



Is There An Advantage To More Corn Acres in Your Rotation?

[Brandy M. Krapf](#), [Dwight D. Raab](#) and [Bradley L. Zwilling](#)

Illinois FBFM Association and Department of Agricultural and Consumer Economics
University of Illinois

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The Midwest is very oriented to the production of corn and soybeans. As the price of corn and soybeans vary and as the cost of inputs to produce those two crops vary, farmers construct budgets to estimate the revenue and expenses of those two crops as they compete against each other for acres in the Midwest. The competition for acres is driven by several things including agronomic factors and profitability.

Today's post will review not the estimated revenue and expenses for those two crops but the actual 1) yields, 2) crop returns, 3) selected costs, and 4) the residual management returns as the percentage of corn acres in a crop rotation increases as compared to a control group. This post uses data from a five-year span (2009-2013) from a group of central Illinois farms operating on higher productivity soils that are members of the Illinois Farm Business Farm Management Association. All revenue is attributed to the accrual method of accounting netted against the total economic expenses associated with the production of that revenue to arrive at accrual based management returns.

For each of the five years, the farms were sorted into one of five groups based on the percentage of acres devoted to corn production. Selected factors were then aggregated on a 'per operator acre' basis and compared to the unsorted average of a group of similar farms. The five groups are:

- 1) Over 75% Corn Acres
- 2) 66% to 75% Corn Acres
- 3) 56% to 65% Corn Acres
- 4) 46% to 55% Corn Acres
- 5) Less than 45% Corn Acres

The data in the tables illustrates the 'advantage' of each of the five percentile groups over the unsorted average. For example, in Table 1, the Over 75% group shows a two bushel per acre production advantage over the unsorted average. That same group shows a \$91.67 per acre revenue advantage. This group has a negative \$42.57 per acre fertility advantage...which means that the average fertility expense for this group was \$42.57 more than the unsorted average.

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The average percentage of acres devoted to corn production for the Over 75% group was 88% for 2013, 87% for 2012, 84.5% for 2011, 84.1% for 2010 and 86.3% for 2009. The percentage of corn acres for the unsorted group was 53.6% for 2013, 54.6% for 2012, 56.2% for 2011, 55% for 2010, and 58.1% for 2009.

The data in Table 1 for 2013 indicates that there was little if any yield advantage or disadvantage of a higher percentage of corn acres. Table 1 reveals that higher percentages of corn production leads to increased costs per acre for fertilizer, pesticides, and seed as represented by the increasing disadvantage of the higher corn percentages. Power and Equipment cost exhibited this same trend. For 2013, the data suggest that per acre revenue was higher at the higher percentages of corn acres but there was a greater cost to produce that revenue. The residual management return advantage was lowest for the highest percent corn acres and highest for the lowest percent corn acres.

Table 1. 2013 - Return and Cost Advantage By Percent Corn Acres

	>75%	66% 75%	56% 65%	46% 55%	< 45%
Yield Advantage (bu/a)	2	0	1	0	1
Crop Return Advantage	\$91.67	\$78.23	\$17.67	-\$24.41	-\$23.98
Fertility Cost Advantage	-\$42.57	-\$28.17	-\$9.72	\$9.21	\$13.48
Pesticide Cost Advantage	-\$15.11	-\$9.52	\$0.40	\$2.20	\$2.23
Seed Cost Advantage	-\$20.63	-\$8.72	-\$4.12	\$1.59	\$14.24
Power & Equip Cost Advantage	-\$12.79	-\$9.32	-\$0.64	\$0.50	\$1.66
Total Cost Advantage	-\$156.84	-\$106.74	-\$30.81	\$27.47	\$41.42
Management Return Advantage	-\$49.59	-\$18.63	-\$11.29	-\$0.51	\$18.64

Table 2 represents data from the dry spring, early planting and dry summer year of 2012. The Over 75% group shows the greatest accrual revenue advantage of the five years at \$125.83. The crop insurance harvest price of \$7.50 per bushel no doubt had an impact if one assumes that a revenue based crop insurance policy was in place. Even though the Total Cost for the Over 75% group showed the greatest disadvantage for the year, the management return advantage was the highest for the Over 75% group.

Table 2. 2012 - Return and Cost Advantage By Percent Corn Acres

	>75%	66% 75%	56% 65%	46% 55%	< 45%
Yield Advantage (bu/a)	-6	7	1	-2	8
Crop Rtn Advantage	\$125.83	\$60.91	\$25.43	-\$42.34	-\$6.31
Fertility Cost Advantage	-\$43.45	-\$22.80	-\$6.55	\$9.12	\$16.68
Pesticide Cost Advantage	-\$2.01	-\$3.13	-\$2.64	\$3.75	-\$6.96
Seed Cost Advantage	-\$21.01	\$1.94	-\$3.68	\$1.06	\$14.72
Power & Equip Cost Advantage	-\$13.02	-\$16.04	\$3.02	\$5.86	-\$4.40
Total Cost Advantage	-\$109.63	-\$78.01	-\$20.44	\$32.46	\$19.15
Management Return Advantage	\$13.96	-\$10.07	\$10.38	-\$13.44	\$11.91

2011 data (wet spring, warm summer and early onset of maturity) in Table 3 indicates no yield disadvantage at the higher corn percentage levels and a slight yield disadvantage at the lower corn percentage levels. Crop returns increase as the corn percentage increases as do fertilizer, pesticides, seed costs and power and equipment costs. The management return advantage decreases as the corn percentage increases with the exception of the 66% to 75% Group.

