Economic impacts of the Expanding Corn-based Ethanol Industry

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Global production of farm-based biofuels—ethanol and biodiesel—has expanded rapidly in the past three years and appears likely to increase even more rapidly in the years just ahead. ***For the 2007-08 marketing year beginning September 1, 2007, the USDA projects U.S. corn processed into ethanol will be 58% larger than in the current marketing year. The accelerated expansion follows a 38% increase in 2006-07.*** While increased construction costs and higher corn prices have slowed construction activity some, the industry continues to expand and likely will continue increasing in size for another three or four years. Forces that will gradually slow the expansion include (1) higher corn prices as the industry draws more land from other crops into corn, (2) infrastructure challenges along with an increasing ethanol supply that likely will reduce the premium of ethanol prices over gasoline, and (3) a widening of the price differential of distillers grain vs. corn and soybeans as supplies increase. Crude oil prices and U.S. government policies also will be key factors affecting the future size of the industry.

Where will the corn-based ethanol industry level off?

My projections show the corn-based ethanol industry beginning to level off at about 5.5 billion bushels of corn processed into ethanol – with the industry probably reaching that level in three and one-half to four years. That is equivalent to slightly over half of last year's corn crop being processed into ethanol. The transition of U.S. and foreign agriculture to a major producer of energy as well as food and fiber is one of the most rapid changes in history. It is creating sharply increased demand for fertilizer, seed corn, other inputs for corn production, and a sharply increased need for grain handling, drying and storage facilities as well as farm and agribusiness transportation equipment. Challenges in the crop input industries and sharply increased cash rents are increasing the cost of producing corn and will be one of several factors behind rising corn prices.

Increased Risk-Management Challenges

Tightening feed grain supplies and the potential for greatly increased volatility in grain and oilseed prices mean that risk-management challenges will be greatly increased for all producers and users of these crops. For corn producers, the explosive growth in ethanol processing plants has created many more markets for their corn than in the past, and is greatly increasing competition at the local level. Aggressive bio-diesel programs in the EU, Canada, the U.S., and other countries as well as foreign ethanol programs are tightening global grain and oilseed supplies. The result will be longer-term upward pressure on crop prices, large changes in crop rotations, movement of lower-quality land into crop production, and increased clearing of land for crop production in South America. Increased foreign corn and soybean production will temper but not eliminate the upward pressure on corn prices from the expanding U.S. ethanol industry.

Key Issues

Key issues for the future of the U.S. corn-based ethanol industry include (1) the timing of an economical break-through in converting cellulose feedstocks to ethanol, (2) changes in automotive technology and possible production of biodiesel from algae, (3) trends in global crude oil supplies and demand, (4) impacts of increased corn use for ethanol on the level and variability of food prices and the livestock industry, and (5) U.S. and foreign government mandates for ethanol and biodiesel fuel production.

A Global Perspective

As an example of the global impact from the expanding U.S. ethanol industry, just the added capacity of U.S. corn-based ethanol plants that are currently under construction is nearly four times the volume of U.S. corn exported annually to Japan. The increase in U.S. capacity under construction represents a volume of corn that is 15 percent larger than the record EU corn crop, and is equal to nearly 70 percent of global corn exports. ***Current economic indicators suggest that within the next 4 to 5 years, the U.S. corn-based ethanol industry may use an annual volume of corn that is equivalent to 160 percent of current global corn exports***. Increased U.S. ethanol production already has tightened world feed grain supplies substantially. Corn prices in the U.S. have risen about 80 percent in the past year, despite the second-highest corn yield per acre. The tightening corn supplies appear almost certain to bring more upward pressure on prices in the years ahead to encourage increased production. ***In the past two years, the U.S. has not produced enough corn to meet market demand. Corn and feed grain supplies have been adequate only because large stocks of corn had been built up before the current boom in ethanol production emerged.***

With the growth of a large new relatively inelastic demand for crops for motor fuel, any serious weather problems in major U.S. or foreign crop-producing regions can be expected to bring sharp increases in crop and food prices. Weather-reduced crop production would require a sharp reduction in the amount of corn used to produce red meat, dairy, and poultry products.

This year, the U.S. is seeing the early stages of a dramatic change in crop rotations that is almost certain to continue for the next few years. Intended U.S. corn plantings are up 16 percent from last year's actual plantings. The increased corn planted area is coming at the expense of other crops. For example, intended cotton plantings are down 20 percent from last year's planted area, along with an 11 percent decline in intended soybean plantings. A number of other crops also are experiencing sharply reduced plantings. This increase in intended corn plantings has given us only one more year of potentially adequate but tight supplies. Based on the number of ethanol plants under construction and nearly ready to break ground, it appears almost certain that an additional increase in corn plantings will be needed in each of the next several years. With sharply increased corn production, there may be a need for as much as a 50 percent increase in the grain storage capacity in Iowa and an even larger increase in grain drying, receiving, handling, and farm-to-elevator hauling capacity.