Planting Decisions: Corn versus Soybeans

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The recent discovery of soybean rust in the United States has prompted many agricultural pundits to predict more corn acres will be planted in the coming crop year. While soybean rust may cause some shift from soybeans to corn, producers have already begun such a shift and will likely continue regardless of the presence of soybean rust. Figure 1 shows that Iowa soybean acreage reached its peak in 2001. Since then, corn acreage has risen by nearly 9 percent while soybean acreage has declined by over 7 percent. Three major factors explain this shift: trend yields, variable costs, and prices. If we look at these factors over the past several years, corn has outpaced or matched soybeans in all three areas. Corn trend yields are growing relatively faster than are soybean trend yields. Variable costs of production for corn are maintaining a consistent margin with those for soybeans. Futures prices for corn are relatively stronger than are those for soybeans.

Figure 2 contains actual and trend yields for Iowa corn and soybeans. Two trend lines are given for each crop. One shows a 1980 to 1997 trend, which represents the information that was available to farmers before planting their crops in 1998. The other shows the trend from 1980 to 2004, representing currently available information.

A comparison of the two sets of trend yields demonstrates that yields in the late 1990s and early 2000s have pushed the corn trend higher, while the soybean trend remains roughly the same. In 1998, the corn trend yield was 129 bushels per acre, 2.9 times the soybean trend yield of 44 bushels per acre. In 2005, the corn trend yield is 156 bushels per acre, 3.4 times the soybean trend yield of 46 bushels per acre. Given corn’s growing advantage in trend yields, for soybeans to be competitive, soybean prices must be relatively higher than corn prices or soybean costs must be relatively lower. Neither of these is turning out to be the case.
USDA has tracked agricultural production costs for many years. The upper section of Table 1 shows the variable (or operating) costs for producing corn and soybeans in the Heartland region, which includes Iowa. Cost figures after 2003 have not yet been published. These figures show corn variable costs are roughly double the variable costs for soybeans. Going back to 1996, this cost relationship has been fairly steady. So variable costs have not moved in favor of either crop for quite some time.

The middle section of Table 1 shows the expected prices for the crops before planting. For these prices, we gathered the futures prices in mid-January on the harvest futures contracts for corn and soybeans. Looking at the ratio of the corn and soybean prices, corn reached its high point in 2002 when its expected price was 53 percent of the soybean price. Since then, the price ratio has moved in soybeans’ favor—until this year. In 2005, the ratio is 0.42, slightly below the 10-year average. So current prices also are not favoring either crop.

The bottom section of Table 1 shows the expected net returns for each crop. The net returns are based on the expected prices, trend yields, and variable costs for each year. The variable costs from 2003 are used for 2004-05. In each year, corn expected net returns have exceeded soybean expected net returns. This is a fair comparison because lower fertilizer costs from planting corn after soybeans are accounted for in USDA cost figures. In fact, going back even further, corn expected net returns have surpassed soybean expected net returns in 9 of the past 10 years. Given that the expected net returns are higher for corn, it is not surprising that Iowa farmers have been shifting from soybeans to corn.

The additional threat of soybean rust is not creating a new incentive to move to corn but is actually just reinforcing the shift. Soybean rust could affect production and planting decisions in several ways. First, if soybean rust does spread during the growing season, soybean producers will face additional variable costs for fungicides. Estimates of the additional costs range from $16 to $35 per acre, depending on the fungicide used, the number of applications, and the severity of the outbreak. This will drive down soybean net returns and make corn relatively more attractive. Second, areas where soybean rust is more likely to be present may shift to alternative crops. Given the biology of soybean rust, southern states are more likely to face rust problems. Corn, cotton, and rice acreage in these areas may increase and the additional production from these acres would put downward pressure on prices for these crops. This change could also spur higher soybean prices. These price changes would support more soybean acres in Iowa. The net effect of soybean rust on expected net returns is uncertain.

