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## 2016 Corn and Soybean Returns Revisited

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USDA's *Prospective Planting* report released on March 31<sup>st</sup> indicated that U.S. plantings of corn in 2016 will be 6% higher than in 2015 and soybean acres will be 1% less. Since the release of this report, corn prices remained about the same while soybean prices increased, increasing the expected profitability of soybeans relative to corn. Corn and soybean returns are calculated under revised harvest delivery prices, and under two prices scenarios presented in an [April 13<sup>th</sup> farmdoc daily article](#). Soybeans are projected more profitable than corn. Three explanations on why corn acres are increasing are provided. Over time, reducing corn and increasing soybeans in rotations should be considered if prices remain at current levels.

### Recent Price Changes

Settlement prices on March 30<sup>th</sup>, the day before the release of the *Prospective Plantings* report, were \$3.84 per bushel for the December 2016 corn futures contract on the Chicago Mercantile Exchange, and \$9.23 per bushel for the November 2016 soybeans contract. On April 18<sup>th</sup>, the December corn contract settled at \$3.90 per bushel, \$.06 higher than on March 30<sup>th</sup>. The November 2016 soybeans contract settled at \$9.67 per bushel on April 18<sup>th</sup>. Between March 30<sup>th</sup> and April 18<sup>th</sup>, soybean prices rose \$.44 per bushel compared to \$.06 per bushel for corn.

### Price Scenarios Examined

Three price scenarios are examined in this article. The first is current prices for delivery of corn and soybeans at harvest. These represent central Illinois grain bids and are \$3.75 per bushel for corn and \$9.50 per bushel for soybeans.

Two sets of Market Year Average (MYA) prices were presented in the [April 13<sup>th</sup> farmdoc daily article](#). The two price sets are based on two different national supply and consumption balance sheets. The first, labeled as WASDE, reflects expectations of the 2016/17 balance sheet to be released in the May WASDE Report. These prices are \$3.40 for corn and \$9.00 for soybeans. The second set, labeled IG, represents potential revisions to the WASDE balance sheet and has prices of \$3.70 for corn and \$9.45 for soybeans. More details behind these price forecasts are provided in the [April 13<sup>th</sup> farmdoc daily article](#).

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Corn-minus-soybean returns are calculated for the above three sets of prices using budgets for northern Illinois, central Illinois with high-productivity farmland, central Illinois with low productivity farmland, and southern Illinois. Yields and costs from [2016 Illinois Crop Budgets](#) are used to make estimates. Relevant bushels and yields used in calculations are:

- Northern Illinois. Corn has a 196 bushel per acre yield and \$609 per acre of non-land costs. Soybeans have a 60 bushel per acre yield and \$354 per acre of non-land costs.
- Central Illinois high-productivity farmland. Corn has a 201 bushel per acre yield and \$552 per acre of non-land costs. Soybeans have a 58 bushel per acre yield and \$351 per acre of non-land costs.
- Central Illinois with low productivity. Corn has an 186 bushel per acre yield and \$560 per acre of non-land costs. Soybeans have a 53 bushel per acre yield and \$344 per acre of non-land costs.
- Southern Illinois. Corn has a 164 bushel per acre yield and \$578 per acre of non-land costs. Soybeans have a 48 bushel per acre yield and \$353 per acre of non-land costs.

### Corn-Minus-Soybean Returns

Corn-minus-soybean returns equal corn returns minus soybean returns. Positive values indicate that corn is more profitable than soybeans, and vice versa. For fall delivery prices of \$3.75 for corn and \$9.50 for soybeans, corn-minus-soybean returns are -\$90 per acre for northern Illinois, \$2 per acre for central Illinois with high-productivity farmland, -\$22 per acre for central Illinois with low productivity farmland, and -\$66 per acre for southern Illinois (see Table 1). Corn is barely projected more profitable only in the central Illinois region with high-productivity farmland. Corn yields are the highest relative to soybean yields in this region.

Region	Price Scenario		
	Fall Bids	WASDE	IG
Corn Price:	\$3.75	\$3.40	\$3.70
Soybean Price:	\$9.50	\$9.00	\$9.45
	\$/acre	\$/acre	\$/acre
North	-90	-129	-97
Central-High	2	-40	-5
Central-Low	-22	-61	-29
South	-66	-99	-72

All corn-minus-soybean returns are negative for the WASDE scenario of \$3.40 for corn, and \$9.00 for soybeans. Corn-minus-soybean returns are -\$129 per acre for northern Illinois, -\$40 per acre for central Illinois with high-productivity farmland, -\$61 per acre for central Illinois with low productivity farmland, and -\$99 per acre for southern Illinois.

The IG scenario has prices very close to current fall delivery prices: \$3.70 for corn and \$9.45 for soybeans. Compared to current fall delivery prices, IP prices are slightly more favorable to soybeans. As a result, all of the projected corn-minus-soybean returns are negative for the IG scenario. Corn-minus-soybean returns are -\$97 per acre for northern Illinois, -\$5 per acre for central Illinois with high-productivity farmland, -\$29 per acre for central Illinois with low productivity farmland, and -\$72 per acre for southern Illinois.

