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Department of Agricultural Economics

THE ECONOMIC FACTORS INFLUENCING PRODUCERS' DEMAND FOR FARM MANAGERS

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The Economic Factors Influencing Producers' Demand for Farm Managers

Abstract

This paper primary objective is to analyze the economic factors influencing producers' demand for farm managers. A survey of commercial farmers' risk management was conducted by mail during the spring of 1999 in Mississippi, Texas, Indiana, and Nebraska. A Tobit econometric model was constructed to analyze the demand for farm managers. Results showed that a complementary relationship exists between marketing inputs and the decision to hire farm managers. The results indicate that, as farmers increase expenditure on marketing consultants and information systems, their expenditure on farm managers increase.

Key Words

Farm manager demand, marketing consultants, information systems, Tobit regression.

The Economic Factors Influencing Producers' Demand for Farm Managers

American farmers direct the activities of one of the world's largest and most productive agricultural sectors. They produce enough food and fiber to meet the needs of the United States and produce a surplus for export. Since farm output is strongly influenced by the weather, pests and diseases, fluctuations in commodity prices, and government farm programs, they must be astute managers to deal with the uncertain environment they confront. Farming operations have become more complex in recent years. As a result, many farmers use computers to keep financial and inventory records, hire marketing consultants and subscribe to marketing information systems. Average farm size has also increased over time. The size of the farm and the complexity of the production system, increasing absentee ownership, and other factors, may influence the farmers' decision to hire a farm manager.

The farm manager duties and responsibilities vary widely. In many cases, managers may establish goals, make financial decisions, monitor production and marketing, hire, assign, and supervise workers, determine crop transportation and storage requirements, and oversee maintenance of the property and equipment. According to the American Society of Farm Managers and Rural Appraisers (ASFMRA), professional farm managers in the U.S. manage more than 25 million acres of farm and ranch land for absentee owners, banks, and trusts, as well as complete more than 175,000 appraisals per year on more than 30 million acres of land (ASFMRA, 2001). Nevertheless, the economic factors associated with the decision to hire a farm manager have not been studied in depth. This study evaluates producers' demand for farm managers, and the role of farm size, farm income, producers' expenditure on marketing information systems and

marketing consultants, and other relevant economic variables on the decision to hire a farm manager. By doing so, we construct an econometric model that explains the demand for farm managers.

Survey Procedure and Data

A survey of commercial farmers' risk management was conducted by mail for a stratified random sample of producers during the spring of 1999 in Mississippi, Texas, Indiana, and Nebraska. In all four states, the survey questionnaire was sent to the people who make the day-to-day decisions in the operation. A total of 1,812 usable questionnaires were available for analysis (Coble et al. 1999). According to the survey data, out of 1,812 respondents, 14 percent owned all the land they farmed, 17 percent rented all the land they farmed, and 69 percent used a combination of own-lease. Farmers' expenditures on farm managers were measured across states, crops, and farm size.

Figure 1 shows producers' expenditures on farm managers by crop. According to the sample average, fifteen percent of the cotton farmers hired a farm manager, and those who hired a farm manager spent an average of approximately $15,000 per year, followed by eleven percent of the soybeans farmers who spent $12,500 per year, nine percent of the sorghum farmers who spent $12,000 per year, and nine percent of the corn farmers who spent $8,000 per year[2]. The average percent hiring was eleven percent and the average expenditure across all crops was approximately $11,255 per year.

Figure 2 shows producers' expenditures on farm managers by state. According to the sample average, sixteen percent of the Mississippi farmers hired a farm manager and spent approximately $21,500 per year, followed by ten percent of the Texas farmers who

[2] All average expenditures are calculated for those farms with a positive expenditure on farm managers.

spent an average $5,232 per year, nine percent of the Nebraska farmers who spent an average $3,000 per year, and eight percent of the Indiana farmers who spent an average $1,400 per year.

