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Department of Agricultural and Consumer Economics, University of Illinois Urbana-Champaign

Weekly Farm Economics: Expected Corn versus Soybean Returns in 2019

Gary Schnitkey

Department of Agricultural and Consumer Economics
University of Illinois

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Attention is beginning to focus on planting decisions of farmers in 2019, with some speculation that acres will shift from soybeans to corn (*farmdoc daily*, February 18, 2019). Even given declines in expected soybean prices, central Illinois budgets do not suggest that switching to more corn will result in higher profitability. If central Illinois budgets do not suggest a switch, budgets from other areas of the country are not likely to suggest switches to more corn either. Projected returns call into question assumptions of large switches of acres from soybeans to corn.

Changes between 2018 and 2019

Two factors have changed between the planning periods in 2018 and 2019. First, expected soybeans prices are lower in 2019 as compared to 2018. A reasonable way of forming expectations of cash prices at harvest is to use current bid prices for fall delivery of grain. In 2018, fall delivery prices for soybeans in the month of February averaged about $9.80 in East-Central Illinois. In 2019, fall delivery prices are roughly $.75 per bushel less at $9.05 (see Table 1). At the same time, fall delivery prices for corn are roughly the same at $3.70 per bushel. An $.75 decline in soybean price reduces expected soybean returns by $45 per acre given a soybean yield of 60 bushels per acre ($45 = .75 lower price x 60 bushels yield).

Table 1. Bid Prices for Fall Delivery of Grain in Februrary of the Year of Delivery, East Central Illinois

	Year					
	2014	2015	2016	2017	2018	2019P
	$ per bushel					
Corn	4.37	3.80	3.60	3.64	3.73	3.70
Soybeans	11.13	9.41	8.55	9.85	9.81	9.05

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Second, costs have increased, with a primary contributor being increases in nitrogen fertilizer prices. Throughout much of 2018, anhydrous ammonia prices were in the low $500 per ton range (see Table 2). So far in 2019, anhydrous ammonia prices have averaged $607 per ton in January and $613 in February (see Table 2). Fall applications of nitrogen were limited in 2018 due to wet soil conditions, leading many farmers to have to price nitrogen in 2019. These farmers likely will pay around $100 per ton more for anhydrous ammonia in 2019 as compared to 2018. If 220 pounds of anhydrous ammonia are applied per acre, leading to an application of 180 pounds of elemental N (180 = 220 pounds x .82 N analysis of anhydrous ammonia), nitrogen fertilizer costs would increase in 2019 over 2018 levels by $11 per acre ($100 price increase per ton x 220 pounds of anhydrous ammonia per acre / 2000 pounds per ton).

Table 2. Anhydrous Ammonia Prices in Illinois, Monthly Pirces from 2015 to 2019

	Year				
Month	2015	2016	2017	2018	2019
	$/acre				
January	729	576	488	492	607
February	730	563	509	501	613
March	732	578	526	518	
April	733	610	528	521	
May	732	606	518	522	
June	730	589	508	517	
July	730	567	495	517	
August	708	534	450	512	
September	664	502	402	500	
October	652	503	405	518	
November	653	506	407	525	
December	650	496	454	554	

Source: Agricultural Marketing Service, U.S. Department of Agriculture

The decrease in soybean price increases the relative profitability of corn. The increase in nitrogen fertilizer price decreases the relative profitability of corn, partially offsetting the impacts if the soybean price increase.

2019 Corn and Soybean Budgets

Table 3 shows 2019 corn and soybean budgets for high-productivity farmland in central Illinois (see *farmdoc* for 2019 Crop Budgets). These budgets incorporate price and cost changes between 2018 and 2019. Two notes about these budgets:

- Yields are 213 bushels per acre for corn-after-corn and 63 bushels per acre for soybeans-after-corn. These are trend yields. In recent years, yields in Illinois have been above trend. Corn yields averaged 20 bushels above trend from 2014 to 2018 (*farmdoc daily*, January 3, 2018) while soybean yields have averaged 6.5 bushels above trend (*farmdoc daily*, December 11, 2018).

- Prices used in budgets are $3.60 per bushel for corn and $8.50 per bushel for soybeans. The corn price is near fall delivery bids while the budgeted soybean price is about $.55 per bushel below the fall delivery bid. The lower budgeted soybean price reflects a general pessimism about soybean prices resulting from expected large supplies relative to demand (see *farmdoc daily*, January 28, 2019). This lower soybean price will decrease soybean profitability relative to corn, suggesting more of a shift to corn than a higher soybean price.

