A Percentage Breakdown of Farm Expenses by Category

Gregg Ibendahl

Introduction

Farming can be a very expensive business. In 2019, the average Kansas Farm Management Association (KFMA) farm had over a half million dollars in total farm expenses ($562,000). The purpose of this paper is to examine the allocation of those expense dollars by category to determine which of those categories are most costly to a farm on a percentage basis.

Procedure

This paper focus on the grain farms with useable farm records. Livestock farms were excluded because the majority of KFMA farms are gain farms and including livestock farms would add more categories of expenses that would not apply to most farms. For this analysis, the expenses are defined using the value of farm production (VFP) method of accrual accounting. VFP is gross farm revenue produced on the farm so by definition feed purchased is treated as a reduction in revenue rather than included as an expense.

The one major difference in the calculation of expenses on KFMA farms is the treatment of depreciation expenses. KFMA uses economic depreciation as opposed to accounting depreciation. The economic depreciation is itself a calculation instead of an exact measure of the yearly decline in asset value. The formulas used by KFMA though do depreciate the asset slower than tax depreciation and is their best estimate for describing how an asset decreases in value over time.

To estimate the percentage allocation of expenses by category, the entire expense category is summed across all farms and then compared to the total farm expenses of all farms. This approach weights each farm by its size as larger farms will have a larger amount spent on each specific expense item. An alternative approach would have been to calculate each farm individually and then average the percentages across farms. This unused approach would have weighted each farm the same.

The percentage of each expense category was calculated for each year from 1977 through 2019. The major categories used were: machinery, fertilizer, seed, herbicides, interest, labor, crop insurance, cash rent, and other. Other is just the remainder left over when subtracting the specified expenses from the total expenses. All the expense categories can be seen by examining one of theKFMA whole-farm analysis reports (www.agmanager.info/kfma/whole-farm-analysis/kfma-state-summaries).

Gregg Ibendahl email: ibendahl@ksu.edu twitter: @ibendahl

Points to keep in mind

Machinery includes depreciation, fuel, repairs, custom hire, and an interest charge. These sub-categories of machinery are shown in a second graph. Crop insurance was not a specific KFMA category until 1993. Cash rent is affected by two factors; the rental rate per acre and the number of cash rented acres. It is likely the percent of farm acres cash rented has increased over time. The interest expense is also affected by two factors; the amount of farm debt and the interest rate.

Results and discussion

Results of the percentage breakdown of expense items relative to all farm expenses is shown in Figure 1 and Table 1. Machinery is the largest expense item on most farms. The percentage has declined from 40 percent of all expenses to around 30 percent today. This shift likely represents a change toward no-till and more chemical weed control. Seed and herbicide expenses have grown the most as a percentage of total expenses. As noted, no-till, along with GMO technology, has changed how crops are produced. Seed expense has increased from 6 percent share to 13 percent. Herbicide expense has increased from a 4 percent share to a 13 percent share. Labor expense has stayed relatively constant at about a 4 to 5 percent share of total farm expenses. Interest expense has declined to about 5 percent of expenses today but that really reflects the current interest rate situation. The 15 percent share of expenses for interest in the early 1980s represents what would happen if we ever see double digit interest rates again.

Figure 2 and Table 2 take the machinery category and break out the major sub-categories of machinery. The economic depreciation shown is affected by both the amount of machinery on a farm and the age of that equipment. Because the depreciation expense is affected by the age of the equipment, there would be an expectation that higher depreciation (i.e., new equipment) should lead to lower repairs and maintenance. This is somewhat suggest by the data as the correlation between depreciation and repairs is -0.55.

An upcoming AgManger article will examine these expense categories in more detail.

