Determinants of Farm Size and Structure

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FACTORS WE OBSERVE ON SUCCESSFUL MIDWEST FARMS TODAY*

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Addressing the title proposed for this paper is a formidable task. In doing so, one feels somewhat like the proverbial blind man attempting to describe an elephant, when he can only touch one of the animal's legs. In approaching this task, I have explicitly chosen not to attempt to conduct a complete review of either management research results or methods of conducting such research. Instead, this paper will focus on implications available from a number of projects utilizing the Farm Business Farm Management (FBFM) data base available at the University of Illinois. Doing this restricts the research approach considered to be primarily positive rather than normative. Further, results for Illinois farms clearly are not necessarily transferable to the entire Midwest. The issues raised by reviewing the results of these studies, however, are transferable to states and types of agriculture beyond the boundaries of Illinois.

The three major components to the paper are:

(a) Consideration of the concept of management success and associated implications for the types of analysis we can perform;

(b) Review of ongoing analyses of the factors driving differential performance (with respect to annual profitability); and

(c) Suggestion of a number of means to extend and enhance research efforts focused on farm firm management.

As will become evident shortly, this paper will draw upon empirical analyses that utilize the input of several faculty, staff, and students at the University of Illinois. The cooperation of these individuals in providing, in some cases, yet to be published data and, more importantly, in helping to shape the thoughts that are expressed here are gratefully acknowledged.

A Positive Side Effect of the Farm Financial Crisis

The 1980s have been extremely difficult for American farmers. Although a time of intense trauma for many farm producers and their families, this experience has vividly demonstrated the need for effective financial management on farm firms. To conduct such analyses, however, farm decision makers need financially-based comparison data which previously has been lacking in the sector. As a result of the sector's experience over the last few years, we are seeing the development of mechanisms to provide additional financially-related comparison data.

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For example, balance sheet data is now being compiled as part of the FBFM summarized data base. Table 1 presents the dispersion of earnings within a sample of almost 800 Illinois producers who provided balance sheets in 1986 (Ellinger, et.al; Ellinger). The data of Table 1 vividly document that wide extremes in performance can occur among a group of relatively similar producers. Within this group, slightly more than a third of the farm operations earned rates of returns which fell below 2 percent. However, almost an identical number of operations had earnings of 6 percent or more. Approximately half of that latter group had earnings in excess of 10 percent.

Table 1.

Range of Rates of Return on Assets* for 796 Illinois Farms in 1986 (Ellinger, et al.)

Rate of Return on Assets	Percent of farms in Category
(2%) -- 2%	34.2
2% -- 6%	31.2
6% -- 10%	17.3
> 10%	17.2

* Rate of return on assets is calculated as net farm income before interest and taxes, less unpaid labor charge for operator and family, divided by total ending assets.

Although such data are interesting and have many valuable applications, presentation in this form does not address this paper's central question. That question relates to identifying the factors that cause the differential performance documented in Table 1. Therefore, even though it is quite likely that additional farm firm financial data will be available in the future, simply having that information will not mean that our understanding of managerial performance will be improved.

Alternative Views of Success

It is, of course, essential that we understand what the concept of success means, if we are to consider research needs to identify the factors leading to success. And success, as with most important concepts, can be viewed in several ways. For example, consider the following five alternative views of success:

(a) Achieving personal goals;
(b) Firm survival;
(c) Firm growth;
(d) Accumulating wealth; and
(e) Annual profitability.

Management texts stress that achieving goals is central to a firm's mission (Boehlje and Eidman). And when advising individual producers, an essential step must be to identify goals and objectives. But, in agricultural economics, most positive research efforts examine data from a large number of operations. It is unlikely that accurate data relating to individual goals will be available within such data sets. Therefore, even though conceptually desirable, much of our positive research will not be focused on achievement of complex personal goals. (It should be noted that the case study method does provide an opportunity to include achievement of goals within analyses of managerial performance. This approach deserves further consideration as a research technique within agricultural economics (King and Sonka).

Simply surviving is a measure of success that is often given too little credit by academics. Recently a visit to east-central Iowa, where I grew up on my family's farm, reinforced that lesson to me. While examining a map of the township in which my family's farm resided, I was struck by the number of farmsteads that were no longer associated with farming activities. In fact, a non-scientific "analysis" with family members suggested that less than half of the farmsteads with independent operations in the 1950s now have separate farming operations. Of course, more concrete data on farm numbers reinforce this result and suggest even stronger erosion of farm numbers in some other regions.