Figure 3 shows producers' expenditures on farm managers by farm size. According to the sample average, seven percent of the small farms (0 to 500 acres) spent approximately $3,000 per year on farm managers. Nine percent of the medium-size farms (501 to 1,500 acres) spent approximately $6,050 per year on farm managers. Fifteen percent of the large farms (1,501 to 5,000 acres) spent approximately $16,500 per year on farm managers. Finally, nine percent of the very large farms (over 5000 acres) spent approximately $58,300 per year on farm managers.

Econometric Procedure

Any analysis of farmers' demand for farm managers need to take into consideration that in some cases the expenditure in farm managers is zero, thus raising the issue of censored samples which would make the use of ordinary linear regression computationally incorrect. A standard approach to deal with censored data is the use of Tobit models (Tobin, 1958). The econometric model used here consists of a Tobit model of farm managers' demand. The marginal effects were calculated using LIMDEP®.

Table 1 provides a description of the variables involved in this study, and Table 2 provides summary statistics on the dependent and independent variables. Producers were asked to quantify their dollar expenditure on farm managers. Specifically, they were asked, "In 1998, how much did you spend on hiring the services of professional farm managers." First, the dependent variable is examined. Eleven percent of the farmers indicated that they hired a farm manager. Those who hired a farm manager paid an

average $11,255 per year. The high percentage of zero expenditure on farm managers (89 percent) indicates that the choice of an econometric model that takes into consideration censoring in the dependent variable is appropriate.

The remaining variables in Table 1 are independent explanatory variables included in the analysis. Total acres measure the total acres available for farming. On average, farmers in our sample had 1,444 acres of farmland. It is expected that larger farms would have increased expenditures on farm managers, as shown in figure 3. A quadratic term was included to capture a possible non-linear effect of increased farm size on expenditure.

Farmers' willingness to take risks measures a farmer's willingness to accept more risk in the farm business. They were asked to rank their agreement on a five-point Likert-type scale for the following statement: "Relative to other farmers, how would you describe your willingness to accept risk in your farm business." This variable takes a value of one if the farmer is much more willing (4 or 5). Thirty-one percent of the producers indicated being in agreement with the statement.

Education indicates whether the farmer has at least some college education. Sixty-five percent of the producers indicated having some college education.

Age is expected to be inversely related to expenditures on farm managers. Since a farmer's expected return from hiring a farm manager decreases as the time horizon increases, therefore, expenditures on farm managers should be inversely related to older age. On average, farmers indicated being 52 years old.

The expenditure on marketing consultants and marketing information systems can be seen in a related framework. Fifteen percent of the farmers indicated that they hired

marketing consultants, and 37 percent of the farmers indicated that they had expenditure on marketing information services. The average expenditures were $407 and $284 for marketing consultants and marketing information systems, respectively. It is expected that farmers will consider marketing consultants and marketing information systems as complementary inputs in aiding the farm manager decision-making process. Therefore, we expect that increased expenditure in marketing consultants and marketing information systems would be related to increased expenditure on farm managers.

The next four explanatory variables measure the percent planted acres of cotton, soybean, corn, and sorghum. On average, the share of farmland for cotton, soybean, corn, and sorghum is 21 percent, 30 percent, 26 percent, and 6 percent respectively.

Farm income measures the percent of household gross income derived from farm operation. On average, 74 percent of the household income is derived from the farming operation.

Contract income measures the percent of household gross income derived from production contracts. On average, 15 percent of the household income is derived from production contracts.

Results

Several of the explanatory variables are highly significant in explaining producers' demand for farm managers. Table 3 provides the parameters and marginal effects of the Tobit model. Total acres and acres squared are both significant. The farmer's expenditures on farm managers increases at a decreasing rate. This result was also observed by Hoag et al. (1999) when examining computer adoption in the Great Plains, Gloy et al. (2000) examination of usefulness and influence of information sources

on commercial farms, and Daberkow and McBride (2001) study of precision agriculture. This study's results suggest that larger farms have greater needs to hire farm managers, up to a maximum at which increased farm size decreases expenditures on farm managers.

