Argentina's domestic corn price

export quota is not predictable either. The average price impact of the export quota for observations since September of 2010 is $29 per ton.

With this estimate of the price impact of export quotas, we are now in a position to calculate the cost of corn to ethanol plants in Córdoba and in Salta. Table 3 shows

estimates of what the cost of corn would have been in Córdoba and Salta with and without a $29 per ton impact from export quotas from October of 2010 to March of 2012. The cost of transporting corn to Rosario is set at $60 per ton from Salta and $30 per ton from Córdoba.[8] For comparison purposes the cost of corn to Iowa corn ethanol plants is also included.

On average over this time period, the cost of corn in Iowa would have been $110 per ton greater than in Córdoba, and $140 per ton greater than in Salta with the export quota in place. On a cents-per-liter basis this is an advantage of 27.6 cents per liter in Córdoba and 35.1 cents per liter in Salta. This cost advantage in Argentina would be reduced by $29 per ton (7.25 cents per liter) if the export quota is eliminated. Table 4 shows the cost of corn for Iowa and Argentina corn ethanol plants.

Revenue from Distillers Grains

In the United States, the price received for distillers grains has varied a tremendous amount, from a low of less than $100 per ton in 2006, to a high of more than $200 per ton at various times. But the ratio of the price received for dried distillers grains relative to the price paid for corn by Iowa ethanol plants since October of 2006 has been much more stable as shown in Figure 7. This ratio has mostly fluctuated between 0.8 and 1.0. This illustrates that despite tremendous variations in the price of distillers grains, the revenue from distillers grains has tracked the cost of corn quite well in the United States.

The marketing of distillers grains in Argentina could be a bit more difficult than in the United States, at least initially, for two reasons. First, because of the corn export tax and quota in Argentina—the cost of corn to domestic livestock feeders is less of an issue than in the United States. Second, the market for distillers grains in the United States has had time to develop over a period of 10 to 12 years. But Argentina has a large number of dairy and beef cattle. Research has shown that cattle can do better on a ration that includes distillers grains than on a corn-based ration. Thus, after a period of time, there is no reason why corn ethanol plants in Argentina should not be able to sell their distillers

[8] The actual cost of transporting corn to Rosario varies during the year depending on the price of diesel fuel and the market power of truckers. The transportation costs used in this analysis represent costs assuming a fairly competitive trucking industry.

TABLE 4. Cost of Corn for Iowa and Argentina Corn Ethanol Plants

	Iowa Plant Price	FAS Teórico	With Export Quota		No Export Quota	
			Córdoba	Salta	Córdoba	Salta
			$ per ton			
Oct-10	193	182	123	93	152	122
Nov-10	206	182	123	93	152	122
Dec-10	220	187	128	98	157	127
Jan-11	238	197	138	108	167	137
Feb-11	258	213	154	124	183	153
Mar-11	259	207	148	118	177	147
Apr-11	279	227	168	138	197	167
May-11	274	214	155	125	184	154
Jun-11	284	220	161	131	190	160
Jul-11	266	216	157	127	186	156
Aug-11	279	221	162	132	191	161
Sep-11	276	209	150	120	179	149
Oct-11	244	197	138	108	167	137
Nov-11	241	180	121	91	150	120
Dec-11	235	163	104	74	133	103
Jan-12	242	172	113	83	142	112
Feb-12	247	183	124	94	153	123
Mar-12	248	192	133	103	162	132

