DOCUMENT RESUME

ED 274 494 RC 015 941

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TITLE Farm Financial Stress and Level of Off-Farm Employment.
PUB DATE Aug 86
NOTE 21p.; Paper presented at the Annual Meeting of the Rural Sociological Society (Salt Lake City, UT, August 26-30, 1986).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Economic Change; Employment Level; *Employment Patterns; *Farmers; *Financial Problems; Participant Characteristics; *Part Time Employment; Rural Economics; Rural Farm Residents
IDENTIFIERS Farm Women; North Dakota; *Ranching; Rural Sociology; Texas

ABSTRACT

Farm and ranch operators in North Dakota (n=933) and Texas (n=1,020) were randomly surveyed in 1985 to determine the relationship of financial conditions to levels of off-farm employment by farm operators and spouses. The overall response rate was 75%. Off-farm employment was measured by number of days the farmer or spouse was employed off of the farm for 4 or more hours and by intention to obtain off-farm employment during the coming year. Debt-to-asset ratio and 1984 net cash farm income were used to measure amount of financial stress. Farm financial condition was not found to be significantly related to amount of off-farm employment. However, farmers and spouses with the highest debt-to-asset ratio who had started farming recently, had highest educational attainment, and who were most pessimistic about chances of continuing farming were most likely to state intentions to seek off-farm employment during the coming year. Off-farm employment was most prevalent among farm families with lowest farm incomes who farmed rented land, had started farming recently, had higher levels of education, and had fewer persons in the household. Tables provide correlation matrix of survey variables and regression coefficients and logistic regression showing effects of independent variables on off-farm employment. (LFL)

Farm Financial Stress and Level of Off-Farm Employment

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Abstract

American farmers are facing their most severe financial crisis since the 1930s. As a result of low commodity prices, high interest rates and falling land values, an unprecedented proportion of farmers are likely to be forced to quit farming in the next few years. One possible way farm families can deal with the current financial crisis in agriculture is to supplement their farm income with an off-farm job. In this paper, data are presented from a 1985 survey of a random sample of farm operators in Texas and North Dakota to determine the extent to which farm financial conditions are related to levels of off-farm employment by farm operators and their spouses. It was found that financial stress was not strongly related to current levels of off-farm employment, but that farm families experiencing severe farm financial difficulties are much more likely to state that they intend to look for off-farm employment during the next year. Implications of these findings are discussed.

Introduction

In recent years American farmers have been facing their most severe financial crisis since the 1930s. As a result of high interest rates, declining land values, and low commodity prices, an increasingly large proportion of American farmers are facing the real possibility of being forced to quit farming within the next few years (U.S. Department of Agriculture, 1984; Leholm et al., 1985; Murdock et al., 1985). Researchers in the sociology of agriculture have recently begun to look at the causes and consequences of the financial crisis in U.S. agriculture, and the characteristics of operators experiencing the most financial stress (e.g., Heffernan and Heffernan, 1985a; 1985b; Bultena et al., 1985; Leistritz et al., 1985; Murdock et al., 1985; Murdock et al., 1986). However, a critical research need that still remains largely unexplored is the adaptive measures utilized by farm families to attempt to survive economically during periods of severe financial stress, and the success of such strategies.

One possible form of adaptation that is potentially available to farm families to improve their financial situation is to obtain an off-farm job. The income obtained from such employment could be used to supplement both the family living expenses and the farm unit until economic conditions improve. Furthermore, income from off-farm sources may be critical to some farm families as they endeavor to meet their financial obligations.

In recent decades an increasingly large proportion of American farmers have obtained off-farm employment (Albrecht and Murdock, 1984; Cavazzani, 1979; Larson, 1981; Singh, 1983; Wimberley, 1983), and by 1982, 43 percent of all farm operators nationwide reported that they had worked 100 days or more off of their farm. The increased importance of off-farm

employment has resulted in a growing literature on this topic. As a result, farm operators' reasons for obtaining off-farm employment, their characteristics, their production practices, and their values and attitudes have been reasonably well established (e.g., Albrecht and Murdock, 1984; 1985; Buttel and Larson, 1982; Coughenour and Swanson, 1983; Heffernan et al., 1981; Ladewig and Garibay, 1983; Singh and Williamson, 1981). As of yet, however, researchers have not examined the extent to which farmers experiencing various levels of financial stress are obtaining or plan to obtain off-farm employment as a means of coping with the farm crisis.