Consideration of survival as a measure of success suggests two alternative research themes. One theme would focus on the actions of the individual producer, in the context of the life cycle of the farm firm. This effort would consider the implicit goal of being able to be a farmer throughout one's adult working life and would identify those factors offering the greatest chance of that result. A second theme, however, would conceptualize the farm firm as a business entity and focus on those factors that gave the firm the opportunity to exist beyond a single individual's working career. Interestingly, we might hypothesize that successful strategies would differ between the two contexts just suggested. Both are tantalizing areas of investigation for which relatively little empirical research is available.

Growth is a commonly used indicator of success in the nonfarm sector. And clearly growth may be closely intertwined with the issue of survival just discussed. Change in average farm size is a variable that has great political interest and, therefore, is an attribute that has been studied extensively. Although much is known about historic patterns of farm size change, relatively little is known about the causal forces driving that change. One reason for this latter deficiency is that most analyses of this issue have been done at regional and national scales, using aggregate data sources.

Recently Garcia, et. al. undertook an analysis of farm size growth for a sample of 161 cash-grain farms over the period, 1976-85. One goal of this effort was to replicate aggregate level analyses and more carefully examine procedures commonly used therein. In that regard, the study was able to document that the measure of size employed could influence significantly the resulting implications for future farm size change. Using the same quantitative technique, for example, differing implications for the future of moderate sized operations were obtained when acreage rather than gross sales was used as the measure of the size of the firm. The effort's second goal was to document causes for differing rates of farm size growth within this sample. For the group of farms studied, factors such as participation in government farm programs, management returns per acre, and managerial intensity were shown to differentially influence growth. Being limited to economic variables routinely collected by farm record systems, however, the study's overall success in this goal was marginal at best. As noted by the investigators, "...growth was influenced by a myriad of factors, some of which are not easily identifiable" (p. 476).

Accumulation of wealth is a success measure that must be interrelated with survival and growth, but probably in complex ways. Long-term longitudinal studies are needed for an investigation of the wealth accumulation process. Such studies are not common for farm firms and are likely to become more difficult to pursue in the future. As farm operators increasingly become part of their regional and national economy, diversification outside of farming will continue to expand. Therefore, "suboptimal" farm investment patterns may be due to differing personal financial portfolios rather than to inferior management decisions. Separating those causes is a challenging but difficult opportunity.

The fifth success measure noted above is annual profitability. Considerable analysis has been done that compares performance of differing types of operations from year-to-year. Although helpful, the variability of climatic and economic forces diminishes the capability of such studies to identify managerial factors leading to greater performance. Over the last five years, a number of researchers at the University of Illinois have begun to evaluate managerial performance over longer time periods. Here the key is the capacity to track individual operations over multiple annual operating cycles and, hopefully, be able to identify patterns of successful behavior. Although an ongoing process, a number of intriguing implications have been suggested to date.

These efforts will form the background for the remainder of this paper. Doing so does not diminish the importance of considering other measures of success, as noted in the preceding discussion. However, consideration of the factors driving differential levels of annual farm profitability is a concern of heightened awareness in agriculture because of our recent economic circumstances. And, as will be noted in the following discussion, understanding income-related performance is itself a complex task worthy of additional investigation by agricultural economists.

Measuring Annual Profitability

Even after limiting the discussion to that of annual profitability, selecting the specific measure of financial performance may not be an unimportant task. Because farm income tax liabilities are generally computed on a cash basis, use of accrual income measures has been slow within agriculture. This is unfortunate as recent research has shown the dangers of misinterpreting performance when using only cash income measures (Lins, et.al.).

Within the accrual income concept, however, there are numerous alternative measures that can be defined as indicators of income performance. A logical question is whether such indicators give consistent messages about successful management. Figure 1 describes the correlation between five alternative measures of profitability in terms of ranking 161 farms based on 10 years of performance data (Thorpe). (Each of these indicators is computed on a per acre basis.) The figure indicates, for example, that the ranking of these farms based on value of farm production has a 0.41 correlation with the ranking based on net farm income.

Figure 1.

Correlation of Five Alternative Measures of Profitability Based on Average Performance of 161 Illinois Farm Firms From 1976-85 (Thorpe)

	VFP	NFI	ADJ NFI BI	ADJ NFI	MGT. RETURNS
VFP	1.00	.41	.62	.40	(.12)
NFI		1.00	.77	.93	.48
ADJ NFI BI			1.00	.83	.49
ADJ NFI				1.00	.56
MGT RETURNS					1.00

VFP is value of farm production.

NFI is VFP less total operating expenses and depreciation plus (minus) gain (loss) on machinery and buildings sold.

