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Relationships of Soybean-to-Corn Price Ratios Between Projected and Harvest Periods

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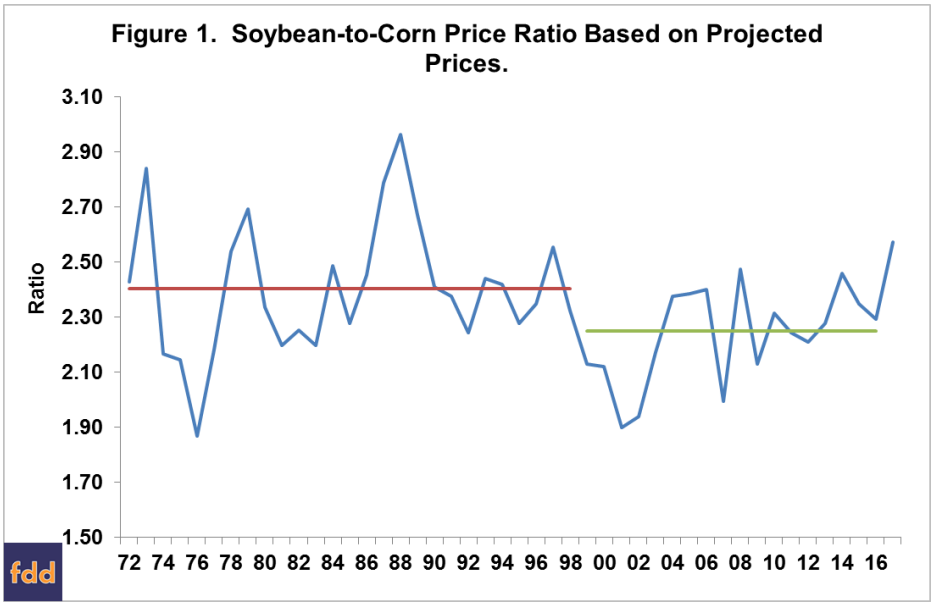
This year's projected prices for crop insurance are $3.96 per bushel for corn and $10.19 per bushel for soybeans, giving a soybean-to-corn price ratio of 2.57. The 2.57 ratio is high compared to similar ratios in previous years, indicating that soybeans are projected to have higher returns than corn. However, the soybean-to-corn price ratio calculated based on projected prices are not that predictive of the price ratio during the harvest period, suggesting price protection should be taken if switching acres to soybeans.

Soybean-to-Corn Price Ratios Over Time

The soybean-to-corn price ratio often is used to aid in quantifying relative returns between soybeans and corn. Higher price ratios indicate that soybeans are relatively more profitable than corn. For example, a $3.50 corn price and a 9.00 soybean price gives a 2.57 soybean-to-corn price ratio (2.57 = $9.00 / $3.50). An increase to a $9.50 soybean price while corn price stays the same causes soybean returns to increase relative to corn. An increase in the soybean price to $9.50 results in a 2.71 price ratio, higher than 2.57 based on a %$9.00 price.

In 2017, projected prices are $3.96 per bushel for corn and $10.19 per bushel for soybeans, giving a 2.57 soybean-to-corn price ratio. The 2017 price ratio is well above those of recent years (see Figure 1). Price ratios were 2.27 in 2013, 2.45 in 2014, 2.34 in 2014, and 2.29 in 2016 (see the Appendix Table 1 for historical projected and harvest prices). Between 1998 and 2017, the soybean-to-corn price ratio averaged 2.24. The 2017 price ratio of 2.57 is well above this 1998-2017 average. The last time the soybean-to-corn price ratio exceeded 2.57 was in 1989 when the soybean-to-corn price ratio was 2.67. (see *farmdoc daily*, March 20, 2014 for an earlier analysis of this issue).

