Factors Contributing to Financially Successful Southern Rice Farms

Linda F. Foreman
Janet S. Livezey

Agricultural Economists with the Resource Economics Division, Economic Research Service, USDA.

Selected paper prepared for presentation at the Southern Agricultural Economics Association Annual Meeting
February 1 – 5, 2003
Mobile, Alabama

Factors Contributing to Financially Successful Southern Rice Farms

Linda F. Foreman

Janet S. Livezey

Abstract

The purpose of this study is to determine factors contributing to the likelihood of financial success among rice farms. The results showed that the ratio of government payments to total production value, tenure, crop diversification, cost control, education, yield, and debt-to-asset ratio were significant factors influencing at least one financial success measure.

Key words: competitiveness, rice farms, farm success, farm profitability.

Introduction

Rice producers operate large farm enterprises in narrowly defined regions where the physical characteristics for economically feasible rice production typically limit their opportunities for producing alternative crops. The lack of alternative crops, especially acute along the Gulf Coast, likely increases the financial risk for rice producers. Many other factors, such as weather conditions, soil productivity, production and financial practices, government policy, prices, yields, farm size, and operator abilities, may also impact the probability of operating a successful rice farm. It would be helpful to understand which factors or strategies employed by rice producers influence the successful outcome of their farm operations.

The purpose of this study is to examine factors influencing the probability of operating a financially

successful rice farm in the Southern U.S. rice-growing region. California rice producers are excluded from this study because the medium grain rice that they produce competes in separate markets from the medium and long grain rice produced by southern rice farms. The Southern region used in the study encompasses rice producers in the major rice producing states of Arkansas, Louisiana, Mississippi, and Texas. This study's objectives are: (1) to review previous work on factors influencing farm success, 2) to examine the characteristics and production practices of successful and less successful rice farm operations, and (3) to use logit regression analysis to find which factors contribute to the financial success of Southern rice grain operations. The results of this study may prove useful in making predictions. For instance, if farm diversification is important to the success of rice farms, then rice production may shift to regions that permit diversification of production.

Literature Review

Numerous studies have analyzed factors contributing to farm profitability. Boessen et al. examined the financial performance of Kansas farms from 1973-85. In their study, a farm was deemed successful if it maintained a positive average real rate of return to farm equity over the study period. They found that successful farms had lower interest rates, lower debt-to-asset ratios, and higher rates of return on assets. Tvedt, Olson, and Hawkins identified factors associated with farm financial success, where success was measured by the return on farm assets, in their study using 1985 data on Minnesota farms. Using regression analysis, they found the debt-to-asset ratio, the value of production to the value of farm assets, the operation of a beef finishing enterprise, and cash rental of farmland were factors positively related to farm success. In addition, they found a negative relationship with farm success for the number of acres squared and a positive relationship for the number of acres. The ratio of the farm's corn yield to the county mean corn yield was positively associated with success while the squared corn

yield ratio had a negative influence. They found a positive association for the ratio of total expenses to value of production and a negative relation for the squared ratio. Burton and Abderrezak tested links between farm characteristics and farm profits for a small sample of Kansas farms in 1984-85. Farm profit was defined as the return to labor, management, and equity. They found that successful farms had more farm assets, higher percentages of rented or leased land and machinery, operation of a farrow-to-hog enterprise, and more efficient input use as measured by gross farm income divided by total expenses. Purdy, Langemeier, and Featherstone found farm size and specialization in swine or dairy enterprises to be positively related to farm financial performance, while the operator's age, percentage of acres owned, the operating expense ratio, and leverage ratio were negatively correlated. Mishra, El-Osta, and Steele studied factors affecting the profitability of small farms where profitability was defined as net farm income and income to operators' labor and management. They discovered farm profitability to be negatively associated with the debt-to-asset ratio and variable costs-to-value of production ratio, and positively related crop insurance use.