Another common weakness with much of the previous research on off-farm employment is that it has looked only at the farm operators and ignored the contributions of the spouse. This is partially due to the fact that the Census of Agriculture obtains information about off-farm employment for the farm operator only. However, the off-farm decisions of the spouse are also a major determinant of the off-farm income of farm families (Coughenour and Swanson, 1983; Maret and Copp, 1982). The purpose of this paper is to determine the extent to which farm families experiencing different levels of financial stress have obtained or plan to obtain off-farm employment in an attempt to deal with the farm crisis. In addition, the off-farm employment patterns of both the farm operator and his/her spouse will be explored.

In addition to looking at the bivariate relationship between off-farm employment and the level of financial stress experienced by the farm, it is also critical that multivariate analysis be made. This will allow a determination to be made if the relationship between off-farm employment and financial stress is real or a result of their common relationship with another variable. Thus, in this analysis, the effects of potentially

important variables such as gross farm sales, crop sales, tenure, satisfaction with farming, year started farming, education, number of persons in the household, and the likelihood of continuing in farming will be statistically controlled.

Methods

The data used for this analysis were taken from telephone surveys of farm and ranch operators conducted in North Dakota and Texas. A common survey instrument was used in the two states, and the surveys were conducted during the same period of time (March-May of 1985). A total of 1953 operators were interviewed in the two states (933 in North Dakota and 1020 in Texas) with an overall response rate of 75 percent (70 percent in Texas and 77 percent in North Dakota). Respondents were screened to obtain persons for whom farming or ranching was their major economic enterprise and for whom the present farm crisis is likely to be of greatest concern. Therefore, interviews were limited to persons under 65 years of age, who were operating a farm or ranch at the time of the interview, who had gross farm sales of over $2,500 in 1984 and who considered farming to be their primary occupation. When compared with the characteristics of farm and ranch operators whose primary occupation was farming and who were under 65 years of age as reported in the 1982 Census of Agriculture, it appears that the sample obtained for this survey is relatively representative of the population of such farm and ranch operators in the two states.

Two measures of off-farm employment were utilized in the analysis. These included the number of days the farmer was employed off of the farm for four or more hours and the number of days the spouse was employed off of the farm for four or more hours. An additional measure was obtained by

asking farmers and their spouses whether or not they intended to obtain off-farm employment during the coming year.

Two variables were used to measure the amount of financial stress being experienced by the farm family including the debt-to-asset ratio and net cash farm income in 1984. The debt-to-asset ratio is among the most widely used indicators of the overall financial health of a farm operation with debt-to-asset ratios over 40 percent considered to be difficult to manage (Johnson et al., 1985). Net cash farm income in 1984 provides an indication of the recent economic returns to the farm enterprise and of the likely profitability of the farm operation. The debt-to-asset ratio is used in percent form while net cash farm income is used in the form of dollar units.

Several control variables are used in the analysis. These include the gross farm sales in 1984, gross crop sales in 1984, the percent of the farmland owned, the self-reported satisfaction with farming (a five-point scale from very satisfied to very dissatisfied), the year the operator began to farm, the education of both the operator and spouse, the number of persons living in the household, and the self-reported likelihood of being able to continue in farming for another three years (a five-point scale from very likely to very unlikely). Each of these control variables are choosen for the analysis to determine if the relationship found between off-farm employment and financial conditions are real or a result of a common relationship to a third variable.

The analysis consists of several parts. First, a correlation analysis will be made in order to see the bivariate relationship between off-farm employment and the financial conditions of the farm. Following this, regression models are run with the off-farm employment variables as the

dependent variables, and debt-to-asset ratio, net cash farm income and the control variables all being used as independent variables. Finally, logistic regression is used to explore the relationship between whether or not the farmer or spouse plan to obtain off-farm employment (the dependent variable) and the financial measures and the control variables as independent variables. For this analysis, logistic regression is used because the dependent variable (plans to obtain off-farm employment) is dichotomous (yes or no) (Nerlove and Press, 1973; Harrell, 1980: Knoke and Burke, 1980).

In using logistic regression, a chi-square statistics is computed for each individual variable and for each model to test the hypothesis that a parameter is zero. For the present analysis, the chi-square for the model on each dependent variable will be reported, as will the chi-square testing the significance of each individual predictor variable in the model. In addition, a D statistic which measures the fit of each model will be reported. This D statistic is analogous to R-square in the normal setting. Individual D statistics, which are similar to partial R-squares, will also be shown. Finally, the intercept and -2LogL for each model will be presented (Harrell, 1980).