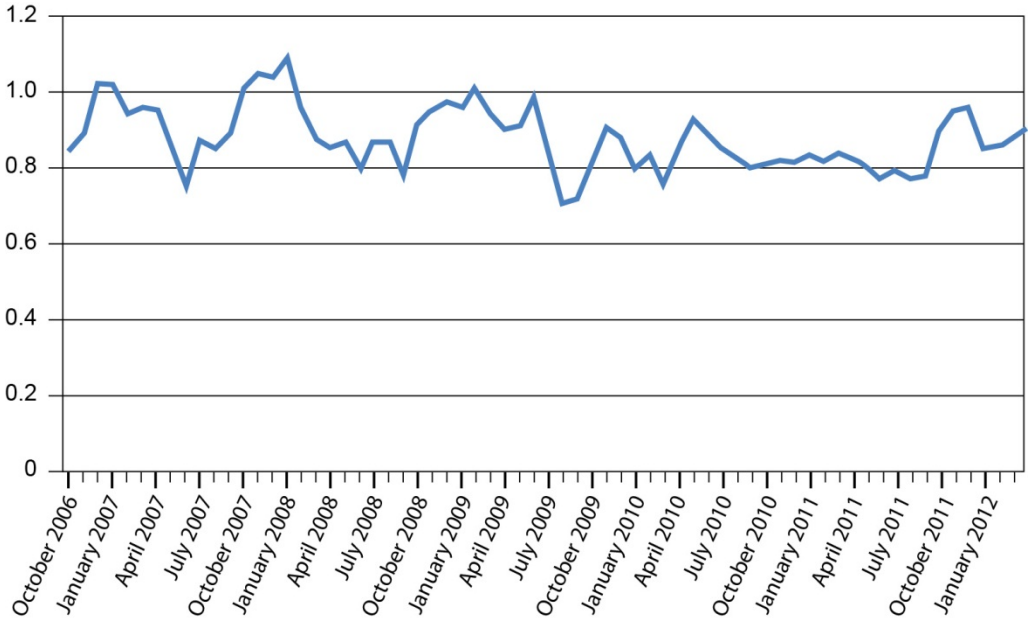

FIGURE 7. Ratio of the distillers grains price to corn price for Iowa ethanol plants

grains at close to the same ratio to corn price that US corn ethanol plants receive. To account for perhaps greater marketing expenses, revenue from distillers grains that are sold wet are assumed to be generated using a price that is 70 percent of the price of corn that is paid by the plant.

One caveat to this price is that the export tax on distillers grains is much lower than on corn. Given the large export market that has been developed by the United States, Argentina could export dried distillers grains and would be expected to do so under two conditions. First, the distillers grains must be dried. Second, if the price that the plant could receive selling domestically is less than the price that could be received in the export market, then it is likely that plants would seek to export distillers grains.

An approximation of the price that corn ethanol plants could receive from the export market is 0.85 times the FOB corn price times 0.97, minus the cost of transporting distillers grains to Rosario, minus the fobbing costs. The 0.85 factor assumes that the export market values distillers grains at 85 percent of the price corn. The 0.97 factor accounts for the 2.95 percent export tax on distillers grains.

Thus, if the FOB corn price is $250 per ton, then 0.85 * 250 *0.97 = $206 per ton. In Salta, with $60 per ton transportation costs and $20 per ton fobbing cost, the net price received at the plant for exported dried distillers grains would therefore be $126 per ton. With an FOB corn price of $250, a 20 percent export tax on corn, $20 fobbing cost for corn, $60 per ton transportation cost, and $29 per ton price depression caused by export quotas, the local corn price in Salta would be only $90.26 per ton. If the local price for distillers grains were 70 percent of the Salta corn price, then the price at the plant from domestic sales of distillers grains would be only $64 per ton. In this example, ethanol plants with a drier would have a large incentive to export distillers grains rather than sell them domestically.

But there is no certainty that driers will be installed in plants and there is no certainty that the government would not increase export taxes levied on distillers grains. To reflect the likely greater marketability of dried distillers grains, the price of dried distillers grains is set at 80 percent of the price of corn paid rather than the 70 percent that is assumed to be paid to a plant that sells distillers grains wet.

Revenue from Ethanol

The Argentine government regulates the price of domestically produced ethanol. In addition, gasoline blenders must pay for the cost of transporting ethanol from the plant to the blending site. The government-regulated price depends on the price of gasoline and the cost of producing ethanol from sugarcane. The government posts the regulated plant price on a monthly basis. These prices are shown in Figure 8. This price has grown over time because Argentina has become an importer of gasoline. Thus domestic gasoline prices have steadily increased, reflecting world crude oil prices (see Figure 8) to a greater extent than was the case in the past.