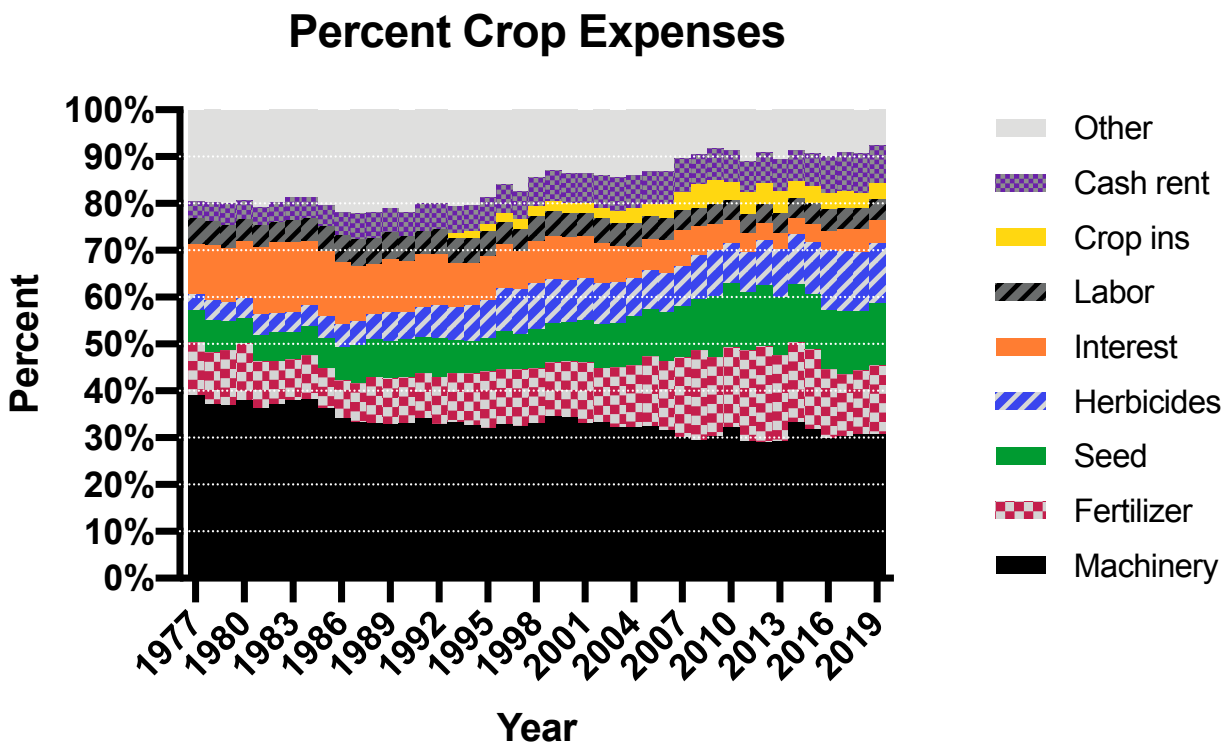

Figure 1. KFMA Farm Expenses as a Percentage of Total Expenses

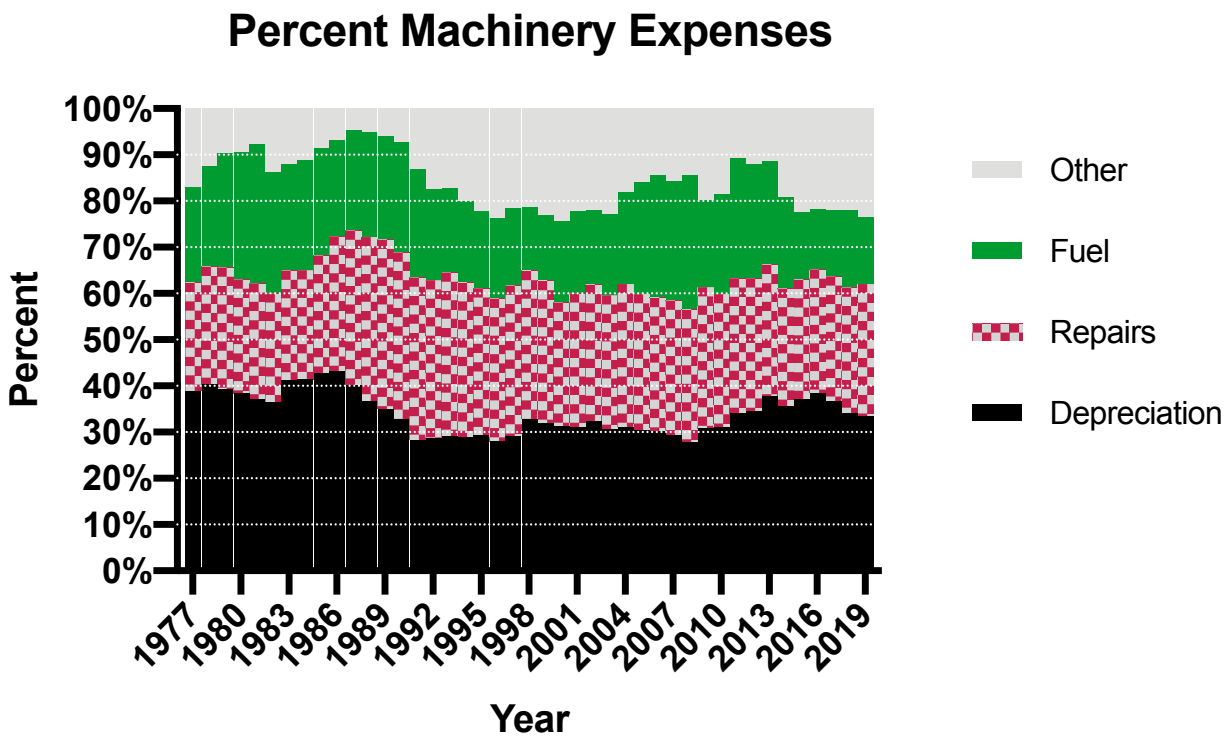

Figure 2. Components of Machinery Expenses as a Percent of Total Machinery Expense

Table 1. Table Version of Percent, Specific Farm Expenses

Year	Labor	Seed	Crop ins	Fertilizer	Herbicides	Interest	Cash rent	Machinery	Other
1977	5.3%	6.7%	0.0%	11.3%	3.5%	10.8%	3.8%	39.1%	19.5%
1978	5.2%	6.9%	0.0%	11.1%	4.2%	11.8%	4.1%	37.1%	19.7%
1979	4.8%	6.1%	0.0%	11.9%	4.1%	11.5%	4.7%	36.8%	20.0%
1980	4.5%	5.5%	0.0%	12.1%	4.2%	12.3%	4.2%	37.9%	19.3%
1981	4.5%	5.6%	0.0%	10.0%	4.5%	14.4%	3.9%	36.2%	20.9%
1982	4.3%	6.1%	0.0%	9.3%	4.0%	15.3%	4.3%	37.0%	19.7%
1983	4.7%	6.0%	0.0%	8.6%	4.1%	15.1%	4.9%	38.0%	18.6%
1984	4.7%	6.0%	0.0%	9.5%	4.5%	13.8%	4.7%	38.1%	18.6%
1985	5.2%	6.3%	0.0%	8.7%	4.6%	14.0%	4.6%	36.2%	20.4%
1986	5.7%	7.1%	0.0%	8.1%	4.9%	13.2%	5.0%	34.1%	21.9%
1987	5.8%	8.2%	0.0%	8.3%	5.0%	11.8%	5.4%	33.3%	22.2%
1988	5.6%	7.9%	0.0%	9.8%	5.3%	10.9%	5.4%	33.1%	22.0%
1989	5.6%	8.1%	0.0%	9.7%	6.1%	11.3%	5.3%	32.8%	21.0%
1990	5.2%	8.3%	0.0%	9.8%	5.7%	10.9%	5.2%	33.0%	21.9%
1991	5.0%	7.6%	0.0%	9.6%	6.3%	11.4%	6.0%	34.2%	20.0%
1992	5.2%	8.1%	0.0%	10.1%	7.2%	11.0%	5.5%	32.9%	20.1%
1993	5.2%	7.0%	1.1%	10.6%	7.0%	9.5%	5.8%	33.2%	20.5%
1994	5.2%	6.8%	1.6%	11.1%	7.8%	9.0%	5.6%	32.6%	20.4%