Findings

Table 1 presents a correlation matrix of all of the variables used in the analysis. Of prime importance for this paper, this table shows the bivariate relationships between the off-farm employment variables and the financial conditions of the farm. The results show that the farmer's debt-to-asset ratio was not significantly related to either of the off-farm employment variables. Thus contrary to expectations, farm families with

excessive levels of debt are not more likely than other farm families to obtain off-farm employment to supplement the family income.

It was also found (Table 1) that there were weak but significant inverse relationships between net cash farm income and the level of off-farm employment among farm families. That is, as net farm income increases, the level of off-farm employment for both the farmer and his spouse decreases. This is consistent with expectations and shows off-farm employment to be greatest among those farm families with the lowest farm incomes.

Table 1 also shows that several of the control variables are significantly related to the level of off-farm employment experienced by the farm family. Generally, off-farm employment was found to be most prevalent among farm families where the gross farm sales and the gross crop sales were the least, where farmland is rented rather than owned, where the farmer started farming recently, where the farmer and his spouse have higher levels of education, and where there are fewer persons residing in the household. The strongest variables at the bivariate level were education and the year started farming (Table 1).

Table 2 presents the results of a regression analysis using the off-farm employment variables as the dependent variables and the farm finance and control variables as the independent variables. It was found that the variables utilized in this study were able to explain only a very small proportion of the variance in the amount of off-farm employment experienced by the farm families in this study. The variables explained only 5 percent of the variation in the number of days the farmer was employed off of the farm and 9 percent of the variation in the number of days the spouse was employed off of the farm. As was the case with the bivariate

relationships, it was found that debt-to-asset ratio was not significantly related to any of the off-farm employment variables. Also, while net cash farm income was significantly related to the level of off-farm employment at the bivariate level, this relationship became insignificant when the effects of the control variables were taken into account. Thus, the results of Table 2 show that the level of off-farm employment is not related to either of the financial measures utilized.

Several of the control variables were significantly related to the level of off-farm employment. The control variables with the strongest relationship to the number of days the farmer was employed off of the farm included gross farm sales (beta equals -.11), gross crop sales (-.10), year started farming (.10) and the farmer's education (.11). These relationships show that off-farm employment is most prevalent among farmers with the least gross farm sales and gross crop sales, persons who entered farming more recently, and farmers with higher levels of educational attainment. When looking at the factors related to the number of days the spouse was employed off of the farm, it was found that the spouse's education and the number of persons living in the household were the two most important variables.

When the spouse has higher levels of education (.19) and when there are fewer persons in the household (-.17) the spouse is most likely to work off of the farm. This last relationship makes sense because the vast majority of the spouses in this study are women and have the major responsibility of child care. In addition, three other variables were significantly related to the level of off-farm employment by the spouse. These included gross farm sales (-.09), the percent of the farm owned (-.07) and year started farming (.12; Table 2).

The results presented thus far indicate that the financial condition of the farm is not significantly related to the extent of off-farm employment held by farm families. Another concern of this paper is to determine if the financial situation of the farm is related to whether or not the farmer or spouse intend to look for off-farm employment during the next year. Perhaps families operating farms in financial trouble have not yet adjusted to the farm crisis by obtaining off-farm employment, but realizing their situation intend to look for such employment during the coming year.

Table 3 presents the results of a logistic regression on whether or not both the farmer and spouse intend to seek off-farm employment. The table shows that the farm's debt-to-asset ratio is significantly related to the likelihood of both the farmer and spouse looking for off-farm employment. As expected, farm families experiencing the greatest levels of financial stress are the most likely to state that they intend to look for off-farm employment during the next year. Net cash farm income was not related to the intentions of either the farmer or spouse to seek off-farm employment.

Four of the control variables were significantly related to the farmers intentions to seek off-farm employment. The strongest relationships were between intentions to seek off-farm employment and year started farming (chi-square = 24.38) and gross farm sales (22.52). Also significant were the liklihood of continuing in farming (16.13) and education (6.66). These relationships indicate that farmers more likely to seek off-farm employment include those who entered farming most recently, those with the least gross sales, those who think they are least likey to continue in farming, and those with the highest levels of education.