Operating Margins

We are now in a position to calculate operating margins, which are defined as revenue from ethanol and distillers grains minus the cost of corn, minus the cost of natural gas, and minus other operating costs. The operating margin is what is used to pay for the fixed costs and to generate a profit. By far the most important fixed cost of an ethanol plant is the cost of the plant itself, whether expressed in the total construction costs, depreciation,

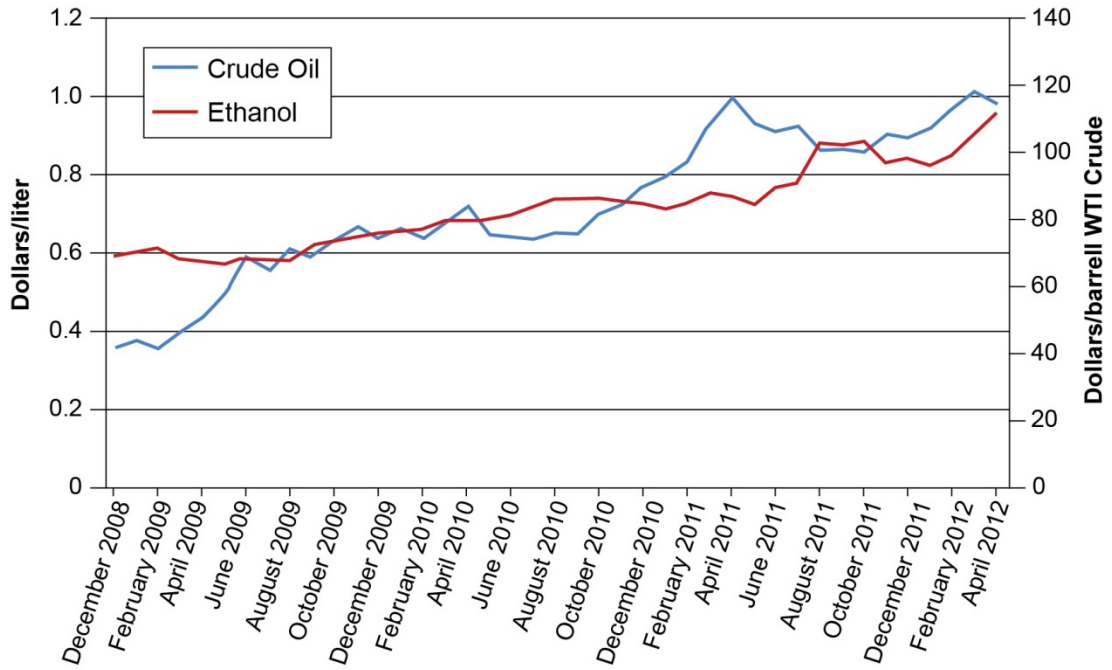

FIGURE 8. Argentina plant price for ethanol and world crude oil prices

or cash flow requirements needed to pay off construction loans. The cost of building a state-of-the-art corn ethanol plant in Argentina is about 60 cents per liter. Other fixed costs include salaries and benefits of plant administrators, insurance, board of directors' costs, office expenses, travel and training, legal and accounting fees, and other profession fees. For a typical US plant these add up to approximately one cent per liter of production per year.

Tables 5 and 6 show operating margins calculated for a range of ethanol prices and corn prices. Natural gas prices use a fixed rate of $8.00 per million BTUs. Margins are calculated for both a plant that dries distillers grains and for a plant that does not dry distillers grains. Table 5 presents operating margins for a Córdoba plant. Table 6 shows margins for a Salta plant. Corn prices are world FOB corn prices as measured by FOB Argentina prices. We predict the corresponding FAS Teórico prices from the results of a linear regression of historical FAS Teórico prices on FOB ARG prices, both shown in Figure 5. The most current price for ethanol in Argentina is more than 90 cents per liter. The most current price of corn that we have is approximately $250 per ton. Thus the current operating margins for a corn ethanol plant if it were in operation today would be

TABLE 5. Operating Margins for a Córdoba Plant

Corn Price			**Operating Margins**			
FOB Arg	**FAS Teórico**	**Ethanol Price**	**Dried Distillers**		**Wet Distillers**	
$ per ton		*Cents/ liter*	*Cents/ liter*	*$ per ton*	*Cents/ liter*	*$ per ton*
150	111	60	38	150	40	158
200	145	60	31	125	33	132
250	179	60	25	99	26	105
300	212	60	18	73	20	78
150	111	75	53	210	55	218
200	145	75	46	185	48	192
250	179	75	40	159	41	165
300	212	75	33	133	35	138
150	111	90	68	270	70	278
200	145	90	61	245	63	252
250	179	90	55	219	56	225
300	212	90	48	193	50	198