1995	5.2%	7.2%	1.6%	12.1%	8.0%	9.5%	5.7%	32.0%	18.7%
1996	4.6%	8.0%	2.1%	11.8%	9.2%	9.4%	6.0%	32.9%	16.1%
1997	4.8%	7.5%	2.2%	12.1%	9.5%	8.2%	5.9%	32.4%	17.4%
1998	5.2%	8.3%	2.3%	11.7%	9.7%	9.1%	6.0%	33.1%	14.5%
1999	5.3%	8.5%	2.1%	11.5%	9.2%	9.3%	6.6%	34.6%	13.0%
2000	5.0%	8.4%	2.2%	11.8%	9.0%	9.3%	6.4%	34.4%	13.6%
2001	4.8%	8.9%	2.3%	13.0%	8.9%	9.1%	6.3%	33.1%	13.5%
2002	5.1%	9.3%	2.3%	11.6%	8.7%	8.7%	6.8%	33.3%	14.1%
2003	4.9%	9.5%	2.7%	12.8%	8.6%	7.7%	7.1%	32.2%	14.5%
2004	5.1%	10.4%	3.2%	13.3%	8.2%	6.7%	7.0%	32.2%	13.9%
2005	4.8%	10.0%	2.8%	15.0%	8.3%	6.6%	7.0%	32.3%	13.1%
2006	4.7%	10.4%	2.9%	14.8%	8.1%	7.2%	7.0%	31.7%	13.2%
2007	4.3%	10.9%	3.9%	17.1%	8.7%	7.6%	7.2%	30.0%	10.5%
2008	4.0%	10.8%	5.0%	19.3%	9.5%	6.1%	6.3%	29.4%	9.6%
2009	4.3%	12.9%	5.1%	16.9%	9.8%	5.7%	6.7%	30.4%	8.3%
2010	4.3%	13.7%	3.9%	17.1%	8.5%	4.9%	6.8%	32.1%	8.7%
2011	4.0%	12.5%	4.8%	19.3%	8.4%	4.2%	6.4%	29.3%	11.1%
2012	3.9%	13.1%	4.4%	20.4%	9.7%	3.7%	6.6%	29.0%	9.1%
2013	4.2%	12.4%	4.7%	18.3%	10.2%	3.5%	6.8%	29.3%	10.6%
2014	4.2%	12.5%	3.6%	17.1%	10.5%	3.6%	6.7%	33.2%	8.6%
2015	4.4%	11.7%	3.6%	17.1%	11.2%	3.8%	7.1%	31.7%	9.3%
2016	4.6%	12.5%	3.6%	14.9%	12.8%	4.1%	7.8%	29.8%	9.8%
2017	4.6%	13.4%	3.5%	13.4%	12.9%	4.6%	8.4%	30.2%	9.0%
2018	4.4%	12.6%	3.3%	13.6%	12.5%	5.0%	8.4%	30.7%	9.4%
2019	4.3%	13.3%	3.5%	14.8%	12.7%	5.1%	8.0%	30.6%	7.6%