ADJ NFI BI is NFI before interest paid less unpaid labor charge for operator and family labor.

ADJ NFI is ADJ NFI BI less interest paid.

MGT RETURNS is ADJ NFI less an imputed charge for equity capital.

(All measures are on a per acre basis.)

As one moves from left to right across the columns, it is interesting to note that the indicators move FROM those that are more readily observable TO those that are more conceptually correct. The first row of Figure 1 suggests a relatively low correlation between value of farm production and the other measures. Clearly, just observing revenues is not a good proxy for profitability, at least for this sample. The indicators in the three middle columns, all alternative measures of net income, appear to group together fairly well. Management returns, where all factors of production have been assigned an economic cost, does not track particularly well with the other measures.

The numbers noted in Figure 1 are interesting but are only a small part of the complete set of measures that are available. Differing denominators, using value of assets or of equity, for

example, could be considered. Further, use of ratio measures is, itself, a source of bias because the producer also is interested in absolute earning levels both as a measure of well-being and of managerial capacity.

The important implication of Figure 1 is not that any one of those five measures is necessarily superior. Rather these results remind us of the need to recognize that the choice of income measure is a key decision variable in the research process. Ideally, we would consider several measures of success, not just one, in attempting to identify factors that affect farm operator success. If that is not possible, then we need to remind ourselves, and the users of our research results, that factors we identify as affecting a specific measure of success may not be robust for alternative measures.

Single Factor Identification of Performance

Although academics seem to prefer complexity in analyzing an issue, decision makers would prefer simple rather than complex answers. Therefore, we need to examine actual performance data to determine if one, or a few, key management strategies dominate in determining performance. (Academics also prefer simple answers when the questions are real to them, i.e., for questions such as, "What does it take to get promoted?" or "How can I get this project funded?" It's when we evaluate other people's problems that we tend to demand more elegant and complex answers.)

Professor D.A. Lins of the University of Illinois has recently compiled an intriguing chart that relates net farm income to the ratio of the farm's interest payments to its value of farm production. This relationship, for a large sample of Illinois farms, is displayed in Figure 2. As depicted there, a strong and negative relationship is shown between these two variables. For the four years considered, the ratio range between .20 and .30 was the level at which net income consistently became negative. In terms of averages for this large sample, exceeding an interest to value of farm production ratio of .30 was a tactic that strongly suggested a negative net farm income.

Being comprised of averages, however, such an analysis fails to answer a number of questions. Analysis of individual farms within this data set would find numerous exceptions to the average relationship. Farms with low or zero interest payments can be found that have negative or low net incomes. Conversely, farms with interest percentages at levels above the 0.25 level can be found that also have positive net income. Therefore, even though examination of Figure 2 reveals an interesting general message, it is unlikely to be universally true.

Other simple performance factors are not likely to provide such strong relationships. A recent analysis considered the relationship between expenditures for fertilizer and managerial success (Sonka). Figure 3 presents the management returns per acre for 161 farms over the years 1976-85. (Here the 161 farms were simply subdivided by whether expenses and returns are above or below average.) The top number in the northwest cell of the matrix indicates that management returns averaged $19/acre for farms with above average management returns and above average fertilizer expenditures. The bottom number in that cell indicates that there were 31 farms in that category.