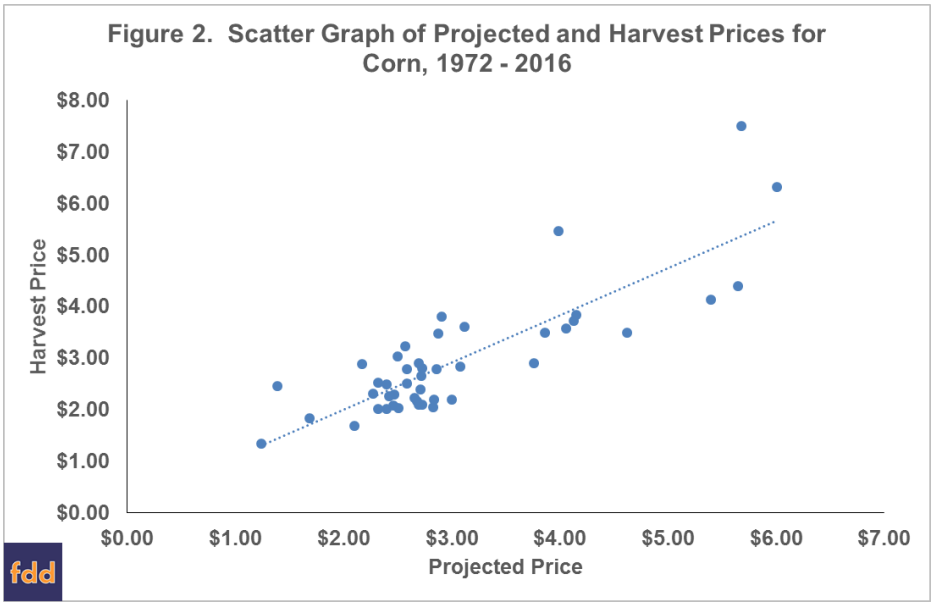
Overall, projected prices in 2017 point to soybeans being relatively more profitable than corn than has been the case in recent years.



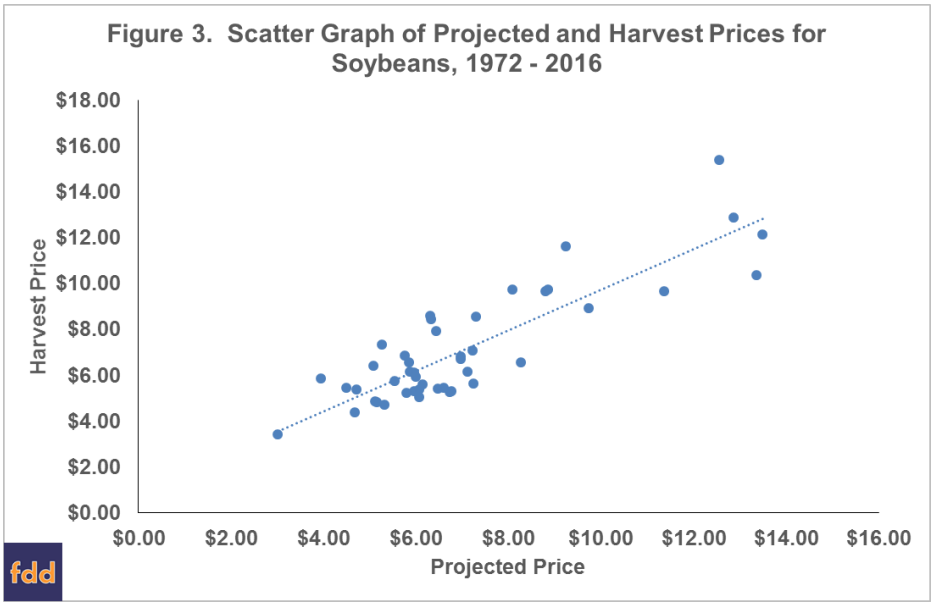
Projected Price Ratios as Predictors of Harvest Price Ratios

Projected prices are based on futures contracts. For the Midwest states, the corn projected price is based on the December contract of that year and the soybeans projected price is based on the November contract. Prices in well-functioning futures markets are some of the best predictors of futures prices on the same contract in the future. Hence, projected prices should be good indicators of harvest prices, which are based on settlement prices during October.

