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Corn versus Soybean Returns: 2016 Projections with Historical Comparisons

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February 16, 2016

farmdoc daily (6):30

Recommended citation format: Schnitkey, G. "Corn versus Soybean Returns: 2016 Projections with Historical Comparisons." *farmdoc daily* (6):30, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, February 16, 2016.

Permalink: <http://farmdocdaily.illinois.edu/2016/02/corn-versus-soybean-returns-2016-projections.html>

In the past three years, soybeans have been more profitable than corn in Illinois. There is a reasonable chance that soybeans will be more profitable than corn again in 2016. Larger increases in corn costs as compared to soybean costs make it more difficult for corn returns to exceed soybean returns, particularly at low corn and soybean prices.

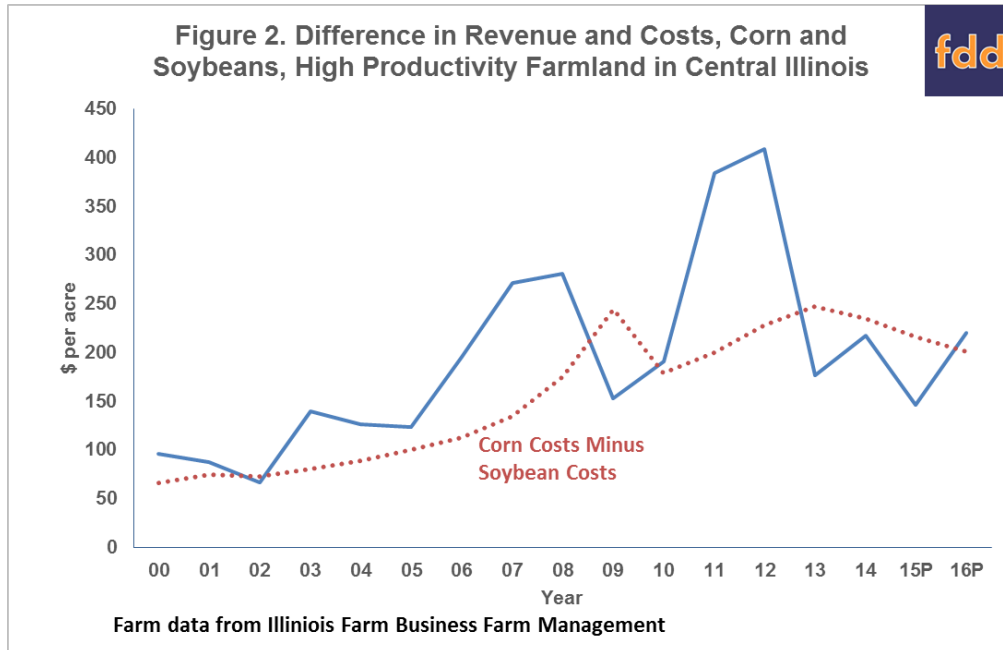
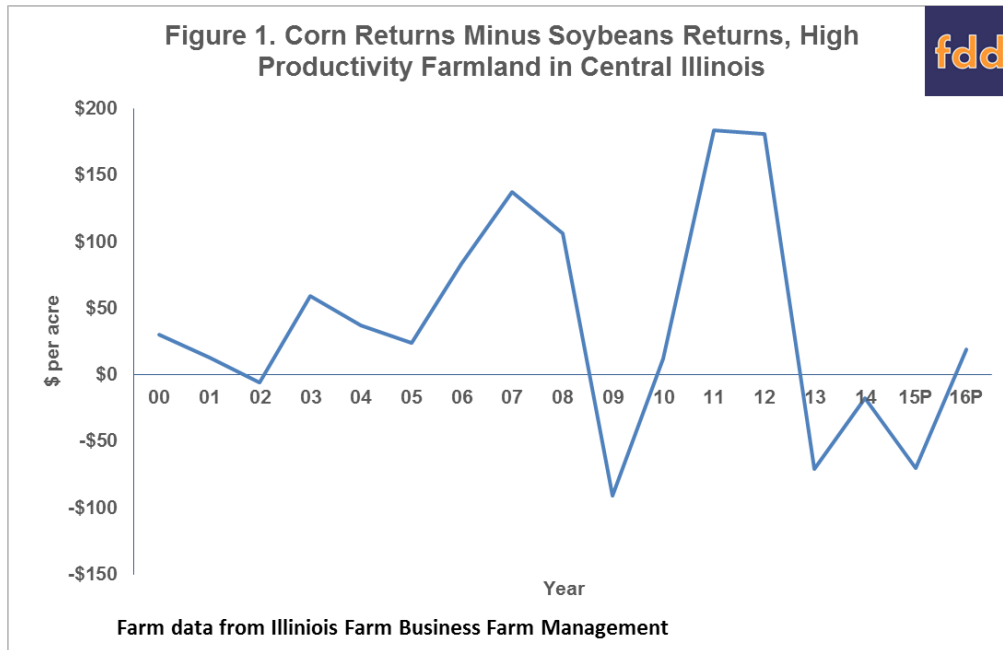
Comparison of Corn and Soybean Returns