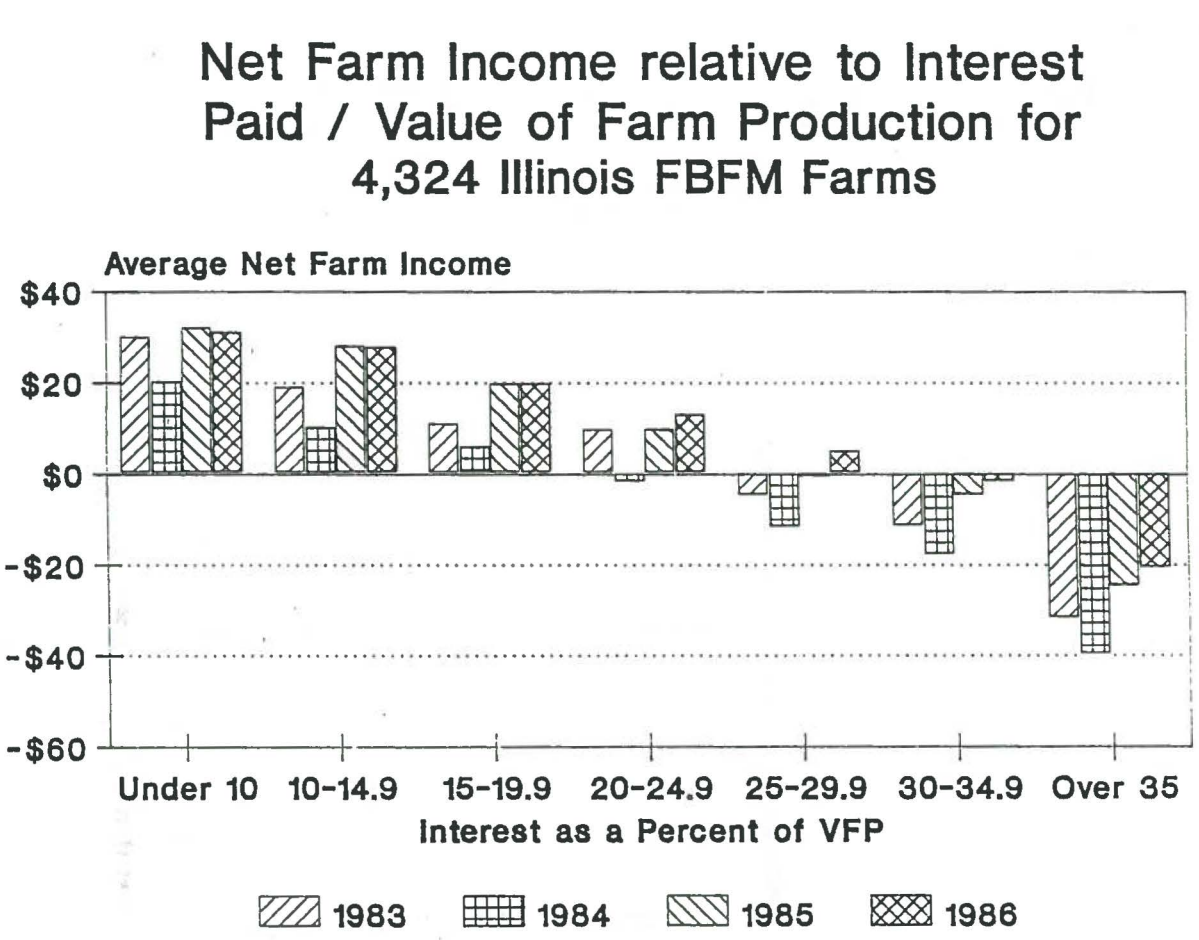

Figure 2.

Relation Between Net Farm Income and the Ratio of Interest Paid to Value of Farm Production (Based on 4,324 Illinois Farms for 1983-86)