For the spouse, five of the control variables were significantly related to their intentions to seek off-farm employment. The strongest relationship was found for education (chi-square = 56.57) where it was found that those with the highest levels of education are most likely to state that they intend to seek off-farm employment. Additional significant relationships were found for year started farming (24.29), number of persons in household (19.02), liklihood of continuing in farming (7.74), and percent of farm owned (6.76). These relationships show that spouses most likely to state that they intend to seek off-farm employment started farming more recently, have fewer people in the household, consider their future in farming to be uncertain, and reside on a farm where a larger proportion of it is rented.

Conclusions

With American farmers facing their most serious financial crisis since the Great Depression, an important concern is to determine how farmers are adjusting in response to the crisis and the success of these adjustments. One potentially important way that farm families can deal with the farm crisis is for farmers or their spouses to obtain employment off of the farm. This paper explored the relationship between the level of financial stress experienced by farm families and the extent to which both the farmer and his spouse have obtained or plan to obtain off-farm employment.

It was found that the financial condition of the farm was not significantly related with amount of off-farm employment by either the farmer or his/her spouse. However, it was found that farmers with the highest debt to asset ratio and who were most pessimistic about their chances of continuing in farming were most likely to state that they intend to seek off-farm employment during the coming year. A similar relationship

was found for spouses. Thus, while farm families experiencing the most financial stress have not adapted by obtaining more off-farm employment, it appears that many of them intend to pursue this course in the immediate future.

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Table 1. Correlation Matrix of the Variables used in the Analysis.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Number of days farmer employed off farm	-												
2. Number of days spouse employed off farm	.19*	-											
3. Debt-to-asset ratio	.01	.02	-										
4. Net cash farm income	-.09*	-.06*	-.14*	-									
5. Gross farm sales	-.07*	-.06*	.03	.03	-								
6. Gross crop sales	-.13*	-.04	.15*	.10*	.06*	-							
7. Percent of farm owned	.01	-.08*	-.17*	-.02	-.07*	-.23*	-						
8. Satisfaction with farming	.00	.02	.15*	-.12*	.02	.11*	.03	-					
9. Year started farming	.11*	.13*	.22*	-.05	-.03	.01	-.30*	-.08*	-				
10. Farmers education	.07*	.09*	.05	-.05	.08*	.08*	-.22*	.04	.38*	-			
11. Spouses education	.04	.19*	.04	-.00	.04	.05*	-.10*	.02	.25*	.52	-		
12. Person in household	.01	-.08*	.08*	-.01	.03	.08*	-.14*	.00	.34*	.16*	.10*	-	
13. Likelihood of continuing in farming	-.00	.03	.24*	-.19*	-.00	.07*	-.09*	.34*	-.03	-.06*	-.05*	.02	-

*Statistically significant at the .05 level.

Table 2. Standardized Regression Coefficients Showing the Effects of Independent Variables on Off-Farm Employment

Independent Variables	Dependent Variables: Number of days Farmer Employed Off Farm	Dependent Variables: Number of Days Spouse Employed Off Farm
Debt-to-Asset Ratio	.02	.01
Net Cash Farm Income	-.04	-.03
Gross Farm Sales	-.11*	-.09*
Gross Crop Sales	-.10*	-.02
Percent of Farm Owned	-.00	-.07*
Satisfaction with Farming	.03	.04
Year Started Farming	.10*	.12*
Education - Farmer	.11*	-
Spouse	-	.19*
Person in Household	-.03	-.16*
Likelihood of Continuing in Farming	.02	.02
F Value	6.89*	11.32*
R^2	.05	.09

*Statistically significant at the .05 level.

Table 3. Logistic Regression Showing the Effects of Independent Variables on Whether Farmer or Spouse Intends to Look for Off-Farm Employment During the Next Year

Predictor Variables	Farmer		Spouse	
	Chi-Square	D	Chi-Square	D
Debt-to-Asset Ratio	4.07*	.04	4.97*	.04
Net Cash Farm Income	0.08	.00	3.03	-.02
Gross Farm Sales	22.52*	-.12	3.65	-.03
Gross Crop Sales	2.39	-.02	1.15	.00
Percent of Farm Owned	0.10	.00	6.76*	-.05
Satisfaction with Farming	2.34	.02	0.07	.00
Year Started Farming	24.38*	.12	24.29*	.11
Education	6.66*	.06	56.57*	.18
Person in Household	0.13	.00	19.02*	-.10
Likelihood of Continuing in Farming	16.13*	.10	7.74*	.06
Model				
D	.26		.29	
Chi-Square	111.61*		158.00	
-2LogL	1417.29		1563.94	

*Statistically Significant at the .05 level.