TABLE 6. Operating Margins for a Salta Plant

Corn Price			Operating Margins			
FOB Arg	**FAS Teórico**	**Ethanol Price**	**Dried Distillers**		**Wet Distillers**	
$ per ton		*Cents/ liter*	*Cents/ liter*	*$ per ton*	*Cents/ liter*	*$ per ton*
150	111	60	43	173	46	182
200	145	60	37	147	39	155
250	179	60	30	122	32	129
300	212	60	24	96	26	102
150	111	75	58	233	61	242
200	145	75	52	207	54	215
250	179	75	45	182	47	189
300	212	75	39	156	41	162
150	111	90	73	293	76	302
200	145	90	67	267	69	275
250	179	90	60	242	62	249
300	212	90	54	216	56	222

more than 60 cents per liter of ethanol produced in Salta and more than 55 cents per liter of ethanol produced in Córdoba. Thus if a new plant were to generate the current operating margins for a full year of operation, then the plant could be paid for in about one year. This level of profitability rivals the level of profitability that US ethanol plants received for about one year during 2005 and 2006.

IV. Potential Size of the Argentina Corn Ethanol Industry

The current large incentive to invest in corn ethanol plants in Argentina likely means a rapid expansion of the industry. The experience of the United States is that such expansion will soon lead to a sharp reduction in profit margins. Margins could shrink whether because the price of corn will increase in response to increased demand by ethanol producers, or ethanol prices will fall because of increased supply. A natural question that needs to be answered is how large the corn ethanol industry can become in Argentina before its size reduces profitability.

The answer to this question is not easily obtained because current profit margins are determined both by fundamental market forces and government policies. From a market

perspective, Argentina exports a significant amount of corn and imports gasoline. Thus it has a natural advantage over many other potential ethanol producers. Expansion of ethanol that would make Argentina a corn importer or an energy exporter would reduce this economic advantage. In addition, Argentine policy supports the price of ethanol at a high level, mandates that gasoline blenders pay to transport the ethanol from the plant, and artificially lowers the price of corn through export taxes and quotas. Reversal of any of these policies would reduce margins. Thus discussing how big the industry could become requires an examination of the impact of growth in the industry, both on the trade status of Argentina and on whether too much growth could trigger a change in government policy. We begin with a discussion of trade status.

Argentina's Status as a Corn Exporter

When trade is free, the domestic price of a good in exporting countries will be lower than the domestic price of importing countries because the cost of transportation must be covered by the price in the importing country. This means that if a country's status as an exporter changes to that of an importer, then the domestic price will increase substantially. The amount of exported corn provides an initial measurement for how large the corn ethanol industry in Argentina can become without triggering a narrowing of margins. As long as Argentina remains an exporter, its domestic price will stay relatively low.

Figure 9 shows that since 2001 corn exports have averaged 12.6 million tons, dipping below 10 million tons only once in 2006. Figure 9 shows the level of corn ethanol production that 90 percent of corn exports could support since 2001. Corn ethanol production is limited to 90 percent to maintain a flow of exports to keep domestic corn prices low relative to world prices. Figure 9 shows that at a minimum, a 4,000 million liter per year ethanol industry could be supported by historical export levels. Simple arithmetic says that the size of the corn ethanol industry based on this measure consists of 20, 200 million liter per year plants or 40, 100 million liter per year plants.

