



## A Narrowing of the Gap on Corn and Soybean Crop Revenue

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On average in Illinois, soybeans have been more profitable than corn since 2014 (*farmdoc daily*, [July 25, 2017](#)), an unusual situation given that Illinois is in the heart of the Corn Belt. Both costs and revenue from the two crops contribute to this situation. Costs increased more for corn than for soybeans from 2006 to 2013 (*farmdoc daily*, [February 16, 2016](#)), causing the need for corn to have more revenue than soybeans for corn to remain as profitable as soybeans. As discussed in this article, the difference between soybean and corn revenue have narrowed in recent years. While yields have played a role in this narrowing, relative prices changes between soybeans and corn explain much of the increase in relative soybean revenues since 2013.

### Data and Approach

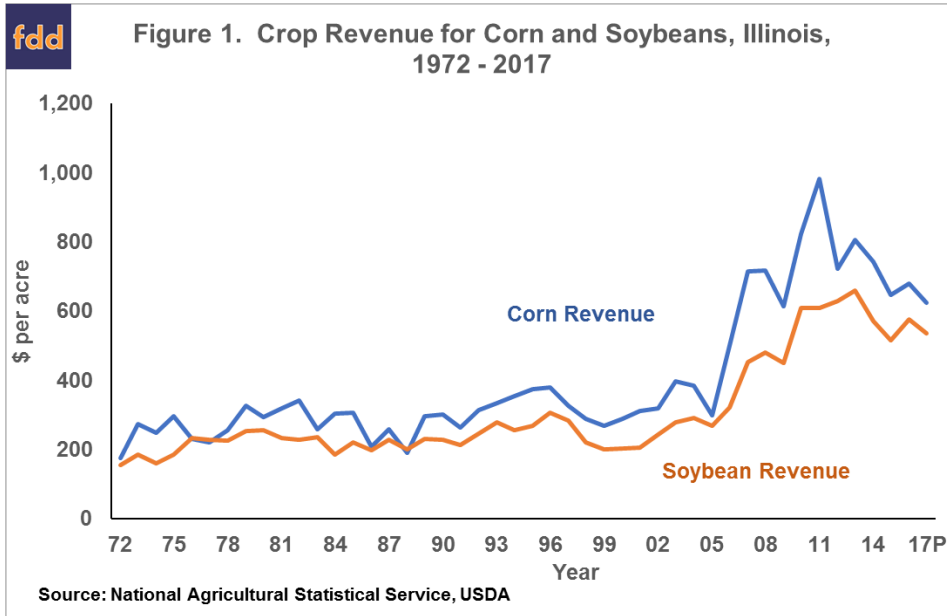
Corn and soybean crop revenues for the state of Illinois are compared over time using data from the National Agricultural Statistical Service (NASS). Two sets of data were obtained from the [QuickStat database](#):

- State yields for Illinois from the years from 1972 through 2017. The 2017 yield may change as NASS revises its yield estimates.
- Market year average prices for Illinois for the years from 1972 to 2016. Estimate of 2017 prices were made based on the midpoints of the national market year average price contained in the [October edition of the World Agricultural Supply and Demand Estimate \(WASDE\) report](#). Midpoints for national prices were \$3.20 per bushel for corn and \$9.20 per bushel for soybeans. Over the past five-years, prices in Illinois have averaged higher than U.S. prices. As a result, \$.05 per bushel was added to the U.S. corn price and \$.20 per bushel was added to the U.S. soybean price. The Illinois market year average price estimates then are \$3.25 per bushel for corn and \$9.40 per bushel for soybeans. As always this time of year, there is considerable uncertainty about market year average prices. In the end, actual 2017 prices could be substantially different than projections used here.

Yield and price data are shown in Appendix Table 1. For each crop, crop revenue was calculated by multiplying yield times price. Resulting corn and soybean revenue series are shown in Figure 1.