Sonka, Hornbaker, and Hudson examined the relationship between management characteristics and income in Illinois cash grain farms. They found that farms with lower incomes have lower yields and higher ratios of operating expenses per value of farm production. Sonka and Thorpe found operators of successful farms, where success is defined by net income per tillable acre, had lower operating expenses per value of farm production, interest expenses per value of production, and higher yields. Plumley, in his study on Illinois cash grain farms, found successful farms had higher liquidity, higher shares of cash- or share-rented land, and higher farm incomes. Mishra, El-Osta, and Johnson found operators of cash grain farms in the U.S. were more likely to be successful if they kept tight control over variable costs, farmed with others, kept farm records, adopted advanced technology, forward contracted, and operated diversified farms. Garcia, Sonka, and Yoo in their study of moderate and large-sized Illinois

commercial cash grain farms found that the percentage of land owned by farm businesses was inversely related to profitability. Farm size, soil productivity, regional climatic conditions, and the ratio of soybean to corn acreage also significantly influenced farm profitability.

El-Osta and Johnson used regression analysis to determine factors associated with the financial performance of commercial dairy farm operations in the U.S. for 1993. The debt-to-asset ratio and the size of operation, measured by the number of dairy cows, were significant factors influencing net farm incomes. Kauffman and Tauer identified management strategies used by successful commercial dairy farms in New York. The success of a strategy was assumed to be reflected in farm profitability, where profitability was measured four ways including income return to labor and management, and the rate of return to equity. The most statistically significant variables, quantity of milk sold per cow and purchased feed per cow, were positively related to profitability while hired labor per cow was negatively related. Haden and Johnson identified factors contributing to the financial performance of 81 Tennessee dairy farms. Production per cow, number of cows, milk prices, forage costs, and debt levels appeared to influence financial performance. Ford and Shonkwiler studied factors affecting net farm income on Pennsylvania dairy operations in 1990. They found that dairy management, herd size, and low debt levels per cow were more important to the likelihood of financial success than variables related to crop and financial management of the farm, such as crop expenses per acre and equity-to-asset ratio.

In summary, the literature reveals that there is no consensus on one specific measure for determining farm financial success. In the majority of the farm success studies, researchers have used a measure of net income or rate of return. Many studies showed that the following variables had statistically significant positive correlations with farm success: farm size, measured by acres; productivity, measured by yields; percentage of rented land; and operation of a livestock enterprise. Many studies found a

negative correlation with debt-to-asset or interest rate variables, and the ratio of cash or variable expenses to the value of production or gross income.

Data and methods

Data for this study came from the rice version of the 2000 Agricultural Resource Management Survey (ARMS). ARMS is an annual survey that serves as USDA's major vehicle for data collection on a broad range of issues about agricultural resource use, costs, and farm financial conditions. Multiple ARMS versions are designed to meet these diverse needs. Each year one version of ARMS collects data for the entire farm operation, while one or more additional versions collect commodity specific data for the costs of production accounts. Data on specific commodities are collected on a rotating basis every 3 to 8 years.

USDA collected rice data for 2000 on the ARMS. Data on production practices and costs and financial management practices were collected from rice producers in five states: Arkansas, California, Louisiana, Mississippi, and Texas. Only Missouri rice producers are not represented in the survey. The sample size for this study consists of 412 rice farms in the Southern states since California rice producers are excluded from this study. Rice farms with negative or zero values of farm equity were deleted from the sample only when examining the probability of farm success using the rate of return to equity.

In this investigation, farm success will be measured in two ways, as the return to operator management and the rate of return on equity. The return to operator management is defined as net farm income minus the opportunity cost of the operators' and other unpaid labor, and the opportunity cost of

agricultural equity. The opportunity cost of labor is the hours of unpaid labor for operator and others multiplied by the average agricultural wage rate by state. The opportunity cost of farm equity is computed by multiplying the rice farm's net worth by the five-year average rate of return on U.S. farm equity for 1996-2000. The rate of return on equity is the ratio of the return on farm equity divided by the farm equity. The return on farm equity is defined as net farm income minus a charge for operator and unpaid labor and a charge for management. The ratio is multiplied by 100.