Table 2. Table Version of Percent, Specific Machinery Expenses

Year	Depreciation	Fuel	Repairs	Other
1977	39.0%	20.6%	23.3%	17.2%
1978	40.3%	21.8%	25.5%	12.4%
1979	39.4%	24.8%	26.2%	9.6%
1980	38.3%	27.6%	24.7%	9.3%
1981	37.2%	30.0%	25.0%	7.8%
1982	36.5%	26.2%	23.5%	13.7%
1983	41.2%	23.1%	23.7%	12.0%
1984	41.4%	23.7%	23.7%	11.2%
1985	42.9%	23.1%	25.3%	8.6%
1986	43.3%	20.8%	29.1%	6.9%
1987	40.1%	21.7%	33.5%	4.7%
1988	36.6%	22.5%	35.7%	5.2%
1989	35.1%	22.3%	36.6%	6.0%
1990	32.8%	23.9%	36.1%	7.2%
1991	28.4%	23.5%	35.0%	13.1%
1992	28.8%	19.6%	34.0%	17.5%
1993	29.1%	18.3%	35.4%	17.2%
1994	28.9%	17.6%	33.4%	20.2%
1995	29.4%	16.7%	31.7%	22.2%
1996	28.0%	17.3%	30.9%	23.8%
1997	29.1%	16.7%	32.6%	21.6%
1998	32.8%	13.8%	32.0%	21.4%
1999	31.9%	14.1%	30.8%	23.2%
2000	31.2%	17.7%	26.8%	24.3%
2001	31.1%	17.7%	29.0%	22.2%
2002	32.4%	16.0%	29.5%	22.1%
2003	30.6%	17.4%	29.0%	22.9%
2004	31.1%	19.9%	30.9%	18.1%
2005	30.4%	24.2%	29.5%	15.9%
2006	30.3%	26.4%	28.8%	14.5%
2007	29.4%	25.9%	29.1%	15.6%
2008	27.8%	29.2%	28.6%	14.3%
2009	30.9%	18.8%	30.5%	19.8%
2010	31.2%	21.6%	28.7%	18.6%
2011	34.1%	25.9%	29.2%	10.8%
2012	34.7%	24.7%	28.6%	12.0%
2013	37.8%	22.3%	28.4%	11.5%
2014	35.5%	19.8%	25.5%	19.2%
2015	37.0%	14.6%	26.0%	22.4%
2016	38.6%	13.2%	26.6%	21.7%
2017	36.7%	14.4%	27.0%	21.9%
2018	34.1%	16.9%	27.2%	21.9%
2019	33.6%	14.4%	28.5%	23.5%