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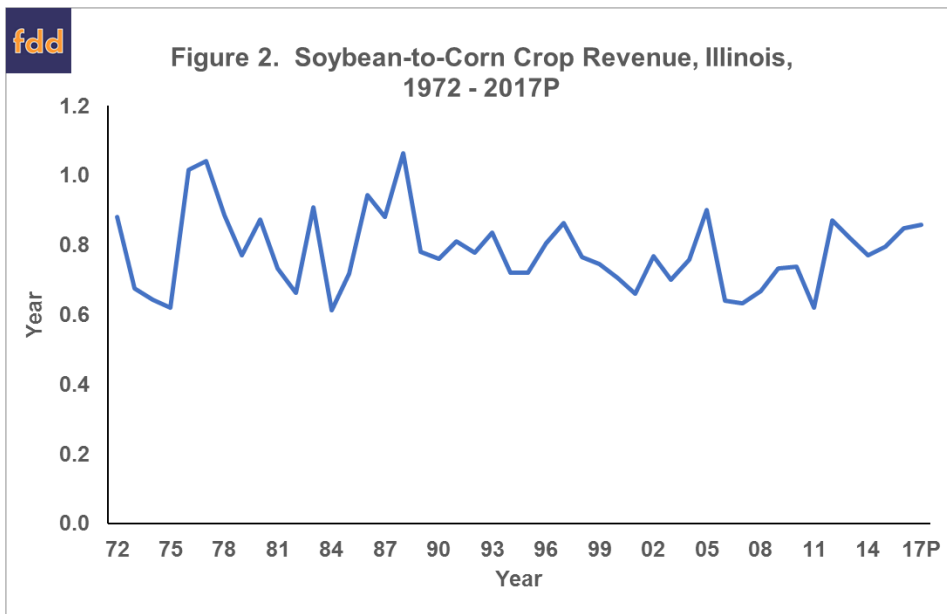
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### Relative Crop Revenue for Corn and Soybeans

As can be seen in Figure 1, both corn and soybean revenues exhibit slight increasing trends from 1972 to 2005. Revenue averaged \$300 per acre for corn and \$233 per acre for soybeans from 1972 to 2005. Then corn and soybean revenue increased due to commodity price increases in the mid-2000s. From 2006 to 2013, revenue averaged \$735 per acre for corn and \$526 per acre for soybeans. Since 2013, commodity prices have declined from 2006-2013 levels, resulting in less crop revenue. From 2014 to 2017, revenue averaged \$673 per acre for corn and \$550 per acre for soybeans

While corn and soybean prices have followed the same trends, the relationship between soybean and corn revenues have changed over time. Relative changes are illustrated in Figure 2, which shows soybean revenue divided by corn revenue, hereafter referred to as soybean-to-corn revenue. Variability exists in soybean-to-corn revenue, particularly from 1972 to 1999 (see Figure 2). While variable, soybean-to-corn revenue did not exhibit any trends from 1972 up to 1999, averaging .8. Then soybean revenue decreased relative to corn revenue. From 2000 to 2005, soybean-to-corn revenue was .75. During the high price period from 2006 to 2013, soybean-to-corn ratio averaged .72, almost .08 below the .80 average from 1972 to 1999. Since 2013, soybean revenues increased relative to corn revenues. Between 2014 and 2017, soybean-to-corn revenue averaged .82, much higher than then .72 average for the 2006 to 2013 period. The 2014-2017 ratio of .82 is roughly the same as from 1972 to 1990.



## Reasons for Higher Relative Soybean Revenue Relative to Corn Revenue

Either changed in relative yields or prices could have caused the higher soybean revenues relative to corn:

- Soybean-to-corn yield ratios equaling soybean yield to corn yield have averaged .30 from 2014 to 2017 (see Table 1). Over time this ratio came down, indicating that corn yields have increased relative to soybean yields. The soybean-to-corn yield ratio averaged .31 from 1972 to 1979, .32 from 1980 to 1989, .32 from 1990 to 1999, .29 from 2000 to 2005, and .30 from 2006 to 2012. The .3 ratio for the 2014-2017 period is lower than those averaged before 1999, but the same as that from 2006 to 2012.
- Soybean-to-corn price ratios equaling soybean price divided by corn price has averaged 2.74 from 2014 to 2017 (see Table 1). Previous soybean-to-corn price ratios averaged 2.60 from 1972 to 1979, 2.56 from 1980 to 1989, 2.48 from 1990 to 1999, 2.61 from 2000 to 2005, and 2.42 from 2006 to 2012. Of all the sub-periods since 1972, the higher ratio has occurred in the most recent years from 2014 to 2017. A higher ratio indicates that soybean prices are relatively higher than corn prices.