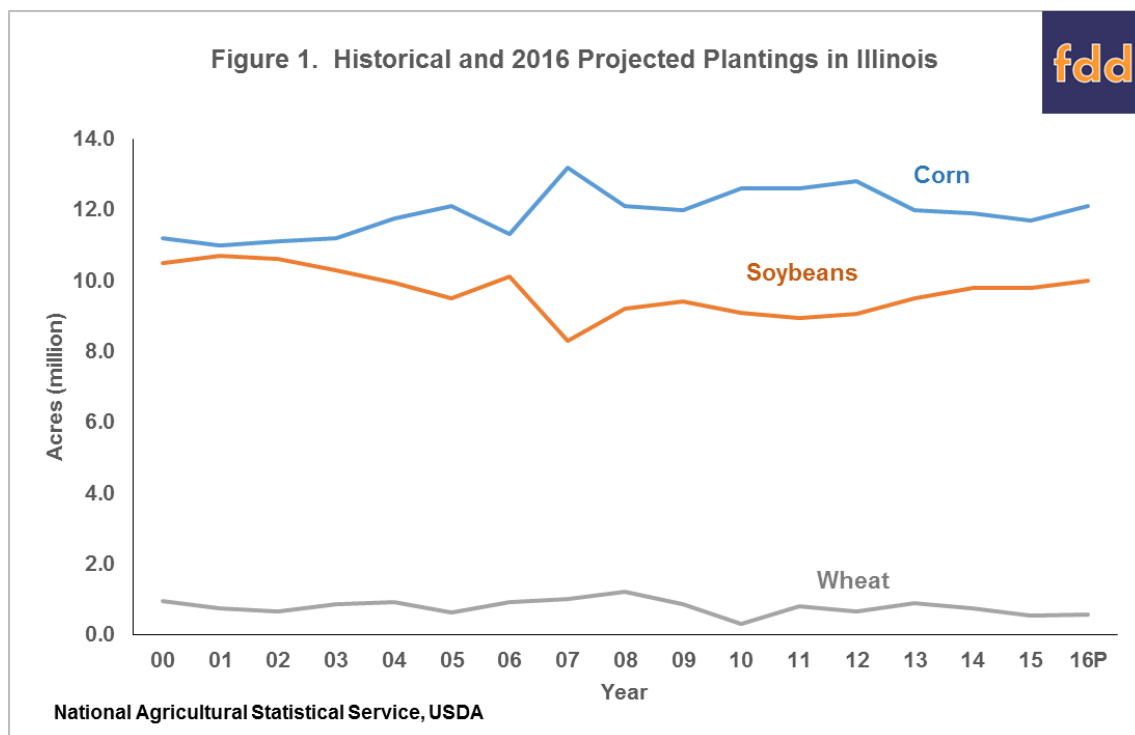
The above price projections represent revisions of return projections made earlier in the year. The revisions contained in this article increase the profitability of soybeans relative to corn (see projections from a [February 16 farmdoc daily article](#) for comparisons). If these 2016 projections hold, 2016 will be the fourth year in a row where soybean returns exceed corn returns.

## Why more Soybeans?

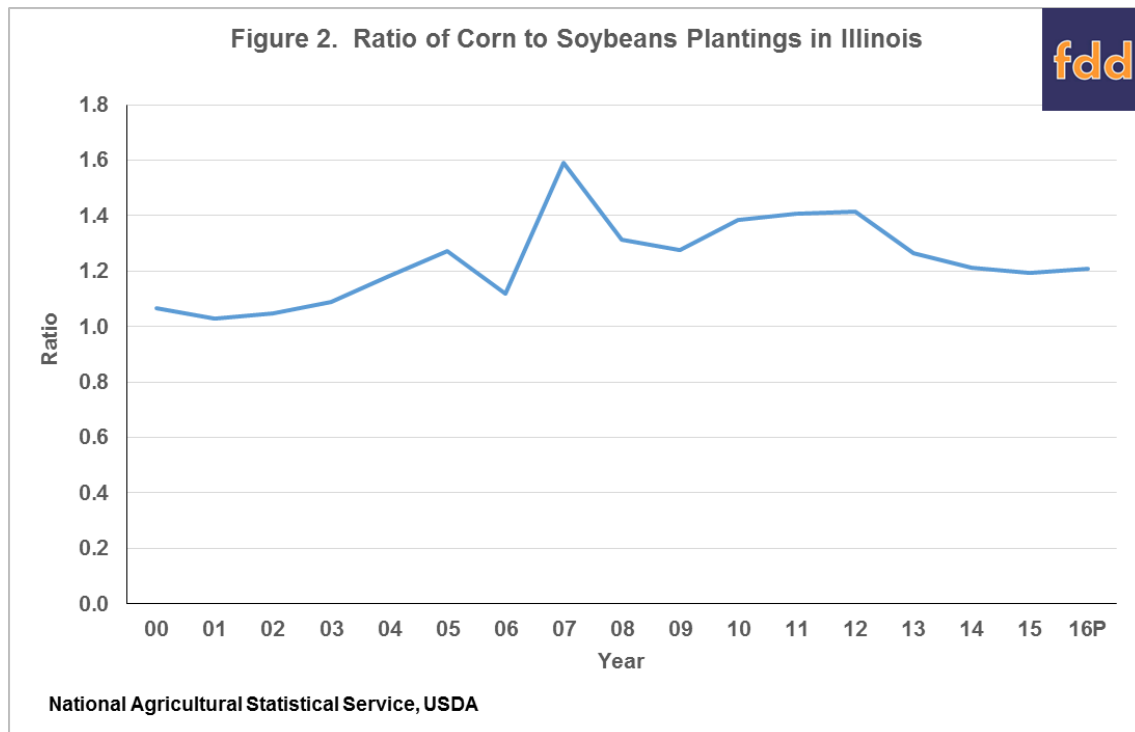
If soybean returns are projected higher than corn returns, why is more corn projected to be raised in the *Prospective Plantings* report? No one explanation likely suffices, but three possibilities present themselves. The first is yield expectations. Weather forecasts suggest that El Nino is weakening, which could lead to a hot and wet July, but a hot and dry August. If this weather scenario came to fruition, soybean yields would likely suffer compared to corn yields. These expectations may play a role in farmer decisions; however, one should take this explanation with a grain of salt. Weather forecasts further out than a week are notoriously error-prone and often contain little more information than historical averages. Farmers likely realize the unreliability of summer-time forecasts and may place little weight on forecasts.