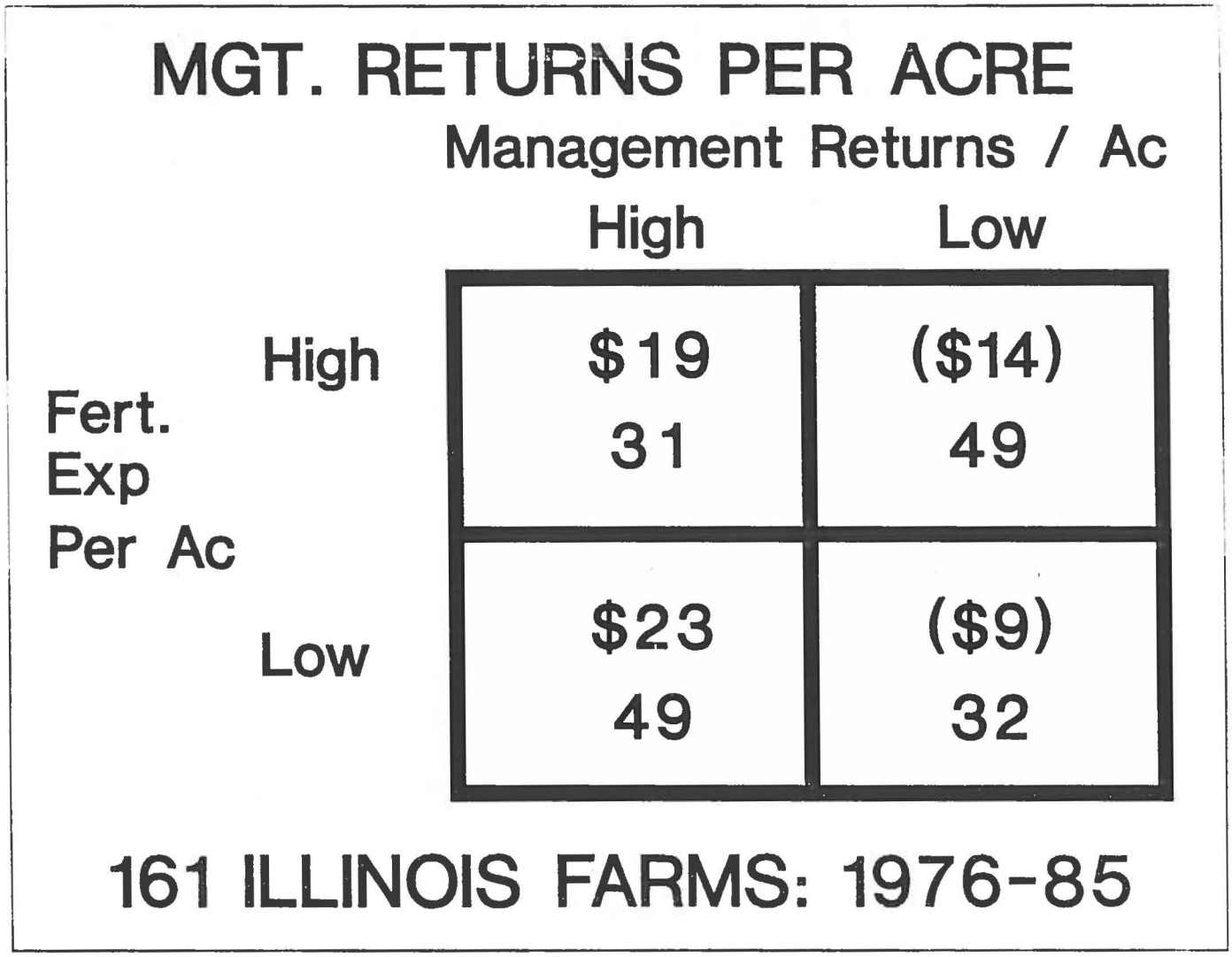

Figure 3.

Management Returns Per Acre for Farms With Above and Below Average Fertilizer Expense Per Acre Versus Farms With Above and Below Average Management Returns (10-year Averages for 161 Illinois Farms) (Sonka)*

* Top number in each cell is management returns in 1982 real dollars. Bottom number is the number of farms in that cell.

Comparing the four cells of Figure 3 again sends the signal that there are considerable differences in performance among relatively homogeneous farms. The two rows of that figure demonstrate that simply knowing a producer's fertilization strategy is not a good indicator of profitability. Neither the simple advice to cut costs nor to maximize use of inputs was necessarily good for this sample of farms.

It's likely that this latter result for fertilizer expense is typical when we try to find a single factor that necessarily leads to success. The individual circumstances of individual farm operations, even when all operations are producing corn and soybeans, are simply too diverse to make such prescriptions meaningful. Further, when a fairly strong signal is discovered, such as for interest to value of farm production, several questions remain. Therefore we need to consider tools and approaches that allow for several factors to be evaluated simultaneously.

Considering Multiple Determinants of Success

Management is the art of "putting things together." Therefore, it is natural that understanding managerial performance requires that we attempt to look at the effect of several potential factors as they simultaneously interact to affect profitability. In this section, results of an eight-year analysis for 179 cash grain operations will be discussed (Sonka, et. al.). The performance of these farms (in terms of management returns per acre) was compiled for the entire period and the top 25 percent of the operations identified. Similarly, the lower 25 percent of the operations were determined. Table 2 lists descriptive statistics, on an annual average basis, for the entire sample as well as for the top and bottom quartiles.

The results for the first two categories of Table 2 (management returns per acre and rate of return on assets) again demonstrate the considerable diversity of performance that exists among very similar farm firms. The remaining categories listed in Table 2 are explanatory variables that seemingly could contribute to those performance differences.

Examination of group averages, such as shown in Table 2, is interesting but our preference here is to consider the simultaneous effect of several variables. To accomplish this, two logit prediction models were estimated. These estimated models are presented in Table 3. The model estimated for the top performing quartile identifies factors affecting whether an operation would be ranked in the top 25 percent of the group or not. Conversely, the model estimated for the bottom quartile identifies factors determining whether an operation's performance would be in the bottom 25 percent or not.

A number of interesting implications are observable from the results of Table 3. First, several variables that we commonly think of as differentiating performance factors are not significant in this analysis. Examples are farm size, crop mix, participation in government programs, and interest paid. Although farm size clearly would be important for determining total farm profitability, its impact on per acre returns is not strong for this sample of farms. The result for the interest paid variable may seem to conflict with the earlier analysis of Figure 2. However, the interest expense paid was relatively low for most of the farms in this sample and therefore its lack of significance here does not mean that interest expense is not a major negative factor for many farms. What these results do reinforce is the notion that substantial performance differences can be documented even when interest expenses are relatively similar.

