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## Profitability and Farm Size on Grain Farms in Illinois

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The effect of farm size on profitability is an issue continually analyzed and debated by agricultural economists. Profitability is impacted by a number of factors, many of which are controlled to some extent by the management decisions of the farm operator. In general, we tend to think there may be increasing returns to scale for grain farms, or that some normalized measure of profitability (i.e. net farm income per acre) may be enhanced by expanding the scale of the operation.

Larger farms may have individual fields spread out over a larger geographical area, providing some level of diversification against weather risk which may affect crop yields. Furthermore, larger farms may be able to more efficiently use larger equipment complements or obtain discounts by buying larger volumes of inputs resulting in lower capital and/or variable input costs per acre.

However, size can also introduce challenges. As the scale of the operation grows, the amount of management time required by the operator also increases. The number of management decisions which must be made regarding marketing, inputs, and the timing of field operations expand with each additional acre or farm added to the operation. Furthermore, decisions regarding the financing of expansion – through land leases or purchase – will also have both short- and long-term impacts on farm profitability.

To analyze the effect of farm size on the profitability of grain farms in Illinois, we used data from Illinois Farm Business Farm Management (FBFM) over three different time periods (see Table 1).<sup>1</sup> The first time period is 1998 to 2002, and was chosen to represent a three-year period of relatively low farm income levels due to low commodity prices. Net farm income averaged \$65 per acre across all grain farms in the sample, with corn prices averaging just under \$2/bu and soybean prices averaging just under \$5/bu. This second time period is one of moderate farm profits with an average net farm income of \$95/acre from 2002 to 2004. Over this period, corn prices ranged from \$2.14/bu to \$2.42/bu and soybean prices ranged from \$5.61/bu to \$7.51/bu. The final time period is from 2007 to 2009, and represents a three-year period of relatively high farm incomes averaging \$236/acre, corn prices ranging from \$3.53/bu to \$4.09/bu, and soybean prices ranging from \$9.80/bu to \$10.40/bu.

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**Table 1. Average Net Farm Incomes for IL Grain Farms: 1998-2002, 2002-2004, and 2007-2009**

	1998-2002	2002-2004	2007-2009
Net Farm Income	\$65/acre	\$95/acre	\$236/acre
Corn Price Range	\$1.91 to \$2.04	\$2.14-\$2.42	\$3.53 to \$4.09
Soybean Price Range	\$4.62 to \$5.01	\$5.61 to \$7.51	\$9.80 to \$10.40
Number of Farms	232	355	486

Table 2 reports average net farm income for each of the three time periods broken down by farm size. During the period of low profitability (1998-2002), operations with between 500 and 1,500 acres earned an average net farm income of \$67 to \$68 per acre, or more than \$10 per acre more than farms with less than 500 acres. Larger farms, operating more than 1,500 acres, also had higher average net farm income than smaller farms but the difference was only \$4 per acre.

During the period of moderate profitability (2002-2004), operations with up to 1,500 acres reported similar net farm income numbers averaging \$96 to \$97 per acre. Larger operations with more than 1,500 acres reported slightly lower net farm incomes with an average of \$88/acre.

**Table 2. Average Net Farm Incomes for IL Grain Farms by Farm Size**

	< 500 acres	500 to 1000 acres	1000 to 1500 acres	> 1500 acres
1998-2002	\$56/acre	\$68/acre	\$67/acre	\$60/acre
2002-2004	\$96/acre	\$97/acre	\$96/acre	\$88/acre
2007-2009	\$246/acre	\$241/acre	\$241/acre	\$219/acre

From 2007 to 2009, the period of relatively large farm profits and high incomes, the highest average net farm income was reported for farms with less than 500 acres at \$246/acre. Farms ranging in size from 500 to 1,500 acres reported slightly lower but similar average net farm incomes of \$241/acre. The lowest income was for the largest farms with more than 1,500 acres at an average net farm income of \$219.

These summaries indicate that profit does vary with farm size, but the direction of that relationship may vary with the economic characteristics of the time period analyzed. In periods of poor to moderate profitability driven by low to moderate commodity prices, operations with more than 500 acres tended to be more profitable than farms with less than 500 acres. However, during the more recent time period of higher prices and larger farm incomes, smaller farms with less than 500 acres reported slightly larger incomes than larger operations.

<sup>1</sup> *The data used for this analysis was provided by Illinois Farm Business Farm Management and included approximately 350 grain farms per time period. A grain farm was defined to be an operation with more than 90% of total acreage planted to corn and soybeans and less than 40% of the grain produced fed directly to livestock. Additionally, farms generating more than 10% of their total gross revenue through custom farming or livestock enterprises were not included.?*