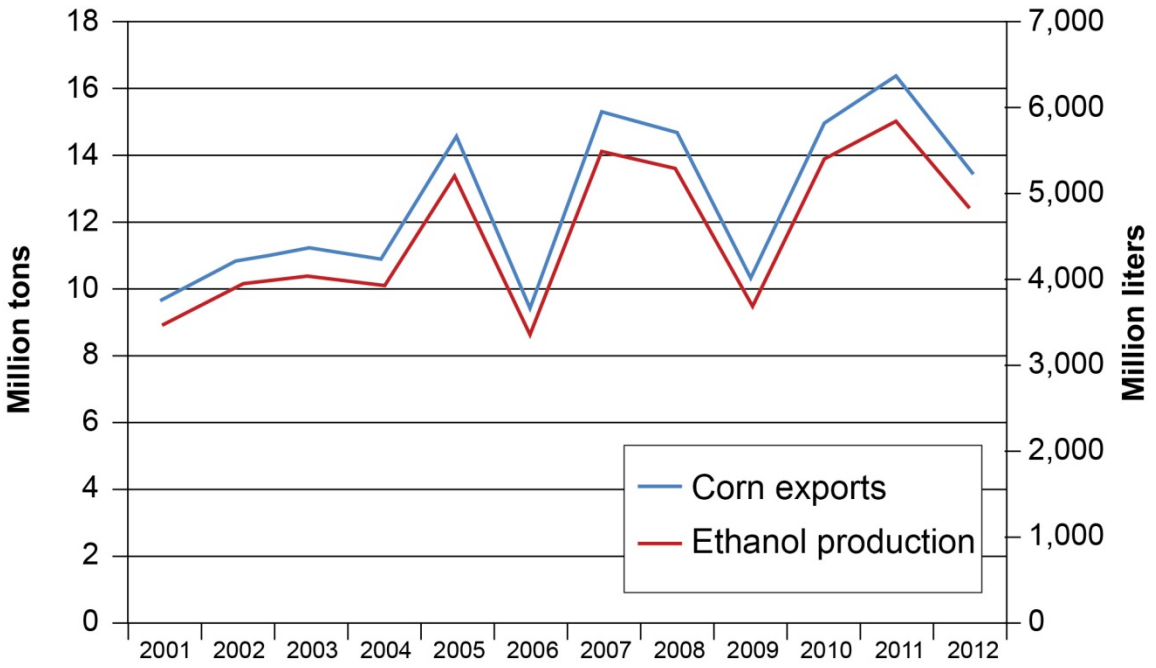

FIGURE 9. Potential size of Argentina ethanol industry based on historical corn exports

Ethanol Expansion and the Price of Corn

Use of aggregate export quantities as an estimator of the potential size of Argentina's corn ethanol industry is crude at best because it assumes that there will be no impact on domestic corn prices unless Argentina becomes a corn importer, and that there will be no corn production increase in response to increased domestic demand for corn. Of course, the two assumptions are consistent because one would not expect a corn supply response unless there was an increase in the price of corn. But what Argentina's corn producers want from an ethanol industry is a better price for their corn. How can Argentina's corn producers benefit from establishment of a corn ethanol industry if the industry size stays low enough to maintain Argentina's status as a corn exporter?

Our visit to Argentina was in March of 2012 and the 2012 crop was just beginning to be harvested. During our tour of farms in Salta we saw a large proportion of the 2011 corn crop being stored in large plastic bags on farms. Given the low corn stocks in the United States and strong export demand, it was surprising to see old crop corn still being stored in March. The reason why the corn was still in storage was that the farmers

literally could not find a buyer for their corn. Domestic demand was already saturated and export restrictions meant that there was no export demand. The corn growers we talked to said that there simply was no market for their corn so it just sat there in storage, deteriorating in quality. Although we did not visit the most important corn growing regions in Argentina, it was evident from our conversations that a lack of a corn market affected these regions as well, although perhaps not to the extent that it affected Salta.

The idea of there not being a market for corn makes no sense to most economists because economic theory says that there will always be a willing buyer for surplus product if the price reduction is sufficient. But a closed export market and a highly inelastic domestic demand is a combination where the domestic corn price would have to fall to a low enough level to quickly create a new alternative market for corn, such as burning the corn in a power plant. The price at which such an alternative use could be created is likely so low that the farmers' statements about there being no market for their corn were literally true. To these farmers the benefits of a corn ethanol industry were obvious: they would have a market for their corn.

But the lack of a market for the 2011 corn crop was solely a result of government-imposed export restrictions on corn. The existence of a corn ethanol industry in 2011 would not have automatically created a market for all the corn produced in Argentina in 2011. Domestic demand would have been higher with corn ethanol, but tighter export restrictions than what actually occurred could have created exactly the same conditions as we saw in March 2012.