Table 2.

Eight-Year Averages and Standard Deviations of Annual Values for Selected Performance Measures and Descriptive Variables (179 Illinois Cash Grain Farms Over the Period 1976-1983) (Sonka, et. al)[a]

Variables	Units[b]	All 179 farms in sample	Top 44 farms[c]	Bottom 44 farms[c]
Management returns per acre	$	4.53 (21.92)	20.21** (21.43)	-13.70** (23.04)
Rate of return on assets[d]	%	0.14 (0.09)	0.23** (0.11)*	0.06** (0.08)
Farm size	acres	597.60 (60.80)	633.52 (45.10)	512.99* (68.72)
Percentage of acreage devoted to:				
Corn	%	0.49 (0.08)	0.49 (0.08)	0.48 (0.09)
diverted from production	%	0.02 (0.06)	0.02 (0.06)	0.02 (0.06)
Soil productivity index[e]	--	85.82 (0.82)	87.56 (0.79)	81.58* (0.74)
Total cash operating expenses[f]	$/acre	58.71 (9.98)	52.35* (8.27)*	68.82** (12.77)**
Interest paid	$/acre	6.87 (4.26)	5.46 (3.64)	8.97* (4.67)
Price received for:				
Corn	$/bushel	1.47 (0.26)	1.49 (0.30)	1.46 (0.24)
Soybeans	$/bushel	3.86 (0.78)	3.93** (0.81)	3.82 (0.76)
Corn yield	bu./ac.	125.91 (26.89)	130.46** (26.23)	117.40** (28.03)
Soybean yield	bu/ac.	41.93 (5.42)	43.74** (5.41)	39.76** (5.83)

Footnotes for Table 2

[a] Numbers in parentheses are averaged individual farm standard deviations.

[b] Economic data are in 1972 constant values.

[c] Ranked by average management returns per acre.

[d] (Net farm income divided by total asset value) * 100.

[e] An index that reflects productivity of soil types in Illinois at high management levels. Each farm's value is a weighted average based on the soil types comprising the tillable acres of that farm.

[f] Annual cash outlay for non-depreciable inputs and repairs on depreciable assets.

* Significant at the 5 percent level.

** Significant at the 1 percent level.

Table 3.

Logit Prediction models for Top and Bottom Performing Quartiles Based on Management Returns Per Acre (179 Farms in Entire Sample) (Sonka, et. al.)

	Equation for:			
	Top performing quartile		Bottom performing quartile	
Variable	Estimated coefficient	Standard error	Estimated coefficient	Standard error
Constant	-33.06**	7.49	26.87**	7.58
Farm size	.000346	.000699	-.0012	.00085
Proportion of acreage devoted to:				
Corn	-2.32	3.59	-3.05	3.16
Diverted acres	1.12	10.84	-9.69	12.24
Soil productivity index	-0.557**	.0301	.0608	.0311
Total operating expense	-0.0449*	.0175	.0547**	.0137
Interest paid	.0140	.0441	-.0062	.0334
Prices received for:				
Corn	6.06*	2.45	-6.43*	2.73
Soybeans	4.43**	1.54	-2.52	1.56
Corn yield	.0549	.0294	-.0984**	.0292
Soybean yield.....	.1628*	.0798	-.0696	.0721
Number of observations predicted correctly[a]:				
Top quartile	18 (41%)		---	
Remainder of sample	125 (93%)		128 (95%)	
Bottom quartile ...	---		20 (45%)	
TOTAL	143 (80%)		148 (83%)	
McFadden R^2	0.22[b]		0.31[b]	
Efron R^2	0.24[c]		0.34[c]	

Footnotes for Table 3

[a] Remainder of the sample refers to the 135 farms not in the top quartile for the first model and to the 135 farms not in the bottom quartile for the second model. The number of correct classifications is computed using a 50/50 classifications scheme (Amemiya).

[b] Computed as $1-[L(B_{mL})/L(O)]$, where $L(B_{mL})$ is the maximum value of the log-likelihood function and the $L(O)$ is the value of the log-likelihood function subject to the constraint that all coefficients except the intercept are equal to zero.

[c] The squared correlation coefficient between the dependent variable and the probabilities predicted by the logit model.

* Significant at the 5 percent level.

** Significant at the 1 percent level.

Soil productivity has a strong negative correlation with the likelihood of being in the top performing group. Because the performance variable used is management return, an equity charge has been deducted for owned land. Therefore this negative correlation may reflect that paying a premium for more productive land (in a physical sense) comes at an economic cost. Although not shown here, the effect of geographic location within Illinois was found to not be a significant variable in this analysis.