Farmers' willingness to take risks is significant and negatively correlated with farmers' expenditures on farm managers. Being in the group with greater willingness to take risks decreases farmer's expenditures on farm managers by $426 per year.

The only commodity percentage variable that was significant in explaining the demand for farm managers was sorghum. The percentage of crop acres in sorghum was significant and negatively correlated with farmers' expenditures on farm managers.

The results suggest that the expenditures on farm managers are positively related to the expenditures on marketing consultants and marketing information systems, implying that there is a complementary relationship between these three production inputs. It appears that, as farmers increase their expenditures on marketing consultants and marketing information systems, their expenditures on farm managers also increase. Ortmann et al. (1993) also observed a positive relationship between expenditures on consultant services, computer use, and the farmer's self-assessment of their production skills. A plausible explanation of this result is that producers, by hiring marketing consultants and information systems to back up the farm manager decision making, benefit from a more complete service than can be provided by hiring these services alone.

Percent of income derived from farming production is significant and negatively related with farmers' expenditures on farm managers. It is expected that on farms where the share of off-farm income to household income is low, the farmer will tend to make more of the production and marketing decisions, thus reducing the expenditures on farm

managers. On average, a 10 percent increase in percent of income from farming operation will reduce the demand for farm managers by 74 percent.

Percent of income derived from production contracts is significant and positively related with farmers' expenditures on farm managers. It is expected that farms involved in more sophisticated production arrangements, or that produce on contract, will require hiring more farm managers to supervise the production activities. On average, a 10 percent increase in percent of income from production contracts will increase the demand for farm managers by 61 percent.

Conclusions

This paper examined the determinants of the demand for farm managers by grain and cotton producers. The results indicate several significant relationships between economic variables and the demand for farm managers. Total acreage positively influenced the demand for farm managers. Giving the economies of scale in grain and cotton production, this is not surprising. Nevertheless, when grains dominate the crop mix, the results show an interesting divergence. It appears that sorghum producers rely less on farm managers.

Producers incurring higher expenditures on marketing consultants and marketing information systems showed a positive relationship with farm managers' demand. According to the positive sign in the coefficient of farmers' expenditures in marketing consultants and marketing information systems, it appears that there is a complementary relationship between these marketing inputs and the decision to hire farm managers. This is not surprising, given that the farmers' expectation for farm managers' higher returns increases with specialization. It appears that private consulting firms and providers of

market information could increase sales by coordinating efforts with farm managers and providing farmers with additional training programs.

Interestingly, producers who are more risk loving had a negative relationship with the demand for farm managers. A plausible explanation of these results is that wealthy producers, who are probably less risk averse, are more willing to make decisions by themselves with no input from professionals or consultants.

Income derived from farming, and income derived from production contracts, are negatively and positively related, respectively, to expenditures on farm managers. We conclude that farmers will value the decision of hiring a farm manager by comparing this cost to the opportunity cost of their time and income forfeited from off-farm work possibilities. In situations in which the share of farm income to household income is high, the farmer will tend to make all the production and marketing decisions, thus replacing the farm manager. On the other hand, if the percent of income derived from production contracts is high, the level of complexity of the farming operation will probably motivate the farmer to hire a farm manager to supervise the production activities.

This study is unique in that its focus is on the economic factors underlying the demand for farm managers, focusing on farm size, income and the effect of marketing tools. Producers from the major crop commodities and producing areas are included. This allows examination of the demand for farm managers that smaller studies have not allowed. Policy makers, educators, market consulting firms and associations of farm managers may find useful our identification of which factors motivate or discourage farmers from demanding additional services, and adjust farm policy and training accordingly.

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Table 1. Farmers' demand for farm managers. Description of variables.