There are two situations whereby establishment of a corn ethanol industry will clearly help at least a portion of corn growers in Argentina. The first is when an ethanol plant is owned by corn growers and the corn grower-owners deliver their corn to the plant. In this case the corn delivered to the plant is not sitting in storage in a field, and the value of the corn is reflected in a combination of the price paid for the corn by the plant and the profits that are paid from operation of the plant.

Corn growers who do not own the plant will not be automatically helped by the existence of the plant. To see why, consider what would happen if two 200 million liter corn ethanol plants were built in Córdoba and the owners were corn growers. These two

plants would consume one million tons of corn. Córdoba produces well in excess of five million tons, so corn would still need to be transported to Rosario for export, and could still be impacted by export restrictions. The Rosario price, minus transportation costs, reflects the maximum price that ethanol plants would have to pay for corn in excess of what plant owners delivered. But if export restrictions were in place, the plants could still find willing sellers of corn if they offered a lower price. The minimum price that they could pay is a price that would be just sufficient to induce Córdoba corn growers to sell them their corn instead of storing it through the season. This illustrates that, unless export restrictions are removed, corn growers who do not own the plant but deliver corn to it will only be helped if the plant pays a higher price than needed to obtain their required amount of corn. Such a higher price would represent a transfer of income from plant owners to these corn growers. Plant owners may choose to voluntarily pay this higher price to create goodwill in the local area, but they would not have to. The above example shows that it is the export restrictions—not a lack of local demand—that is the primary reason why corn growers did not have a market for all of their corn in 2011.

The second situation where local corn growers would receive a higher price for their corn occurs if local demand for corn outstrips local supply. Consider what would happen if the two 200 million liter corn ethanol plants were established in Salta. Corn production in Salta and adjacent areas of other provinces totaled about 1.5 million tons in 2011. If local corn demand totals more than 500,000 tons of corn then the new ethanol plants would drive local demand for corn above local supply. To obtain the additional corn to run the plants would require that corn be transported from other provinces such as Córdoba and Santa Fe. The price that the plants would need to pay for corn would have to cover the associated cost of transportation. Assuming this cost is $30 per ton of corn, this means that corn prices in Salta would have to be approximately $30 per ton higher than in Córdoba and Santa Fe. The corn price in Córdoba and Santa Fe would not change because corn would still be shipped to Rosario. But the corn price in Salta would rise by $30 per ton. All corn growers in Salta, whether they deliver corn to the plants or not, would enjoy this $30 per ton increase in the price of corn. In addition, as long as corn was being imported into the region, the local corn growers would always have a market for

their corn. The price that they receive may still be impacted by export restrictions if prices in Córdoba and Santa Fe are depressed, but there would always be a market as long as local demand outstripped local supply.

The scenario described above in Salta is an example of a change in basis, where basis is the difference between local cash or spot prices and the price of a futures contract at a specific time. Spot prices are typically below futures prices in a region (or country) if the region exports a commodity. If a region moves from being an exporter to an importer then the basis can narrow, which means that spot prices move closer, but are still below, futures prices; or the basis can reverse itself and local prices increase above futures prices.

The above discussion demonstrates that there are three ways that Argentine corn growers could benefit from the establishment of a corn ethanol industry even if Argentina remains a corn exporter. First, expansion of corn ethanol production could reduce corn exports enough to make government export restrictions less effective, thereby limiting their impact on domestic prices. Local prices for corn would then be approximately equal to the Rosario theoretical price minus transportation costs, and corn farmers would have more predictable marketing opportunities for their corn. Second, if expansion of corn ethanol in a region causes that region to move from a corn exporter to a corn importer, then local prices in the region will strengthen to ensure that an adequate supply of corn is brought into the region to satisfy the increased demand. All corn growers in the region benefit, whether they deliver to the plant or not. The third way is that if the owners of a plant are corn growers, then the value of the corn delivered to the plant, as reflected by the combination of the price paid for the corn by the plant plus any positive profits generated by processing the corn, will be higher than if the corn were sold for some other use.