The return to operator management was chosen as a measure of farm success for rice operations since it places a value on the opportunity costs for operator labor and equity. Thus, a farm operation run mostly with operator labor is placed on the same foundation as a farm employing mostly hired labor. The return to operator management is in units of dollars per farm. Since the return to operator management is likely to be a positive function of farm size, another farm success measure was also examined. The rate of return on equity was chosen because it eliminates the influence of size economies that influence dollar measures of farm success, and because it accounts for the influence of debt levels and interest rates.

To facilitate this analysis, rice producers were ranked by each farm success measure. Producers were classified as successful if they ranked in the top half and less successful if they fell into the lower half. Logit regression analysis is used to identify factors associated with probability of operating a successful farm. In this study, one indicates that a farm was classified as successful and zero indicates that a farm was less successful. Factors chosen for this analysis are those found in the literature to impact farm success.

Characteristics of successful rice producers

Data on factors expected to influence farm success are shown in table 1 for the two farm performance measures. Also included in the table are indicators of whether the differences in group means are statistically significant. When success is measured by the operators' management income, successful farms had significantly more total acreage, crop acreage, harvested rice acreage, and share-rent acres. Not surprisingly, these farms also had higher average values of production, gross cash incomes, and government payments while having less debt and lower ratios of expenses-to-income and debt-to-assets. Operators of these farms were more likely to have completed college and to be less than 50 years old.

Alternatively, when success is defined as earning a rate of return on farm equity sufficient to be ranked in the upper half of all rice farms, returns generated from production relative to the value of farm equity become important. Farms owning a relatively low percentage of their operated acreage are more likely to fall into the successful category. Data in table 1 indicate that successful farms have lower asset, debt, and equity values, while having similar debt-to-asset ratios as the less successful farms. Successful farms also have lower average production expenses per farm, lower ratios of expenses-to-gross income, and higher net incomes from the farm operation and rent more land. Operators of successful farms are less likely to be 65 years or older and more likely to be sole proprietors.

Model specification

The logit model is used to determine factors associated with the log of the odds that a farm is successful. The data on rice farms, along with the review of previous studies and economic theory, suggest the

following variables influence the odds of achieving financial success: operator age, age^2, and education; farm organization, efficiency, and diversification; debt-to-asset ratio; size; land productivity; ability to use government programs; and tenure.

The operator age and age^2 and education are incorporated into the model. Age and age^2 are used to represent operators' farm experience and risk-taking preferences. Generally, producers become more proficient and knowledgeable with increasing experience, increasing the likelihood of higher incomes and farm success. However, younger farmers generally take more risks than older farmers. Younger farmers are frequently early adopters of new technologies that may lead to lower production costs. New technologies frequently require financial or human capital investments that older farmers may be reluctant to acquire since their period to earn returns from their investment may be shorter as they approach retirement. Higher education may improve a farmer's ability to profitably allocate farm resources. Hence, more highly educated farmers are expected to achieve higher profitability.

Farm organization, measured as a binary variable equal to one if the operator is a sole proprietor and zero if organized as a corporation or partnership, is expected to be negatively correlated with the probability of success. Farm operations organized as corporations or partnerships usually have more than one person involved in major decisions with each person contributing their unique talent, abilities, interest, and capital to the operation.

The literature review suggests that one of the important variables influencing the probability of farm success is the ratio of cash expenses to value of production. Lower values of this efficiency ratio are associated with increased probability of success. According to the literature, this ratio measures the operator's ability to combine and utilize resources to produce income and to control cash expenses.

