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What is the Impact of Power and Equipment Costs on Illinois Grain Farms?

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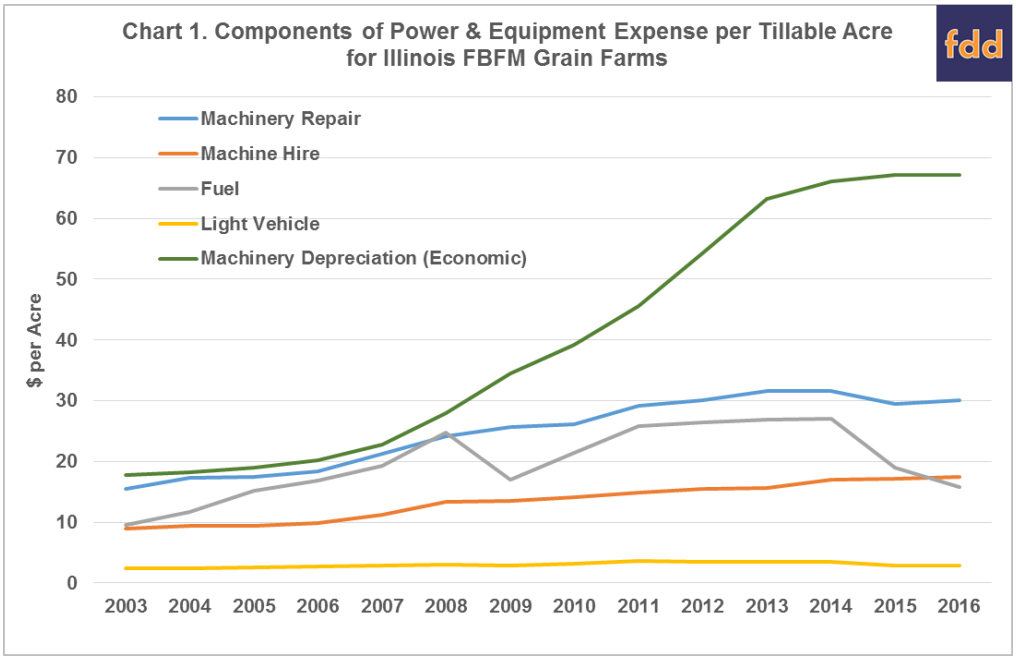
With tightening margins and lower crop prices, producers are looking for ways to cut costs. In this article, we will look at power and equipment costs components, how they vary by farm size and the impact on profitability. In 2004, Gary Schnitkey wrote a similar article called "Per Acre Machinery Costs and Values on Illinois Farms, 2003". We will look at some of the same items that were in that article, but with updated trends, charts and current year data.

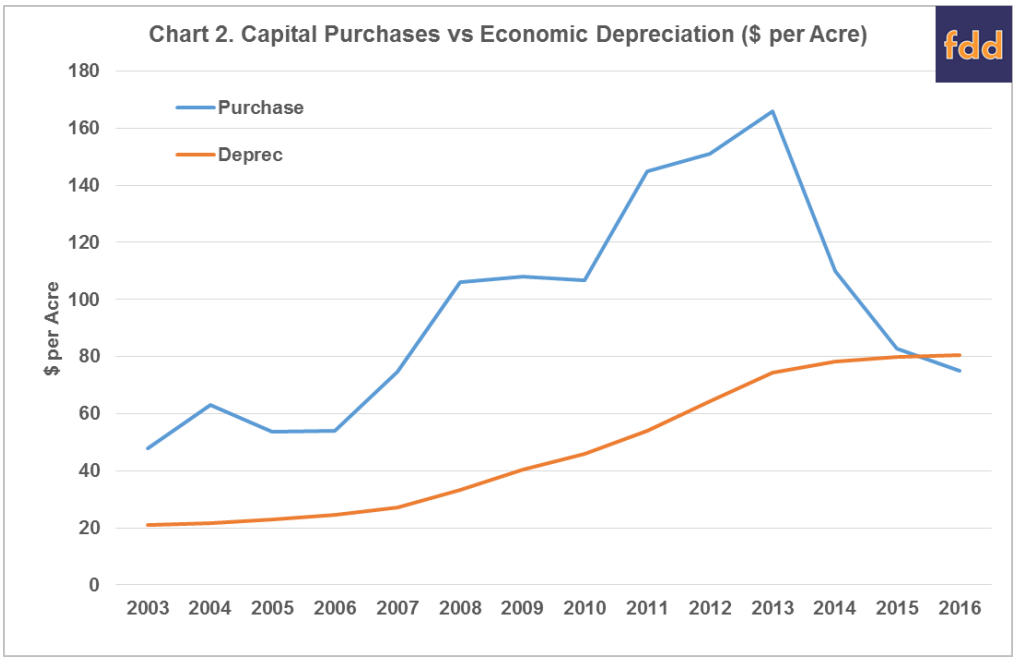
In 2003, FBFM changed depreciation methods. Before 2003, tax depreciation was used to determine machinery depreciation. Because tax law now allows large write-offs in the year of purchase, economic depreciation was adopted in 2003. Depreciation of most farm machinery is determined using a ten-year 125% declining balance with a salvage value of $0. Bonus depreciation or expense elections claimed for tax purposes are not included in economic depreciation.