Figure 3 shows the soybean prices that would be needed to make corn and soybean expected net returns comparable with and without soybean rust. For the soybean rust scenario, additional costs of $25 per acre are assumed. Given this additional cost, an extra 55¢ per

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**Table 1. Variable costs, expected prices, and expected net returns**

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<tr>
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<th>2001</th>
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<th>2003</th>
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<th>2005</th>
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<td>218.59</td>
<td>236.43</td>
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<td>127.57</td>
<td>160.22</td>
<td>215.89</td>
<td>181.27</td>
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</tbody>
</table>

**Figure 3. Soybean prices needed to have expected net returns equal to corn**

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Continued on page 9
Continued from page 7

bushel of soybeans would be needed to offset the costs and maintain net returns. With a corn price of $2.37 per bushel (the futures price for corn on January 7) and assuming no soybean rust problems, soybean prices would need to move up to $6.42 per bushel (82¢ higher than the soybean futures price on January 7) to match expected net returns with corn. With soybean rust, soybean prices would need to increase to nearly $7 per bushel. Of course, $7 soybeans are quite possible if rust significantly reduces yields or causes major acreage shifts out of soybeans and into corn. But, at least so far, the futures market is discounting the possibility of either event happening. 

Compared with many other countries, the United States has been slow to adopt a system that would provide age verification of all cattle.

2004. Canada has been out of the Japanese market since May 2003 because of BSE, but the Canadian cattle identification system will be a cornerstone of Canada’s efforts to reenter the Japanese market.

Both Canada and the USDA believe effective firewalls are in place to ensure cattle suspected of having BSE are removed from the North American herd and kept from entering the food system. The United States has named Canada a “minimum-risk region,” which means the Canadian industry meets risk standards that (a) prohibit specified risk materials in human food; (b) implement a ruminant-to-ruminant feed ban; (c) restrict imports to minimize exposure to BSE; (d) use surveillance procedures that meet or exceed international guidelines; and (e) use epidemiological investigations, risk assessment, and risk mitigation measures.

Canada’s third case of BSE created renewed concern in the U.S. beef industry, with some groups urging the U.S. government to keep the border closed to live cattle. However, both countries had acknowledged the possibility of additional cases, and the United States is proceeding with its decision to allow imports of live cattle under 30 months of age and other specified animals and products from Canada. On March 7, 2005, the United States and Canada will once again become a North American market.

Based on the importance Japan places on documented age verification and Canada’s adoption of a national identification system, opening the U.S. border to live Canadian cattle should not slow U.S. efforts to reenter the Japanese import market. On the other hand, additional negotiations will be required to compensate for the U.S. industry’s slow uptake of animal identification, age verification, and traceability systems. Further, being banned from the U.S. market forced Canada to increase slaughter capacity. This means the Canadians will have more beef to sell and can market their source-identified product as being distinctly different from most U.S. beef.

Of greater concern than opening the border is that, once access is granted, exporters are likely to face consumer resistance to U.S. beef. Consumer polls indicate that between two-thirds and three-fourths of Japanese consumers say they will not buy U.S. beef when it becomes available. Given this consumer attitude, markets for less-expensive cuts of U.S. beef will exist in food service outlets where source identification is not required. However, convincing consumers to purchase more-expensive cuts from retail outlets that require country-of-origin labeling and from restaurants that provide source identification will be a much harder sell.

Experience has given the Japanese government a strong incentive to respond to consumer concerns. Traceability of livestock and other food products is a high priority in Japan, and supermarkets and other food suppliers have been quick to embrace traceability as part of consumer assurance programs. The intent of the U.S. NAIS is to allow for rapid tracking of animals in case of disease outbreaks. However, because the system would provide both documentation of age and traceability from birth to the doors of the slaughter plant, adoption of the system would be a major step forward in satisfying Japanese concerns about animal identification and traceability and perhaps in avoiding extended import bans in the event of future animal disease or meat safety issues.