Figure 1 shows corn-minus-soybean returns for high-productivity farmland in central Illinois. These values are averages across grain farmers enrolled in Illinois Farm Business Farm Management (FBFM), Historical values reported in an [Actual and Projected Returns and Costs publication](#) available in the management section of *farmdoc*. Positive values indicate that corn was more profitable than soybeans and vice versa. From 2000 to 2012, corn was more profitable than soybeans in all years except 2002 and 2009. Corn returns exceeded soybean returns by very large margins in 2011 and 2012. From 2013 to 2015, soybean returns exceeded corn returns, an unusual three-year run compared to years between 2000 and 2012. In 2016, corn is projected to be more profitable than soybeans; however, the difference is small and soybeans could again be more profitable than corn.

Evaluating revenue and cost differences aids in understanding switches in profitability between corn and soybeans. The blue line in Figure 2 shows gross revenue from corn minus gross revenue from soybeans. Corn always has had more revenue than soybeans. Between 2000 and 2006, the average difference in revenue between corn and soybeans averaged \$119 per acre. Between 2007 and 2015, this difference became larger, averaging \$247 per acre. The revenue differences were very large in 2011 and 2012, averaging \$384 per acre in 2011 and \$409 per acre in 2012, the same years in which corn returns exceed soybean returns by large amounts.

The red line shows corn costs minus soybean costs. The difference has tended up from a \$66 per acre difference in 2000 to \$231 per acre in 2013. Since 2013, the difference has decreased modestly, reaching a projected level of \$201 per acre in 2016.

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Most of the cost difference between corn and soybeans comes in direct costs: fertilizer, pesticides, seed, drying, storage, and crop insurance. In 2000, direct costs accounted for 81% of the total cost difference between corn and soybeans. This percentage has grown over time, reaching 94% in 2013. As documented elsewhere, non-land costs roughly doubled between 2006 and 2013 (see *farmdoc daily*, [September 1, 2015](#)). Corn costs increased more than soybeans costs leading to these larger difference between corn and soybeans. Of the direct costs, the categories having the largest influence on differences are nitrogen fertilizer and seed costs.

Corn is more profitable than soybeans when the revenue difference line exceeds the cost difference line in Figure 2. As also illustrated in Figure 1, soybeans have been more profitable than corn in 2013, 2014, and 2015. The increase in the cost difference has contributed to soybeans being more profitable than corn. Also contributing are lower commodity prices