However, this explanation does not account for differences in the value of agricultural production caused by differences in price or yields. Also, the ratio is, essentially, the net margin for an enterprise, which is very nearly endogenous to any farm success model. It is therefore questionable whether the variable should be included in the model. If included, one would expect this variable to be statistically significant and to make a major contribution to the explained portion of all farm success models.

Diversification of a farm operation can increase the probability of farm success. Farms with multiple commodities are less susceptible to income declines if market conditions drive down the price of a single commodity or their main commodity is struck by disease or hit with unfavorable weather. On the other hand, over-diversification may not allow one to gain expertise in a particular commodity or allow one to achieve economies of size. Therefore, the influence of this variable is unpredictable. Diversification is measured as the ratio of rice value of production to the total value of production. Farm size, measured by the number of operated acres, is expected to be positively correlated with profitability. As the number of operated acres increases, fixed costs for machinery and irrigation equipment can be allocated over a greater number of acres. Producers with larger acreage may able to purchase inputs at steeper discounts or to sell their output at a premium due to the economies of size.

The ratio of the government payments to the value of agricultural production was included to account for producers' ability to understand, analyze, and participate in government agricultural programs. The ability to benefit from government agricultural programs payments may play a greater role in the future with the 2002 Farm Bill options for updating acreage and yields. A positive relationship is expected for the government payment ratio between farm profitability. Farmland productivity influences farm profitability. Farmland productivity depends upon the weather and climatic conditions, soil types, and moisture levels, among other factors. The productivity of farmland is further enhanced by the

producer's ability to match the crop best able to grow in particular fields to the field's particular traits and the producer's ability to utilize production practices to enhance yields. The rice yield was chosen to represent the productivity of rice operations.

The ratio of acres owned-to-operated is included in the model since the literature review indicates that renting land is positively related to farm profitability. The debt-to-asset ratio is typically included in financial success models to account for farmers' financial management strategy. High debt-to-asset ratios are associated with reduced farm profitability and increased financial risk.

Model Results

The results from the logit regression model are shown in table 2 for two farm success definitions with two versions of the model for each success measure. The first column under each measure shows results without the farm efficiency variable; the second column shows the effects with the efficiency variable. The logit model was less likely to predict the odds of farm success when success was defined using operator management returns. As expected, the models that included the ratio of cash expenses-to-value of production have higher values for McFadden's R^2 and the percentage of correct predictions are greater. Without the efficiency variable, the logit model does not predict farm success very well. With the additional variable, McFadden's R^2 shows that the logit model based on the return to operators' management explained 29 percent of the variation, compared to 35 percent for the rate of return on equity model. The return to operators' management model correctly predicted 83 percent of cases, while the rate of return to equity model correctly predicted 85 percent of the cases.

When farm success was based on operator management income and the cash expense to value of

production was omitted, four variables were statistically significant at the 90 percent or better level: operator education, ratio of government payments to value of production, rice yield, and the debt-to-asset ratio. As expected, education and rice yields were positively associated with management returns. Operators with more years of formal schooling have a greater chance of operating a successful rice farm. The rice yield, a proxy for productivity of all farmland used in rice farm operations, was positively associated with farm success. The coefficient for the ratio of government payments to the value of production is positive, indicating that one's ability to understand and utilize the government's agriculture programs increases the odds of farm success. The debt-to-asset ratio was negatively associated with management returns. High debt levels relative to assets reduce income and lower the odds of achieving financial success.

The model containing the additional variable on the ratio of cash expenses to value of production has five statistically significant variables; operator education, the ratio of cash expenses-to-value of production, ratio of government payment-to-value of production, rice yield, and the debt-to-asset ratio. These five statistically significant variables include the four variables found to be statistically significant in the model that excluded the cash expenses-to-value of production ratio.

The following variables were not found to be statistically significant in neither model using the operator management return measure of success: age and age^2, farm organization, farm size, the ratio of owned-to-operated acres, and farm diversification. Farm size may not be significant in the model since rice farms tend to be rather large and have less variation in total operated acres than cash grain farms and U.S. farms in general.