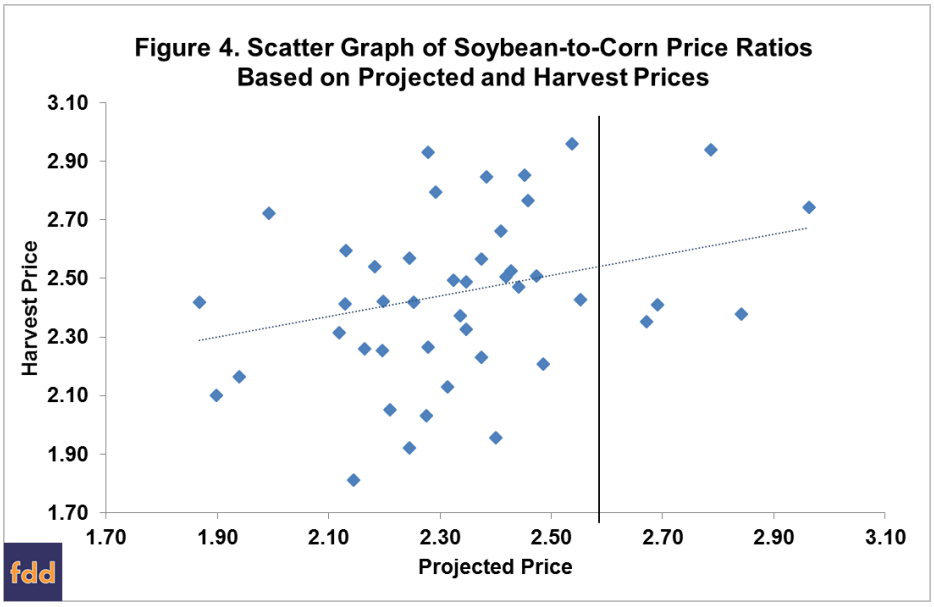
From 1972 to 2016, projected prices for corn averaged $3.04 per bushel while harvest prices averaged $2.95 per bushel, a difference of $.09 per bushel. A high degree of correlation exists between projected and harvest prices, as is depicted in the scatter graph in Figure 2. The correlation coefficient for the entire 1972-2016 period is .83. Prices increased after 2005 with the higher use of corn in the production of ethanol. Correlation coefficients still are high after dividing the entire period into sub-periods around 2005. The correlation coefficient from 1972 to 2005 is .52 and from 2006 to 2016 is .66.



Similar relationships exist for soybeans. From 1972 to 2016, projected prices averaged $7.04 and harvest prices average $7.12, a difference of only $.08 per bushel. Higher projected price typically indicated higher harvest prices (see Figure 3). The correlation for the 1972-2016 period is .86. Correlation coefficients for sub-periods are .50 for the 1972-2005 period and .73 for the 2006-2016 period.



One might expect a similarly strong relationship between price ratios, but for soybean-to-corn price ratios are much less pronounced (see Figure 4). Figure 4 shows a scatter graph of the price ratios based on the projected and harvest price. There is a positive relationship between prices ratios based on the projected price and ratios based on harvest prices. However, there is more variability than for the individual prices. For the 1972-2016 period, the correlation coefficient is .27.



To illustrate with an example, the solid line in Figure 4 is positioned at the 2.57 projected price ratio for 2017. There are five projected price ratios above 2.57 for the 1972-2016 period. Those five observations had an average price ratio based on the projected price of 2.79. Those five had an average price ratio based on the harvest period of 2.56. On average, there was a fall from the projected price ratio to the harvest price ratio.

Summary and Comments

For a variety of reasons, price ratios are much harder to predict than overall price levels. Market reactions, planting intentions, and differences in yield responses impact price ratios. This, in turn, will impact the relative profitability of corn and soybeans.