Summaries of Illinois Farm Business Farm Management (FBFM) records indicate that power and equipment costs on Illinois grain farms average $139.66 per tillable acre in 2016. Power and equipment costs are composed of utilities ($6.79), machinery repairs ($28.24), machine hire and leases ($18.55), fuel and oil ($16.60), light vehicle ($2.00) and machinery economic depreciation ($67.48). This cost compares to 2007 when the total power and equipment cost per acre was $83.49. Chart 1 shows the breakout of the parts of power and equipment costs from 2003 to 2016 per tillable acre.

In Chart 1, we see that in 2008 economic machinery depreciation began to accelerate more than the other components of power and equipment costs. The acceleration was due to increased incomes as well as increased expense election limits for tax purposes. Farmers were purchasing equipment to utilize the expense election to have current tax deductions.

Chart 2 shows average capital purchases per acre for Illinois grain farms from 2003 to 2016 compared to total economic depreciation. Capital purchases began to increase in 2006 with the run-up in grain prices. This trend continued through 2013, and capital purchases have been decreasing since then. In 2016, capital purchases were less than the economic depreciation on a per acre basis.





Farm Size and Power Costs

Average power and equipment costs by farm size is displayed in Table 1. Power and equipment costs averaged higher for the smallest and the largest farm sizes. Average power and equipment costs do not show a trend for size categories in the middle ranges. In 2016, the lowest average power and equipment cost was $127 per acre for farms between 2,001 and 3,000 acres. The highest cost was $160 for farms with 500 or fewer acres. The second highest was $154 for farms with more than 5,000 acres.

Table 1. Power & Equipment Costs on Illinois FBFM Grain Farms

	Power & Equipment cost ($ per Acre)		
Tillable Acres	2007	2011	2016
500 or Less	$93	$140	$160
501 to 1,000	84	128	139
1,001 to 2,000	79	120	136
2,001 to 3,000	76	114	127
3,001 to 4,000	78	116	134
4,001 to 5,000	87	128	140
More than 5,000	114	130	154

Table 2 shows economic machinery depreciation as a percent of total power and equipment costs by farm size. As you can see, there is not much difference in the percent of economic machinery depreciation by farm size. However, the percent has increased on average about 10% every five years since 2007. The average economic depreciation as a percent of total power and equipment costs was 27% in 2007, 36% in 2011, and 48% in 2016.

Table 2. Economic Depreciation as a Percent of Power & Equipment Costs on Illinois FBFM Grain Farms

Tillable Acres	2007	2011	2016
500 or Less	24%	31%	42%
501 to 1,000	26%	36%	48%
1,001 to 2,000	30%	39%	50%
2,001 to 3,000	32%	40%	50%
3,001 to 4,000	29%	39%	51%
4,001 to 5,000	33%	34%	45%
More than 5,000	19%	37%	41%

Power Costs and Profitability

Lower power and equipment costs tend to lead to higher profitability. For this study, profitability is measured by per acre management returns. Management returns equal revenue minus economic expenses, with economic expenses including costs for unpaid labor and equity capital invested in the operation. Table 3 shows management returns by ranges of power and equipment cost from 2007 to 2016. In all but one category in 2008, management returns increased when power and equipment costs decreased.

Table 3. Management Returns for Range of Power & Equipment Costs on Illinois FBFM Grain Farms

Power & Equipment Costs	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
$75 and Less	201.66	205.84	64.88	197.33	270.34	277.98	102.39	64.59	-47.90	76.27
$76 to $100	159.89	176.02	19.62	170.82	238.57	244.78	71.16	40.42	-68.80	46.40
$101 to $125	127.26	139.62	-4.78	136.57	209.47	228.19	47.66	6.52	-94.36	1.10
$126 to $150	96.95	108.86	-28.03	103.64	190.36	204.71	20.22	-21.01	-126.29	-25.85
$151 to $175	56.14	75.42	-81.76	90.33	179.16	199.33	-9.46	-42.23	-163.64	-48.70
$176 to $200	12.21	47.70	-118.93	81.84	141.98	134.56	-49.52	-70.77	-174.64	-107.79
Greater than $200	-11.92	64.57	-162.22	24.25	127.08	112.14	-110.72	-148.12	-250.61	-170.43

In 2016, farms that had power and equipment costs of $75 and less per tillable acre averaged management returns of $76 per acre. As power and equipment costs increased, average management returns decreased. For power and equipment cost categories between $76 and $100 per acre, management returns were $46 per acre. For farms with power and equipment costs above $200 per acre, management returns averaged *a negative $170* per acre.

In general, a strong link exists between power and equipment costs and management returns. Farms that have lower power and equipment costs tend to have higher profits. Controlling costs, including power and equipment costs, is a key in increasing farm profitability.

Summary

Power and equipment costs on Illinois FBFM grain farms increased quickly during the run-up in grain prices in the mid-2000's. The main driver was economic machinery depreciation because of increased capital purchases. Even though capital purchases have decreased since 2013, economic machinery depreciation has and will continue to increase because of prior large amounts of capital purchases. There is a strong connection between power and equipment costs and profitability because as power and equipment costs decrease, profitability tends to increase. Therefore, power and equipment costs are worth looking into when trying to cut costs. However, in 2016, 48% of this cost was due to economic machinery depreciation, which will be slow to change thus large cuts will need to be made to the other components of power and equipment costs to make a more current impact on costs.

The author 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 with computerized 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.

Reference

Schnitkey, G. "Per Acre Machinery Costs and Values on Illinois Farms, 2003." FEFO 04-11, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, July 28, 2004.