Data in Table 4 from 2010 (April planting and high temperatures during pollination) show the largest yield disadvantage to higher corn percentages of the five year period. The crop return advantages are much lower in 2010 than the other four years. The cost disadvantages for the two higher corn percentage groups are at lower levels than most of the other years.

Table 3. 2011 - Return and Cost Advantage By Percent Corn Acres

	>75%	66%-75%	56%-65%	46%-55%	< 45%
Yield Advantage (bu/a)	0	0	-2	3	-6
Crop Rtn Advantage	\$99.18	\$60.03	\$4.05	-\$33.02	-\$19.66
Fertility Cost Advantage	-\$47.72	-\$16.15	-\$5.28	\$11.78	\$16.71
Pesticide Cost Advantage	-\$6.51	\$0.16	-\$1.84	\$2.24	-\$2.66
Seed Cost Advantage	-\$24.55	-\$3.93	-\$2.44	\$3.11	\$16.09
Power & Equip Cost Advantage	-\$13.89	-\$7.60	\$1.05	\$3.41	-\$7.30
Total Cost Advantage	-\$145.19	-\$61.03	-\$14.65	\$38.19	\$107.69
Management Return Advantage	-\$45.39	\$12.36	-\$12.56	\$2.82	\$10.02

Table 4. 2010 - Return and Cost Advantage By Percent Corn Acres

	>75%	66%-75%	56%-65%	46%-55%	< 45%
Yield Advantage (bu/a)	-11	-5	0	4	2
Crop Rtn Advantage	-\$15.47	\$14.21	\$6.36	\$1.80	-\$28.98
Fertility Cost Advantage	-\$20.53	-\$15.07	-\$5.17	\$7.11	\$17.29
Pesticide Cost Advantage	-\$0.88	-\$2.80	-\$0.33	\$1.44	-\$2.53
Seed Cost Advantage	-\$21.12	-\$5.12	-\$1.57	\$3.57	\$8.65
Power & Equip Cost Advantage	-\$2.28	-\$14.17	-\$0.93	\$2.24	\$0.77
Total Cost Advantage	-\$61.67	-\$75.42	-\$21.89	\$27.20	\$196.37
Management Return Advantage	-\$62.40	-\$59.60	-\$12.91	\$26.90	\$1.50

Table 5. 2009 - Return and Cost Advantage By Percent Corn Acres

	>75%	66%-75%	56%-65%	46%-55%	< 45%
Yield Advantage (bu/a)	1	-6	2	1	1
Crop Rtn Advantage	\$41.61	\$19.66	\$8.54	-\$19.34	-\$43.93
Fertility Cost Advantage	-\$49.87	-\$5.00	-\$6.63	\$17.55	\$25.27
Pesticide Cost Advantage	-\$2.91	-\$0.40	\$0.35	\$0.76	\$1.19
Seed Cost Advantage	-\$15.84	-\$6.12	-\$0.30	\$5.33	\$5.14
Power & Equip Cost Advantage	\$0.04	-\$12.87	\$1.11	\$2.99	\$7.34
Total Cost Advantage	-\$102.68	-\$56.04	-\$2.76	\$39.23	\$184.76
Management Return Advantage	-\$63.36	-\$32.93	\$6.99	\$20.23	\$6.79

2009 conditions were wet spring, cool summer and a late/wet harvest. The crop return advantage at the higher levels of corn percentages was more muted than in the recent three years. The fertility, pesticide, and seed cost disadvantages all increase as the percent of acres devoted to corn increases. The power and equipment cost advantage decreases as corn acres increase with the exception of the Over 75% group. Management returns are generally lowest at the higher corn percentages.

Summary

Four of the five years data indicate that while there is an advantage to revenue that is associated with an increasing percentage of corn. The data also suggest that there is a cost (total economic cost) disadvantage that overcomes that accrual revenue advantage especially at the highest percentage of production devoted to corn.

Terms

Crop Returns – cash income adjusted for the change in inventory from beginning to end of year; includes accrual adjusted FSA and crop insurance income.

Management Returns – accrual net farm income less interest on equity capital and less an allowance for unpaid labor.

Operator Acres – the acres from which the farm operator derives revenue; a farm with 100 owned acres, 100 cash rented acres, and 100 50/50 crop share acres would have 250 operator acres.

Power and Equipment - include utilities, machinery repairs, machine hire and lease, fuel, and machinery depreciation (economic, not tax).

Unpaid Labor – is the number of months of unpaid labor times a monthly labor rate. This is to credit the family and operator for labor contributed to the operation.

Interest on Equity Capital – a non-land and land interest charge less accrued interest expense.

The authors would like to acknowledge that data used in this study comes from the local Farm Business Farm Management (FBFM) Associations across the State of Illinois. Without their cooperation, information as comprehensive and accurate as this would not be available for educational purposes. FBFM, which consists of 5,500 plus farmers and 60 professional field staff, is a not-for-profit organization available to all farm operators in Illinois. FBFM field staff provide on-farm counsel along with recordkeeping, farm financial management, business entity planning and income tax management. For more information, please contact the State FBFM Office located at the University of Illinois Department of Agricultural and Consumer Economics at 217-333-5511 or visit the FBFM website at www.fbfm.org.