The high 2017 soybean-to-corn price ratio currently suggest that higher returns exist for soybeans than for corn. Historical analysis suggests that the high projected price ratio may not persist to harvest. Moreover, bid prices for 2017 fall delivery of soybeans have been at levels where planting soybeans

would produce a profit if yields are at or above average. Farmers who are switching acres to soybeans may wish to price or otherwise protect against soybean price falls that could occur.

References

Schnitkey, G. "Soybean-to-Corn Price Ratios in Spring and Fall." *farmdoc daily* (4):52, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, March 20, 2014.

Appendix Table 1. Projcted and Harvest Prices for Midwest States

	Corn		Soybeans		Soybean-to-Corn Price Ratio	
Year	Projected	Harvest	Projected	Harvest	Projected	Harvest
1972	1.24	1.35	3.01	3.41	2.43	2.53
1973	1.39	2.46	3.95	5.85	2.84	2.38
1974	2.91	3.80	6.30	8.59	2.16	2.26
1975	2.70	2.90	5.79	5.25	2.14	1.81
1976	2.72	2.65	5.08	6.41	1.87	2.42
1977	2.73	2.09	5.96	5.31	2.18	2.54
1978	2.27	2.31	5.76	6.84	2.54	2.96
1979	2.59	2.78	6.97	6.70	2.69	2.41
1980	3.12	3.61	7.29	8.57	2.34	2.37
1981	3.76	2.91	8.26	6.56	2.20	2.25
1982	3.00	2.20	6.76	5.32	2.25	2.42
1983	2.88	3.48	6.33	8.43	2.20	2.42
1984	2.86	2.78	7.11	6.14	2.49	2.21
1985	2.66	2.23	6.06	5.05	2.28	2.26
1986	2.10	1.69	5.15	4.82	2.45	2.85
1987	1.69	1.83	4.71	5.38	2.79	2.94
1988	2.17	2.89	6.43	7.93	2.96	2.74
1989	2.71	2.39	7.24	5.62	2.67	2.35
1990	2.47	2.30	5.95	6.12	2.41	2.66
1991	2.59	2.51	6.15	5.60	2.37	2.23
1992	2.70	2.09	6.06	5.37	2.24	2.57
1993	2.40	2.49	5.86	6.15	2.44	2.47
1994	2.68	2.16	6.48	5.41	2.42	2.50
1995	2.57	3.23	5.85	6.56	2.28	2.03
1996	3.08	2.84	7.23	7.07	2.35	2.49
1997	2.73	2.81	6.97	6.82	2.55	2.43
1998	2.84	2.19	6.60	5.46	2.32	2.49
1999	2.40	2.01	5.11	4.85	2.13	2.41
2000	2.51	2.04	5.32	4.72	2.12	2.31
2001	2.46	2.08	4.67	4.37	1.90	2.10
2002	2.32	2.52	4.50	5.45	1.94	2.16
2003	2.42	2.26	5.26	7.32	2.17	3.24
2004	2.83	2.05	6.72	5.26	2.37	2.57
2005	2.32	2.02	5.53	5.75	2.38	2.85
2006	2.50	3.03	6.00	5.93	2.40	1.96
2007	4.06	3.58	8.09	9.75	1.99	2.72
2008	5.40	4.13	13.36	10.36	2.47	2.51
2009	4.13	3.72	8.80	9.66	2.13	2.60
2010	3.99	5.46	9.23	11.63	2.31	2.13
2011	6.01	6.32	13.49	12.14	2.24	1.92
2012	5.68	7.50	12.55	15.39	2.21	2.05
2013	5.65	4.39	12.87	12.87	2.28	2.93
2014	4.62	3.49	11.36	9.65	2.46	2.77
2015	4.15	3.83	9.74	8.91	2.35	2.33
2016	3.86	3.49	8.85	9.75	2.29	2.79
2017	3.96		10.19		2.57	