One last reason why Argentine corn growers believe that a corn ethanol industry would help them receive a better price for their corn is that with the export restrictions in place, the only buyers of corn are domestic livestock feeders. Livestock feeders can take advantage of the position as the only buyer and offer a lower price for corn than they would have to pay if the market were competitive. The measurement of the market power of domestic livestock producers in Argentina and any subsequent impact on the price of corn they would pay is beyond the scope of this study. Thus any market power influence

on the price of corn is implicitly captured by the impacts of export restrictions on the price of corn. If domestic livestock feeders do exert market power, expansion of corn ethanol production would be expected to increase domestic competition for corn and reduce the ability of the livestock industry to depress the price of corn.

Impact of Expanded Corn Ethanol on Planted Corn Acreage

As pointed out in Section II, Argentina's farmers plant far more soybeans than they would if they had the good fortune to operate in a world where planting decisions were determined by world market prices combined with agronomic considerations. Crop rotation is a standard agronomic practice because it maintains or builds soil health; reduces weed, insect, and disease pressure; and it has the potential to reduce financial risk through crop diversification. Many people that we interviewed in Argentina expressed the hope that expansion of corn ethanol would make farmers more willing to plant corn, if for no other reason than to obtain the benefits from greater crop rotation.

But farmers choose what to plant primarily based on the expected financial returns to alternative crops. Unless expanded corn ethanol production leads to higher returns to corn, there is no reason to believe that corn plantings will change. In the United States, corn acreage has increased substantially since 2006, not because corn ethanol production expanded, but rather because the returns from planting corn are higher than the returns to planting alternative crops. Of course, part of the reason why returns to corn have increased is that US corn ethanol production increased the world price of corn, but Argentina's potential for corn ethanol production will not have as great an impact on world corn prices.

Suppose that Argentina reduces its corn exports by 10 million tons. According to the latest USDA WASDE projections this quantity represents about 1.2 percent of world coarse grain supplies and about 12.5 percent of world coarse grain trade. If the world demand elasticity for coarse grains is -0.2 then a 1.2 percent drop in supply accessible to the world would lead to a 5.4 percent increase in world prices. This is the maximum that corn prices would increase because any resulting increase in supply of coarse grains would offset part of the increase.

Similarly if the elasticity of world import demand for coarse grains is -1.0, the maximum impact of a 12.5 percent drop in world export supply would be 12.5 percent. But a large portion of this increase would be offset by a corresponding increase in world export supply of coarse grains which is much more elastic than total world supply.

In contrast, the increase in US corn ethanol production since 2006 represents more than 80 million tons of corn. Thus one would expect that a 10 million ton increase in corn ethanol production in Argentina would have about one-eighth the impact on corn prices that the expansion in US corn ethanol has had on world prices. This means that the impact on world corn prices from an expansion of corn ethanol production in Argentina would be relatively modest, and the resulting change in corn plantings in Argentina in response to this change in world prices would be positive, but modest in turn. Given where world prices are, a three percent increase in world prices equals about $6.50 per ton. By comparison, in Section III of this report we estimated that export quotas have depressed corn prices by an average of $29 per ton.

So any significant impact on the amount of corn planted in Argentina from expansion of corn ethanol will come about from 1) corn grower-owners of ethanol plants expanding corn production in response to the added value their corn gets from being processed into ethanol; 2) a strengthening of local corn prices in a region because the region needs to import corn from other regions in Argentina; or 3) expansion of corn ethanol significant enough to make import quotas ineffective.

Endogeneity of Local Corn Prices

It is likely that all of these mechanisms will be at work at different times and in different regions if a significant corn ethanol industry gets established in Argentina. For example, if two large corn ethanol plants were constructed in Salta, the region might need to begin importing corn, which would increase the local corn price. However, this would be a short-run situation because a higher corn price would induce farmers in Salta to grow more corn. There is a desire by Salta farmers to plant fewer hectares of soybeans and more of corn to increase crop rotations. The reason why they do not plant more corn is

that they do not have a market for the corn they are producing now, and the market price they get for their corn makes soybeans a better financial choice.

If the price of corn in Salta were to increase because of the establishment of enough ethanol plants, then farmers would respond by growing more corn. If enough additional corn were grown, then Salta would return to its former status as a corn-exporting region and the price of corn would drop again. It is likely that a new equilibrium would be reached in Salta whereby corn plantings would be higher than current levels. In years of high yields, there would be surplus corn and the price of Salta corn would be low to reflect the cost of transporting corn out of Salta. When yields are low, corn would need to be imported into Salta so local prices would be high to reflect the cost of bringing corn into Salta. This type of situation is experience by corn growers in the state of North Dakota in the United States.