Operating expenses, in total, are inversely related to financial success. Crop yields, and prices received, are positively correlated with management returns per acre. These results suggest that management is a process of "putting things together." Within this sample, at least, being effective across the functions of production, cost efficiency, and marketing was the key attribute distinguishing superior from inferior performance.

The models estimated tended to be helpful in distinguishing performance. Both models could correctly predict performance of the farms in the sample in excess of 80 percent of the time. This corresponds to a random process which would have a 62.5 percent chance of being correct. The R^2 values for the models, however, are not overly impressive. These values underscore the notion that there are numerous factors affecting differential performance in addition to the measures shown in Table 3.

Extensions to the Analysis

The analysis just described relates to long-run performance for a group of farm operations using readily available and quantifiable data as potential explanatory factors. Although useful, there is more that we would like to know. Or, stated somewhat differently, it seems as if the data available "should" have more to tell us. This section will briefly discuss three possible areas for additional analysis: variability of performance, non-financial factors, and forms of competition among farms.

Performance Variability

The analysis described in Tables 2 and 3 looked at average performance over an eight-year period. Although informative, that presentation masked considerable year-to-year variability of performance. Because risk and uncertainty are topics of interest to agricultural economists, as well as managers, it is interesting to pursue the issue of the stability of the performance groupings shown in Table 2. An intriguing question is whether those farms that were on average superior or inferior in performance were consistently in those groups on a year-to-year basis.

Of those 44 producers who were in the top 25 percent group for the entire period, only 22 were in the top quartile in 5 or more of the 8 years in the study period. Only 4 of them were in that top performing group 7 or more years. These results suggest that considerable variability of income performance exists, even among these rather similar operations and using accrual measures of returns. A corollary question, then, is what is the likelihood that any producer in the entire sample might achieve top quartile performance in any one year? For this sample, 128 of the 179 producers were ranked in the top one-fourth of the group in at least one of the eight years.

Variability within the lower performing group was equally as pronounced as for the top quartile. The corresponding numbers for the bottom quartile are that only 21 producers were in

the lower quartile 5 or more years, only 5 were in that category for 7 or more years, and that 121 producers in the entire sample were in the lower group in at least one year.

Potential Non-financial Factors

The preceding quantitative analysis was limited to variables that are readily available in a farm records systems. Except for acreages and yields, these variables were financial in nature. However, these are only proxies for managerial behavior. In a companion on-going analysis, we have attempted to attain additional information about the management strengths of individual producers. There are 135 producers for whom long-term farm record data (in this case, 10 years) also are available (Thorpe). Each of these producers works closely with an Illinois Farm Business Farm Management field staff representative. In many cases, that field staff representative also prepares the income tax return for the individual farmer. These contacts mean that the field staff representative is in a unique position to evaluate the managerial strengths of these farmers.

For each farmer in the sample, the appropriate field staff representative was asked to assess the managerial strengths of the farmer for each of nine categories. This ranking was conducted on a scale from one to five. In total, 40 field staff served as evaluators. Ideally, only one outside evaluator would have provided such assessments for all the producers in the sample. This, of course, is impossible for the large number of operations in this study. Therefore, the results provided below must be interpreted with the caution that differing rater attitudes may have affected the results.

As a start to the evaluation process, it seemed interesting to consider if producers who consistently had higher income performance had a different orientation towards management than those who consistently had lower income performance. Table 4, therefore, shows the rankings of management strengths for the top 25 percent income group (over the entire 10-year period) as compared to the rankings for those producers in the lower income quartile.

Although clearly exploratory, Table 4 suggests a number of interesting implications both in terms of similarities and differences in management orientation. For example, the field staff evaluators indicate that maximizing yields is important across both income groups. Reinforcing the results of Table 4, this suggests that being a "good" producer of physical output is important but it is not a differential characteristic. Marketing is assessed fairly high for both groups. Finding new technology is ranked relatively low in orientation in both groups. This does not necessarily mean that technology adoption is not important. Rather, it is possible that the search for technology is less apparent or conducted on a less routine basis than the other factors. In either event, it again does not appear to discriminate between the income groups.

Four factors are ranked quite differently across these two income groupings. These are:

Financial planning;
Disciplined spending;
Reduction of operating expenses; and
Physically working hard.

The higher income group appears to be relatively more concerned with financial planning and disciplined spending whereas they have a relatively lower orientation towards reduction of operating expenses or physically working hard.