Variables	Description
Dependent Variables	
Producers' expenditure in farm managers	Dollar amount paid to hired farm managers (dollars).
Independent Variables	
Total acres	Total acres available in the farming operation (acres).
Total acres squared	Total acres available in the farming operation squared (acres squared).
Willingness to accept risk	Dummy variable = 1 if farmer is willing to accept high levels of farm risk.
Education	Dummy variable = 1 if farmer has some college education.
Age	Age of the farm operator (years).
Percent cotton acres	Acres planted to cotton with respect to total acres (percent).
Percent soybean acres	Acres planted to soybeans with respect to total acres (percent).
Percent corn acres	Acres planted to corn with respect to total acres (percent).
Percent sorghum acres	Acres planted to sorghum with respect to total acres (percent).
Producers' expenditure on marketing consultants	Dollar amount paid to hired marketing consultants (dollars).
Producers' expenditure on marketing information systems	Dollar amount paid to purchased marketing information systems (dollars).
Farm income	Percent of household gross income derived from farm operation.
Contract income	Percent of household gross income derived from production contracts.

Table 2. Farmers' demand for farm managers. Summary statistics of variables.

Variable	Mean	Standard Deviation	Minimum	Maximum
Expenditure in farm managers[a]	11255.364	7188.763	.00	100000
Expenditure in marketing consultants[b]	406.6964	1957.694	.00	40000
Expenditure in information systems[c]	284.1319	524.3745	.00	4800
Total acres	1443.856	1548.493	25	18000
Total acres squared	4481068.20	14813786.1	625	324000000
Willingness to take risks	.31350	.46406	.00	1.00
Education	.64931	.47733	.00	1.00
Age	51.9838	12.117	19	90
Percent cotton acres	.21433	.32271	.00	1.00
Percent soybean acres	.30155	.27440	.00	1.00
Percent corn acres	.26564	.26843	.00	1.00
Percent sorghum acres	.06108	.16372	.00	1.00
Income from farming operation	74.455	27.426	2	100
Income from production contracts	15.144	29.084	.00	100

[a] Eleven percent of the farmers in the sample indicated that they hired a farm manager.

[b] Fifteen percent of the farmers in the sample indicated that they hired marketing consultants.

[c] Thirty-seven percent of the farmers in the sample indicated that they made expenditures on marketing information systems.

Table 3. Farmers' demand for farm managers. Univariate Tobit model results.

Variable	Maximum Likelihood Coefficient	Marginal Effect Coefficient
Intercept	-31484.9 (8674.8)	
Total acres	6.052 (1.737)	0.49777***
Acres squared	-0.4114 (0.00195)	-0.00033***
Willingness to take risks	-5174.58 (2670.7)	-425.60**
Education	-604.09 (2706.5)	-49.686
Age	-46.416 (104.33)	-3.817
Percent cotton acres	8070.92 (5761.2)	663.82
Percent soybean acres	-8491.62 (6401.4)	-698.42
Percent corn acres	-7850.49 (6453.3)	-645.69
Percent sorghum acres	-33241.8 (12754.3)	-2734.10***
Expenditure in marketing consultants	1.8091 (0.4285)	0.1488***
Expenditure in marketing information systems	3.6241 (2.2513)	0.2980*
Income from farming operation	-90.008 (46.60)	-7.403**
Income from production contracts	74.374 (37.317)	6.117**
σ = 27174.04*** (1692.2)		

Numbers in parentheses are standard errors. Single, double, and triple asterisks indicate statistical significance at the $\alpha = 0.1$, 0.05, and 0.01 levels, respectively.