The second is that corn typically has been more profitable than soybeans, particularly near long-run projections of \$4.50 for corn and \$10.00 for soybeans (*farmdoc daily*, March 15, 2016). Farmers may be reacting less to current market conditions and anticipating a return to conditions closer to longer-run averages. Weighing against this explanation is the fact that soybeans have been more profitable than corn in the previous three years (*farmdoc daily*, February 16, 2016).

The third reason is that projections in the *Prospective Planting* report are not suggesting a shift away from soybeans in the Midwest. In Illinois, both corn and soybean acres are projected higher in 2016. Corn plantings are projected at 12.1 million acres compared to 11.7 million acres in 2015. Corn plantings in 2015 were down from the 2014 level of 11.9 million acres in 2014, likely due to wet spring and early summer weather leading to prevented plantings. Soybean plantings in 2016 are projected at 10.0 million acres, up from 9.8 million acres in 2015. If 2016 prospective plantings come to be, more acres of soybeans will be planted in any year since 2006 (see Figure 1).



In actuality, 2016 corn-to-soybean plantings in Illinois are not projected to change much from 2015 levels. For 2016, the ratio of corn to soybeans acres is 1.21, up slightly from the 2015 level of 1.19. Overall though, relative plantings have not changed much in Illinois since 2013 (see Figure 2).



Perhaps the more surprising fact is that more acres are projected to be planted in 2016. In Illinois, planting of corn, soybeans, and wheat are projected at 22.6 million acres. In 2015, plantings were 22.0 million acres, down because of prevented planting. In 2014, 22.4 million acres were planted, 200,000 acres less than in 2016. The last time 22.6 million acres were planted was in 2004. Of course, differences of 200,000 acres across the state of Illinois are relatively small changes.

### Farmer Rotation Decisions

Illinois farmers seemed to have settled on rotations that result in 20% more corn than soybean acres. Given the past three years of return results, these rotations may need to be reevaluated. A shift to more soybeans may be economically warranted, with perhaps a shift to a 50-50 corn-soybean rotation being appropriate in many areas of northern and central Illinois. Corn-after-corn now is projected to be much less profitable than soybeans-after-corn ([farmdoc daily, March 15, 2016](#)).

Planting decisions for 2016 can change from intentions, particularly if planting becomes delayed (see [April 18, 2016 farmdoc daily article](#) for a discussion). The Planting Decision Model, a Microsoft Excel spreadsheet, can be used to evaluate late planting. This spreadsheet is available for downloading from the [FAST section of farmdoc](#).

Not shifting away from corn to soybeans does have impacts in more than just commodity markets. Maintaining high corn acres reduces incentives for input suppliers to lower input prices. Corn costs are higher than soybean costs. For example, seed costs for corn average \$125 per acre compared to \$76 per acre for soybeans. Selling corn seed likely provides more margin to input supply firms than does selling soybean seed. Also, fertilizer costs are lower for soybeans because nitrogen is not needed for soybeans. Recent expectations of more corn acres may have led to recent increases in nitrogen fertilizer prices ([farmdoc daily, April 5, 2015](#)). A shift to soybeans would provide incentives for input firms to reduce corn costs to maintain corn acres.

### Summary

Current projections indicate that soybeans will be more profitable than corn. If these projections come true, soybean will be more profitable than corn in the last four years. If prices continue at current levels, rotation decisions may need to be evaluated. In particular, the economic advisability of planting corn-after-corn should be evaluated.

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