Table 3. 2019 Crop Budgets, Central Illinois -- High Productivity Farmland

	Corn-after-Soybeans	Corn-after-Corn	Soybeans-after-Corn	Soybeans-after-Two Years-Corn	Wheat	Double-Crop Soybeans
Yield per acre	213	203	63	65	85	41
Price per bu	$3.60	$3.60	$8.50	$8.50	$4.20	$8.50
Crop revenue	$767	$731	$536	$553	$357	$349
ARC/PLC	7	7	7	7	7	0
Crop insurance proceeds	0	0	0	0	0	0
Gross revenue	**$774**	**$738**	**$543**	**$560**	**$364**	**$349**
Fertilizers	$145	$155	$46	$46	$76	$28
Pesticides	75	81	45	45	27	40
Seed	114	114	73	73	50	48
Drying	18	17	1	1	1	0
Storage	15	15	8	8	1	1
Crop insurance	24	24	16	16	9	4
Total direct costs	**$391**	**$406**	**$189**	**$189**	**$164**	**$121**
Machine hire/lease	$13	$13	$14	$14	$18	$11
Utilities	5	5	4	4	7	5
Machine repair	24	24	20	20	33	25
Fuel and oil	17	17	15	15	20	22
Light vehicle	1	1	1	1	2	2
Mach. depreciation	63	63	54	54	49	27
Total power costs	**$123**	**$123**	**$108**	**$108**	**$129**	**$92**
Hired labor	$18	$18	$17	$17	$16	$14
Building repair and rent	5	5	4	4	3	6
Building depreciation	12	12	11	11	9	5
Insurance	10	10	10	10	5	0
Misc	9	9	9	9	10	0
Interest (non-land)	18	18	15	15	14	11
Total overhead costs	**$72**	**$72**	**$66**	**$66**	**$57**	**$36**
Total non-land costs	**$586**	**$601**	**$363**	**$363**	**$350**	**$249**
Operator and land return	**$188**	**$137**	**$180**	**$197**	**$14**	**$100**

Prepared by: Gary Schnitkey, University of Illinois, schnitke@illinois.edu, 217 244-9595.
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Operator and land returns are $188 per acre for corn and $180 per acre for soybeans, suggesting that corn will be more profitable than soybeans. However, this difference in profitability does not suggest a large shift in acres to corn. Most farms in central Illinois have a corn-soybean rotation, necessitating a move to corn-after-corn to grow more corn. Corn-after-corn returns are projected at $137 per acre, which are less than the $180 per acre soybean-after-corn return. These lower corn-after-corn returns suggest maintaining a corn-soybean rotation.

Other Budget Values

Operator and land returns shown in Table 3 were recalculated for two different scenarios. First, a $9.00 soybean price was used to calculate soybean returns. The $9.00 price is close to fall bids. Given that corn prices do not change, operator and land returns for corn remain the same as those shown in Table 3:

Corn-after-soybeans: $188 per acre, and

Corn-after-corn: $137 per acre,

while soybean returns increase to:

soybeans-after-corn: $211 per acre, and

Soybeans-after-two-years-corn: $229 per acre.

As would be expected, this price scenario increases soybean profitability relative to corn. Current forward bids do not suggest a shift to corn from a profitability standpoint.

The second scenario maintains the corn and soybean prices at $3.60 and $8.50, respectively, but increases corn yields by 20 bushels per acre and soybean yields by 6 bushels per acre. This scenario reflects a situation where budgets are more optimistic than trend yields due to high yields in recent years. In this case, operator and land returns are:

Corn-after-soybeans (233 bushels per acre): $260 per acre

Corn-after-corn (223 bushels per acre): $209 per acre

Soybeans-after-corn (69 bushels per acre): $231 per acre

Soybeans-after-two-years-corn (71 bushels per acre):$248 per acre

Higher yields increase returns and also increase the relative profitability of corn. However, corn-after-scorn is less profitable than soybeans-after-corn. These projections do not suggest that growing more corn would be more profitable than maintaining soybean acres given that both crops have above trend yields at 2013-2018 levels.

Summary and Conclusions

Current fall delivery prices do not suggest that switching to more corn away from soybeans will result in higher profitability on high-productivity farmland in central Illinois. Due to high relatively corn yields, central Illinois is one of the most profitable areas to grow corn relative to soybeans, If central Illinois budgets do not suggest a switch to corn, budgets in less productive areas likely will not suggest a shift from soybeans to corn.

YouTube Video: Discussion and graphs associated with this article: https://youtu.be/oyWHVTVW6eA

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