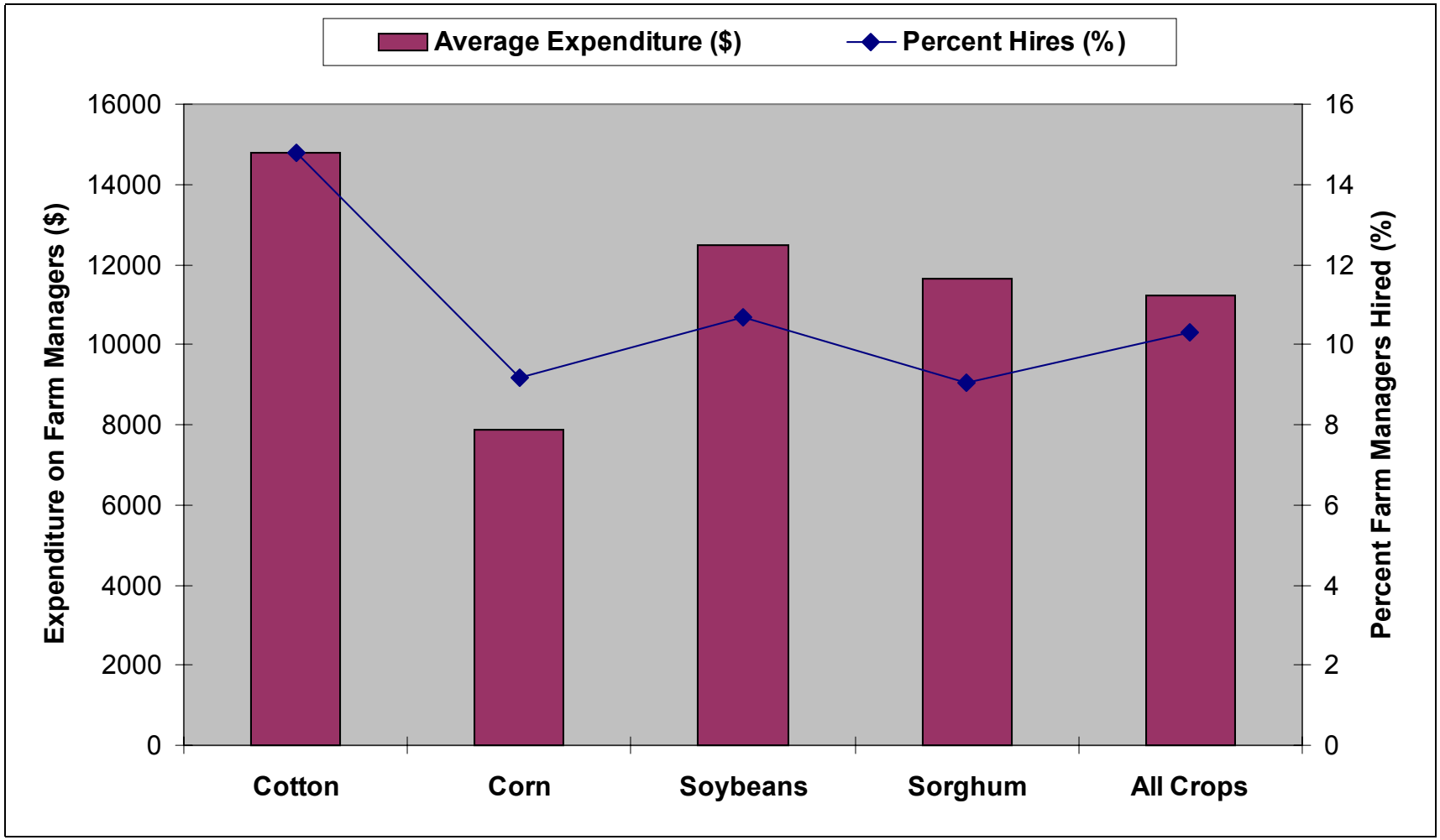

Figure 1. Crop producers' risk management survey. Expenditure on farm managers by crop.