When success is measured using the rate of return to farm equity, only the tenure variable was

statistically significant in both model versions. The negative coefficient for tenure ratio, defined as the ratio of owned-to-operated acres, indicates that producers were more likely to have higher rates of return if higher proportions of the land used in their farm operations were rented. This is consistent with the findings of other researchers.

Two additional variables, the ratio of government payments to value of production and the ratio of cash expenses to value of production were statistically significant in the model version containing the cash expense-to-value of production variable. As expected, the coefficient for the ratio of government payments to value of production was positive while the coefficient for the cash expenses-to-value of production was negative. Age, age^2, operator education, organization, farm diversification, size, productivity, and the debt-to-asset ratio were not found to be significant factors in the rate of return on equity for southern rice farms.

Conclusion

In this study, the most statistically significant variables for predicting success for rice farms depended on the definition of farm success. When farm success is defined as being in the upper half of rice farms when ranked by their return to the operator's management then education, farm efficiency (controlling cash expenses relative to the value of production), receipt of government payments, farm productivity (measured by the rice yield), and the debt-to-asset ratios are significant factors influencing farm success. If success is designated as having rates of return on equity above average, then control of cash costs, insightful use of the government programs, and using rental arrangements increases the probability of operating a successful rice farm.

The major results of this study compare favorably with other studies on farm success. This study, like many others, found that the ratio of cash expenses to value of production is a major factor influencing farm success. This study differs most significantly from other studies by the inclusion of a non-binary variable, the ratio of government payments to the value of production to indicate the importance of government payments to farm operations. This study, like others, found that increasing the proportion of the farm assets owned by operators decreases net management income and the rate of return on farm equity. Various reasons have been offered for an explanation, including the possibility that rental rates are too low, purchase prices of farm assets are too high, and that the rental of farm assets frees producers from interest and mortgage payments. With the income returns to farm assets averaging less than 2 percent, producers may earn higher rates of income return in other forms of investment. Like other studies, this study did not account for capital gains/losses on farm assets that arise from farmland ownership.

References

Boessen, Christian R., Allen Featherstone, Ph.D., Larry N. Langemeier, Ph.D., and Robert O. Burton, Jr., Ph.D., "Financial Performance of Successful and Unsuccessful Farms," *Journal of the American Society of Farm Managers and Rural Appraisers*, Vol. 54 No.1, April 1990.

Burton, Robert O. and Ali Abderrezak, *Expected Profit and Farm Characteristics*, Staff Paper No. 89-1, July 1988, Department of Agricultural Economics, Kansas State University.

El-Osta, Hisham S. and James D. Johnson, *Determinants of Financial Performance of Commercial Dairy Farms*, Technical Bulletin No. 1859, USDA-ERS, July 1998.

Ford, Stephen A., and J. S. Shonkwiler, "The Effect of Managerial Ability on Farm Financial Success," *Agricultural and Resource Economics Review*, Volume 23, Number 2, October 1994.

Garcia, Philip, Steven T. Sonka, and Man Sik Yoo, "Farm Size, Tenure, and Economic Efficiency in a Sample of Illinois Grain Farms," *American Journal of Agricultural Economics*, Vol. 64, Number 1, February 1982.

Haden, Kimberly L. and Larry A. Johnson, "Factors Which Contribute To The Financial Performance Of Selected Tennessee Dairies," *Southern Journal of Agriculture Economics*, Vol. 21, No. 1, July 1989.

Kauffman, III, Jonas B. and Loren Tauer, "Successful Dairy Farm Management Strategies Identified by

Stochastic Dominance Analyses of Farm Records," *Northeastern Journal of Agricultural and Resource Economics*, Vol. 15, No. 2, October 1986, p168-177.