In the major corn growing regions of Argentina this type of basis reversal is unlikely. A basis reversal would only occur if corn ethanol expansion was so large that it caused a reversal of Argentina's status as an exporter to world markets. This could occur in years of short corn crops, but again, there is such a pent up need to plant more corn by farmers for rotation purposes, that any large increase in the price of corn caused by the need to import corn into Argentina would be short-lived because farmers would respond by planting more corn and less soybeans.

Limitations on the Size of Argentina's Ethanol Industry Due to Domestic Ethanol Demand

Argentina's drivers use approximately 5,000 million liters of motor gasoline per year. Based on recent trends consumption will increase to 6,000 million liters per year in 2015. Because Argentina is a member of Mercosur, its automobiles have the same capability of using ethanol as do the gasoline vehicles (not the flex fuel vehicles) that are sold and driven in Brazil, which can use up to a 25 percent ethanol blend. Given the lower energy content of ethanol, a gasoline use of 6,000 million liters at a 25 percent blend translates into a maximum domestic ethanol market of about 1,600 million liters of ethanol in 2015. At 400 liters per ton of corn processed, this means that the domestic ethanol market could be supported by a maximum of four million tons of corn.

It is evident that the size of the domestic fuel market has a potentially larger impact on the potential size of Argentina's ethanol than does the amount of corn that Argentina exports. This raises two possibilities. One possibility is that expansion of corn ethanol stops at between three and four million tons of corn per year. Stopping short of the full four million ton domestic saturation point will reduce the chance that the domestic market becomes saturated, because it is not likely feasible to have 100 percent of automobiles running on 25 percent ethanol blends.

The second possibility is to continue corn ethanol expansion beyond four million tons and to enter the ethanol export market. If corn export taxes and quotas continue into the future, Argentina will continue to be a low-cost source of corn, so there is no reason why Argentina's ethanol industry could not be competitive in world markets. The problem is that world ethanol prices are far below Argentina's regulated prices. It is not likely that the government will allow ethanol producers to receive a very high price for ethanol sold domestically when a large amount of ethanol is being exported at lower world market prices. Such a move would violate trade rules also because the high domestic price would presumably only be available to domestic producers. Thus if the corn ethanol industry expanded much beyond three million tons of corn being processed into ethanol (1,200 million liters per year) then it is likely that margins would be substantially reduced.

To see what would happen to margins if Argentina entered ethanol export markets is straightforward to calculate if one knows the price of ethanol and the cost of transporting ethanol. Currently, the wholesale price of ethanol in the United States is $0.57 per liter. In Brazil, the wholesale price of anhydrous ethanol in January of 2012 was $0.75 per liter. Assuming that Argentina plant prices for ethanol to export markets would equal $0.60 liter. The results presented in Tables 4 and 5 in Section III show that at this ethanol price, corn ethanol plants in Argentina would still have positive operating margins of between 18 and 46 cents per liter, depending on the plant location and the price of corn and on whether distillers grains were dried or not.

V. Risk Factors

The impressive potential for returns presented in this study does not represent risk-free returns. The experience in the United States shows that fluctuations in the price of corn and the price of ethanol can quickly change a period into a period with tight or negative margins. Because Argentina imports gasoline, its ethanol price is set at close to parity to imported gasoline. This policy is favorable for ethanol, but also means Argentina's domestic ethanol price will reflect fluctuations in the world price of gasoline.

Risk is also caused by fluctuations in the world price of corn. As demonstrated in this report, current policy is favorable to ethanol plants in terms of its impacts on the cost of procuring corn relative to a similarly-situated plant in the United States, but the policy does not stabilize the domestic price of corn. Rather, fluctuations in the world price of corn are directly transmitted to fluctuations in Argentina's domestic price of corn. Thus, although profit margins for corn ethanol plants should be higher than profit margins for corn ethanol plants in the United States and other countries, variability in profit margins will be quite similar to that experienced by other plants.