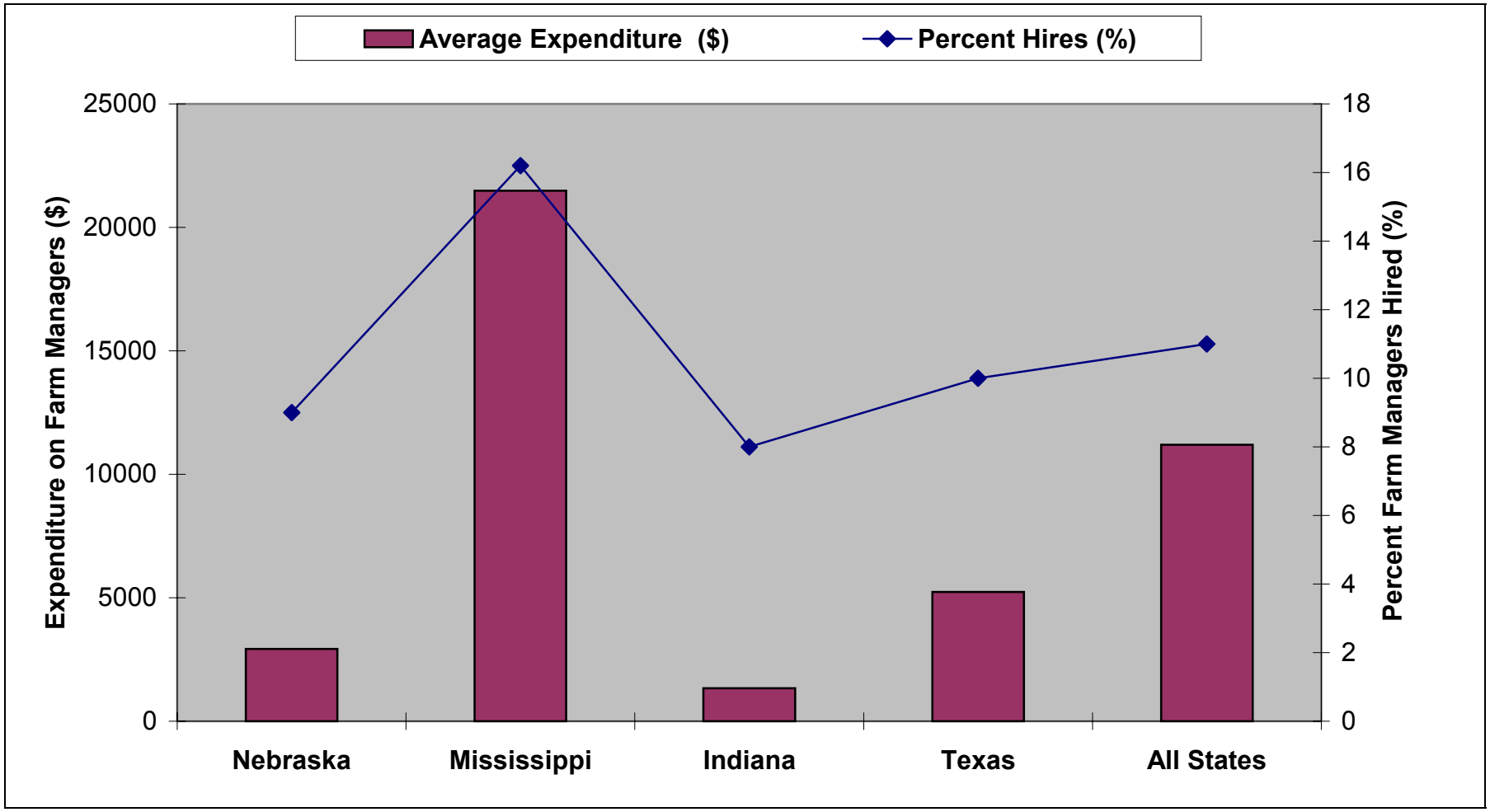

Figure2. Crop producers' risk management survey. Expenditure on farm managers by State.

Figure 3. Crop producers' risk management survey. Expenditure on farm managers by farm size.