Overall, changes in relative prices have been more of a factor in higher soybean revenues since 2013.

**Table 1. Soybean-to-Corn Ratios for Yield, Price, and Crop Revenue, Illinois**

Period	Ratio of Soybean-to-Corn		
	Yield	Price	Revenue
1972 - 1979	0.31	2.60	0.82
1980 - 1989	0.32	2.56	0.82
1990 - 1999	0.32	2.48	0.78
2000 - 2005	0.29	2.61	0.75
2006 - 2013	0.30	2.42	0.72
2014 - 2017	0.30	2.74	0.82
1972 - 2017	0.31	2.55	0.78

<sup>1</sup> Equals soybean value divided by corn value.

Source: National Agricultural Statistical Service, USDA.

## Summary

In recent years, soybean revenues have been relatively higher than corn revenues. Relatively high soybean prices have contributed to this situation. Since soybean revenues increased relative to corn revenue, soybeans have been more profitable than corn. Soybeans likely will be more profitable to corn until soybean prices decline relative to corn prices.

## References

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**Appendix Table 1. Yield, Prices, and Crop Revenue for Corn and Soybeans in Illinois**

Year	Corn			Soybeans		
	Yield	MYA Price <sup>1</sup>	Crop Revenue	Yield	MYA Price <sup>1</sup>	Crop Revenue
	bu/acre	\$/bu	\$/acre	bu/acre	\$/bu	\$/acre
1972	110	1.59	175	35	4.47	154
1973	103	2.64	272	32	5.84	184
1974	82	3.02	248	25	6.49	159
1975	116	2.56	297	36	5.11	184
1976	107	2.14	229	33	7.05	233
1977	105	2.09	219	38	6.01	228
1978	111	2.30	255	34	6.75	226
1979	127	2.57	326	39	6.46	252
1980	93	3.14	292	34	7.62	255
1981	126	2.53	319	38	6.15	234
1982	131	2.61	342	39	5.89	227
1983	79	3.26	258	30	7.94	234
1984	114	2.66	303	32	5.90	186
1985	135	2.27	306	43	5.17	220
1986	135	1.54	208	40	4.91	196
1987	132	1.96	259	38	6.00	228
1988	73	2.59	189	27	7.45	201
1989	123	2.40	295	40	5.76	230
1990	127	2.36	300	39	5.85	228
1991	107	2.46	263	38	5.70	214
1992	149	2.11	314	43	5.69	245
1993	130	2.57	334	43	6.49	279
1994	156	2.27	354	46	5.61	255
1995	113	3.30	373	39	6.88	268
1996	136	2.79	379	41	7.55	306
1997	129	2.53	326	43	6.56	282
1998	141	2.04	288	44	5.01	220
1999	140	1.91	267	42	4.75	200

<sup>1</sup> Market Year Average Price

Source: National Agricultural Statistical Service, USDA.

**Appendix Table 1. Yield, Prices, and Crop Revenue for Corn and Soybeans in Illinois, cont.**

Year	Corn			Soybeans		
	Yield	MYA Price <sup>1</sup>	Crop Revenue	Yield	MYA Price <sup>1</sup>	Crop Revenue
2000	151	1.91	288	44	4.62	203
2001	152	2.04	310	45	4.55	205
2002	135	2.35	317	43	5.66	243
2003	164	2.42	397	37	7.51	278
2004	180	2.14	385	50	5.84	292
2005	143	2.08	297	47	5.76	268
2006	163	3.07	500	48	6.68	321
2007	175	4.09	716	44	10.40	452
2008	179	4.01	718	47	10.20	479
2009	174	3.53	614	46	9.80	451
2010	157	5.24	823	52	11.80	608
2011	157	6.25	981	48	12.80	608
2012	105	6.87	721	43	14.60	628
2013	178	4.52	805	50	13.20	660
2014	200	3.71	742	56	10.20	571
2015	175	3.69	646	56	9.19	515
2016	197	3.45	680	59	9.78	577
2017P	192	3.25	624	57	9.40	536

<sup>1</sup> Market Year Average Price

Source: National Agricultural Statistical Service, USDA.