Mishra, Ashok K., Hisham S. El-Osta, and Cheryl J. Steele, "Factors Affecting the Profitability of Limited-Resource and Other Small Farms," *Agricultural Finance Review*, Volume 59, 1999.

Mishra, Ashok K., Hisham S. El-Osta, and James D. Johnson, "Factors Contributing to Earnings Success of Cash Grain Farms," *Journal of Agricultural and Applied Economics*, Vol. 31, No. 3, Dec. 1999.

Plumley, Garett O. and Robert H. Hornbaker, "Financial Management Characteristics of Successful Farm Firms," *Agricultural Finance Review*, Vol. 51, 1991.

Purdy, Barry M., Michael R. Langemeier, and Allen M. Featherstone, "Financial Performance, Risk, and Specialization," *Journal of Agricultural and Applied Economics*, Volume 29, No. 1, July 1997.

Sonka, Steven T., Robert H. Hornbaker, and Micheal A. Hudson, "Managerial Performance and Income Variability for a Sample of Illinois Cash Grain Producers," *North Central Journal of Agricultural Economics*, Vol. 11, Number 1, January 1989.

Sonka, Steven T. and James N. Thorpe, "Income Performance and Managerial Characteristics on Illinois Cash Grain Farms," *Journal of the American Society of Farm Managers and Rural Appraisers*, Vol. 55, Num. 1., April 1991.

Tvedt, Douglas D., Kent D. Olson, Douglas M. Hawkins, *Short-Run Indicators of Financial Success for Southwest Minnesota Farmers*, Department of Agricultural and Applied Economics, University of Minnesota, Staff Paper Series p89-7. Feb.1989

Table 1. Measuring Success Using Returns to Operator's Management and Rate of Return on Equity on U.S. ARMS Rice Farms, 2000

Item	Operator's management returns				Rate of return on equity			
	Less successful (*a*)		Successful (*b*)		Less successful (*a*)		Successful (*b*)	
Returns to operator's management (*$*)	-73,306	*b*	168,871	*a*	-67,129	*b*	160,408	*a*
Rate of return on equity (*%*)	**-8		**14		*-20	*b*	43	*a*
Rice yields (*cwt/acre*)	62	*b*	65	*a*	63	*b*	65	*a*
Total operated acres per farm	1,370	*b*	1,734	*a*	1,608		1,454	
Owned acres	390		477		605	*b*	277	*a*
Cash-rented acres	*481		481		*488		426	
Share-rented acres	561	*b*	811	*a*	579		785	
Acres of cropland	1,204	*b*	1,595	*a*	1,380		1,377	
Harvested rice acres	358	*b*	452	*a*	392		411	
Prodn. value all commodities (*$/farm*)	252,245	*b*	386,232	*a*	310,533		320,516	
Rice production value (*$/farm*)	129,255	*b*	174,190	*a*	144,637		156,757	
Percentage of rice to total prodn. value	51		45		47		49	
Farming occupation (*%*)	94		92		91		95	
Operator age (*years)*	51		49		51		49	
Less than 50 years (*%*)	43	*b*	53	*a*	46		50	
Operator completed college (*%*)	21	*b*	30	*a*	28		22	
Operator completed high school (*%*)	41		38		39		40	
Sole/family proprietor (*%*)	69		65		62	*b*	74	*a*
Family corporation (*%*)	7		*7		10	*b*	*3	*a*
Gross farm income per farm (*$*)	315,783	*b*	542,939	*a*	382,183		463,407	
Production expenses per farm (*$*)	356,263		340,861		411,512	*b*	274,624	*a*
Net farm income per farm (*$*)	-40,480	*b*	202,078	*a*	**-29,329	*b*	188,783	*a*
Gross cash income per farm (*$*)	317,420	*b*	529,964	*a*	382,483		450,325	
Crop cash income per farm (*$*)	175,214	*b*	318,389	*a*	205,389	*b*	277,919	*a*
Government payments per farm (*$*)	95,492	*b*	138,128	*a*	105,114		123,207	
Cash prodn expenses per farm (*$*)	325,209		310,983		375,074	*b*	250,405	*a*
Net cash income per farm (*$*)	**-7,789	*b*	218,981	*a*	**7,410	*b*	199,921	*a*
Ratio of expenses/gross cash income (*%*)	103	*b*	59	*a*	98	*b*	56	*a*
Farms with negative income (*%*)	48	*b*	0	*a*	46	*b*	0	*a*
Farm assets (*$ per farm*)	971,040		1,011,524		1,326,873	*b*	682,219	*a*
Farm debt (*$ per farm*)	142,503	*b*	76,159	*a*	143,937	*b*	64,953	*a*
Farm equity (*$ per farm*)	828,537		935,365		1,182,937	*b*	617,266	*a*
Debt/asset ratio (*%*)	17	*b*	12	*a*	13		11	