Decline Prices Impacts on Revenue Differences between Corn and Soybeans

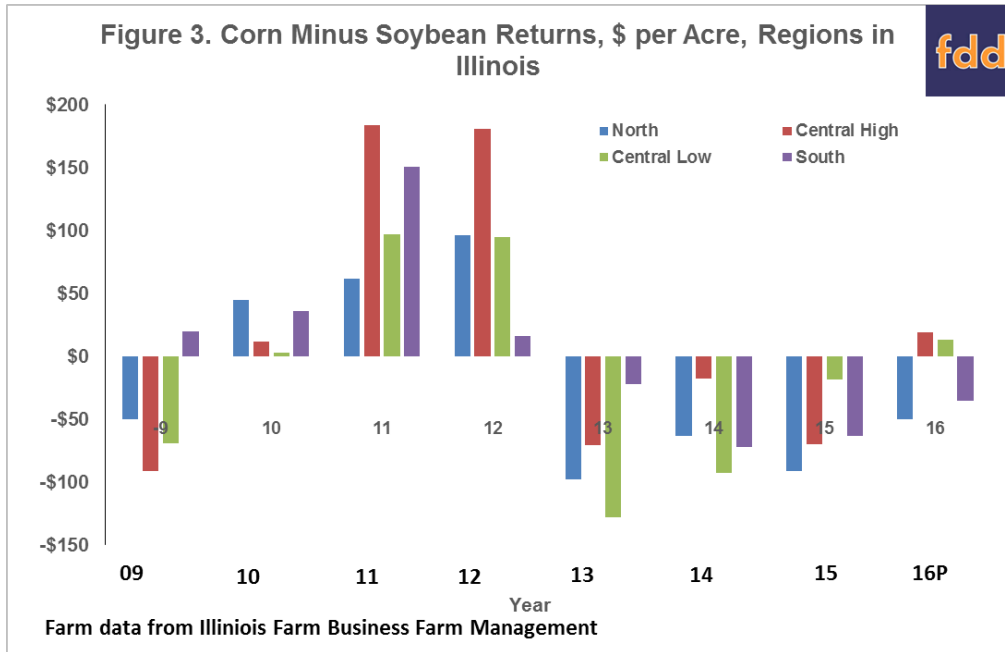
Decreases in commodity prices make it more difficult for corn revenue to exceed soybean revenue by a wide enough margin to cover the cost differences, as is illustrated in Table 1. Panel A calculates a difference in crop revenue between corn and soybeans. Yields used are 200 bushels for corn and 61 bushels per acre for soybean. The corn yield is 3.28 times the soybean yield, the historical relationship in central Illinois. Prices are set at \$4.50 per bushel for corn and \$10.50 for soybeans, giving a soybean-to-corn price ratio of 2.33. At this yield and price combination, the difference in crop revenue between corn and soybeans is \$259 per acre.

Table 1. Gross Revenue Differences between Corn and Soybeans at Different Prices			
	Yield	Price ¹	Revenue
Panel A. Prices Near Long-Run Expectations			
	bu/acre	\$/bu	\$/acre
Corn	200	4.50	900
Soybeans	61	10.50	641
		Difference	259
Panel B. Expected prices for 2016.			
	bu/acre	\$/bu	\$/acre
Corn	200	3.80	760
Soybeans	61	8.87	541
		Difference	219

¹ Corn price is 3.28 times soybean price.

Panel B shows the revenue difference calculation for \$3.80 corn and \$8.87 soybeans. These prices are near 2016 expectations and have the same soybean-to-corn price ratio as in Panel A of 2.33 (2.33 soybean-to-corn price ratio = \$8.87 soybean price / \$3.80 corn price). At these prices, the difference in corn and soybean revenue is \$219 per acre, considerably below the \$259 level at a \$4.50 corn price and \$10.50 soybean price.

Central Illinois is in the heart of the corn-belt and has higher corn yields relative to soybean yields than many other regions. Its profit advantage in growing corn over soybeans tends to be larger than other regions. Figure 3 shows historic corn-minus-soybean returns for four regions of Illinois. Note that all regions have the same trends over time. In 2016, soybeans are projected to be more profitable than corn in northern and southern Illinois.



Summary

Soybean returns are more likely to exceed corn returns now than in the years before 2013. Similar to the last three years, soybean likely will be more profitable than corn unless a combination of one or more of the following four items occur:

1. Both corn and soybean prices increase to higher levels than currently expected. If relative price increases are the same for corn and soybeans, higher prices cause corn returns to increase relative to soybean returns.
2. Relative corn and soybean prices change, with the corn price increasing relative to soybean price
3. Corn yields are high relative to soybean yields.
4. The difference in corn costs decrease relative to soybean costs. Likely items that could contribute to this decrease are lower nitrogen fertilizer prices or lower corn seed costs.

References

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