Table 4.

Comparison of Management Strength Rankings Between Farmers Whose Net Incomes Were in the Top Quartile Versus Those in the Bottom Quartile (Total Sample of 135 Illinois Farms for 1976-85) (Thorpe)

Top quartile group	Ranking	Bottom quartile group
Maximize yields	1	Reduce operating expenses
Financial planning	2	Maximize yields
Disciplined spender	3	Physically works hard
Marketing	4	Marketing
Attention to detail	5	Attention to detail
Reduce operating expenses	6	Financial planning
Reduce overhead expenses	7	Reduce overhead expenses
Find new techniques	8	Disciplined spender
Physically works hard	9	Find new techniques

Using survey responses relative to a behavioral attribute such as managerial strength is a difficult process. It is not clear, for example, that the evaluator is interpreting a factor in the same way that it was intended or the evaluator may be subconsciously using a factor as a proxy for some other characteristic. The use of multiple raters is a particular shortcoming of these results. However, the differential attribute rankings of Table 4 are intriguing and suggest that further work to integrate financial and behavioral information may have significant contributions to our understanding of managerial behavior.

Alternative Forms of Competition

The relative small size of farm firms and their typical role as price takers has lessened our recognition of the potential for alternative modes of competition among farm firms. Yet, evaluation of farmer behavior would suggest that a number of modes of competition exist within a community of otherwise similar farm operators. For example, the more conservative producer may choose to use high levels of equity, own the majority of the firm's fixed assets, and by accepting a relatively low return on those assets achieve a low cost position. A second individual may choose to rent considerable amounts of the firm's land base to expand the operation to a size which achieves consumption goals. This latter individual may also achieve a low cost position but stress a differing mode to gain cost efficiency. The managerial orientation results of Table 4 further suggest that alternative forms of competition may include less visible forms than land tenure or use of debt.

Recently the general business management literature has considered that analysis of differing forms of competition may be an enhanced means to understand strategic performance. These investigations have led to the conceptualization of strategic groups within industries (Porter, 1980).

Here the goal is to group firms according to similarity of competitive behavior. Early work focused on size and market share to differentiate market leaders and followers (Porter, 1973). Further research led to the realization that more managerially oriented variables (such as use and type of advertising, national or regional marketing scope) could enhance understanding of firm performance within an industry.

Development and maintenance of meaningful groups conceptually should be linked to the rigidity of barriers limiting mobility between those groups. McGee suggests that the relative height of mobility barriers can be related to the following factors:

Organizational structure and control;
Management skills;
Diversification and vertical integration; and
Firm ownership structure.

Although the relative role of each factor is undoubtedly different in an industry composed of large public corporations than within the farm production sector, the concept of strategic groupings among farm firms may be helpful. For example, this concept could be used to extend the analysis of Table 3. Possibly some of the factors found to be important in that analysis should be considered as strategic differences and further analysis done to evaluate performance within those groupings.

Summary

As social scientists, agricultural economists have the responsibility to attempt to understand and explain the economic behavior of farm decision makers. In addition, those agricultural economists particularly interested in management of farm firms hope that their efforts to explain and predict can lead to improved farm decision making. Because of the economic adversity of the 1980s and the prospects for increasing turbulence within agriculture's economic environment, the need for research to enhance individual decision making on farms is great and is likely to expand.

This paper has considered three aspects of research relating to management performance for the farm business. First, five differing measures of success were suggested and implications for alternative research modes discussed. Second, empirical results from a number of studies of performance on Illinois farms were reviewed. Finally, three (out of the many) means to extend and enhance research efforts in this area were presented.

The opportunity to make important contributions to our understanding of managerial performance on farms, as well as to enhance performance, is an exciting prospect for agricultural economists. The economic adversity of the 1980s has heightened our clientele's awareness of the need for such research. Agricultural economists are well-positioned to exploit these opportunities. The paradigms and tools of the applied economist are essential to such research investigations. If, however, we are to achieve the potential that exists, we must strive to be creative in our use of those tools as well as continually expand our "tool kits" to adapt tools from closely aligned behavioral professions.

Although research efforts based on normative approaches will be valuable in these pursuits, we must strive to ensure that significant portions of our efforts are grounded by data from the actual operations and performance of individual farm firms. Using such data often is frustrating because the actual farm firm data "occasionally" will not conform to our theories as to how farm firms "should" operate. These inconsistencies can result from a number of data shortcomings, but

also may reflect the need to enrich our underlying theories of behavior. Grappling with, and overcoming, these problems are essential if the entire body of our research is to be both credible and useful.

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