Notes:
Coefficient of Variation (CV) = (Standard Error/Estimate) x 100.
* indicates that CV is greater than 25 and less than or equal to 50.
** indicates that CV is greater than 50.
a and *b* indicate that estimates are significantly different from the indicated group at the 90 percent or better level using the t-statistic.
Source: 2000 USDA Agriculture Resource Management Survey.

Table 2. Parameter Estimates for Factors Influencing Success on U.S. ARMS Rice Farms, 2000

Item	Operator's management returns				Rate of return on equity			
	w/o eff	w/o eff	w eff	w eff	w/o eff	w/o eff	w eff	w eff
	Coef-ficient	t statistic	Coef-ficient	t statistic	Coef-ficient	t statistic	Coef-ficient	t statistic
Intercept	-1.7323 ***s***	-1.84	2.5629	0.83	0.0151	0.00	5.8085 ***s***	1.99
Operator age^2 (*years*)	-0.0003	-0.74	-0.0001	-0.07	0.0005	0.46	0.0012	1.08
Operator age (*years*)	0.0187	0.41	-0.137	-0.16	-0.0466	-0.49	-0.1194	-1.10
Operator education (*years*)	0.3867 ***s***	2.05	0.6003 ***s***	1.87	0.0193	0.08	0.0770	0.22
Organization (*1 if sole proprietor, 0 if not*)	-0.1095	-0.45	-0.3037	-1.13	0.4551	1.58	0.4674	1.42
Diversification (*rice value of Prod. to the total value of prod.*)	-0.6268	-1.29	-1.3144	-1.58	-0.2185	-0.48	-0.3997	-0.79
Farm efficiency (*cash expenses to value of prod*)	.--	.--	-5.3270 ***s***	-3.86	.--	.--	-6.1152 ***s***	-4.77
Government payments (*ratio of govt payments to value of prod.)*	0.5906 ***s***	2.85	3.3572 ***s***	3.34	0.5901	1.73	3.1801 ***s***	3.60
Size (*total acres operated*)	0.0001	0.64	0.0002	1.01	0.0000	0.19	0.0001	0.83
Productivity (*rice yield in cwt. per acre*)	0.0262 ***s***	3.02	0.0221 ***s***	3.07	0.0183	1.68	0.0093	0.88
Tenure (*ratio of acres owned to total acres*)	-0.3446	-0.99	0.6933	1.22	-1.7702 ***s***	-3.79	-1.0823 ***s***	-2.53
Debt-to-asset ratio (*percent*)	-1.2918 ***s***	-2.63	-0.8717 ***s***	-2.21	-1.2978	-1.47	0.0817	0.11
McFadden's R^2	.065		.287		.085		.345	
Percent of concordant predictions	61.3		82.6		64.5		85.0	
Sample size	412		412		403		403	

Notes:
s indicates that estimates are statistically significant at the 90 percent or better level using the t-statistic.
-- Variable not included in model.
Source: 2000 USDA Agriculture Resource Management Survey.