November 1986 A.E. Res. 86-28

"NONMONETARY CONSIDERATIONS IN FARM OPERATOR LABOR ALLOCATIONS"

By
Deborah H. Streeter
William E. Saupe

Department of Agricultural Economics
Cornell University Agricultural Experiment Station
New York State College of Agriculture and Life Sciences
A Statutory College of the State University
Cornell University, Ithaca, New York, 14853

Nonmonetary Considerations in Farm Operator Labor Allocations

by

Deborah H. Streeter and William E. Saupe*

During the past decade increasing numbers of farm families have augmented their farm revenues with income from an off-farm job. In 1984, off-farm wages and salaries made up 31% of average farm family income (Ahearn). Over 60% of agricultural producers in the U.S. now derive some of their income from off-farm work, a significant shift toward dependence of farm families on employment opportunities off the farm (Schuh). The trend towards multiple job-holding is of special concern to policy makers interested in farm family income issues and rural development.

Recent economic studies of off-farm labor supply (Huffman, Bollman, Sumner, Simpson and Kapitany) have cast the problem in the framework of utility maximization, yielding models in which farmers, at the optimum, allocate labor to each market such that marginal rates of return from each occupation are equal. In estimating the supply of off-farm work, these models include relevant exogenous variables that affect the marginal rates of return to farm and off farm work, such as measures of human capital, family and farm life cycles. Nonpecuniary benefits associated with farm work, such as fresh air, physical exercise, and a farm family lifestyle are mentioned but usually considered not tractable (Bollman, Huffman, Sumner, Simpson and Kapitany). Thus, none of the models includes explicit recognition of non-monetary benefits that might accrue to farm work.

For policymakers, the omission of nonpecuniary considerations may be an important limitation of existing economic models of labor allocation by farmers. For example, the existence of such externalities would increase the implied wage to farmers for their farm work and lead to allocations of labor toward farming that would seem nonoptimal based on monetary marginal returns. Rural development policies aimed at creating off-farm opportunities for farmers and their families could fail unless returns to off-farm work are high enough to compensate the farmer for losing the farm lifestyle. Alternatively, measuring farm family income in monetary terms alone may not give full consideration to the benefits perceived by farmers of working on the farm.

---

* Deborah H. Streeter is an Assistant Professor in the Department of Agricultural Economics at Cornell University. William E. Saupe is a Professor in the Department of Agricultural Economics at the University of Wisconsin-Madison. The authors gratefully acknowledge the useful comments and suggestions by Richard Boisvert, Harry Kaiser, David Lee, Donald Liu, Chris Ranney and Priscilla Salant. This manuscript was prepared by Holly Knickerbocker.

This paper presents a model in which the role of nonpecuniary benefits derived from farm work is explicitly recognized. A supply function for off-farm work is derived and then estimated using ordinary least squares regression The econometric results of estimating the model for multiple job-holding farmers in Mississippi and Tennessee provide evidence that not only is there wage elasticity in the supply of off-farm work, but also that nonmonetary benefits derived from farm work do have a significant effect on the off-farm labor allocation of the operator.

Previous work

Early studies of off-farm earnings concentrated on the rural-to-urban migration of those with off-farm work (Fuguitt, Baumgartner). Off-farm work was assumed to be a transitional employment pattern for operators leaving the farm sector. In the early 1970s, the focus was shifted by Polzin and McDonald, who tested the theory that farmers allocate time on and off the farm in such a way that marginal revenue product equals the net farm wage. The new approach was distinct in a crucial aspect: multiple job-holding was allowed to enter as a possible solution at the optimum.

At about the same time, researchers interested in other labor force issues such as the supply of labor by women (Gronau, Heckman, Heckman and Macurdy),the role of time-saving services (Sharir), aggregate labor force behavior, and life cycle issues (Heckman and Macurdy, Smith) were extending the early labor force work of Mincer (1962) and Becker (1965).

Building on the utility maximizing framework used in these labor studies, Huffman (1981) presented the first off-farm work model for farmers in which the utility function was specified and first order conditions presented. His empirical findings were that the off-farm labor supply of farmers was increased by raising the level of education and increasing the amount of agricultural extension. Bollman (1979) translated Huffman's formulation to a kinked demand curve analysis which he used to estimate off-farm work supplied by Canadian farmers. Sumner (1982) extended the model by providing a unified treatment of a corner solution and by directly considering the selection bias problem. The utility maximizing model was compared to a target income model by Simpson and Kapitany (1983), who found that the models produced divergent results about off-farm work labor allocations.

Little economic analysis has been done on the nonpecuniary aspects of farm work. Deaton, Morgan and Anschel (1982) have shown that there is a "psychic cost" associated with migration from rural to urban communities. Sociologists who have studied the structure of farm family decision making (Colman, Konigsburg and Puryear) emphasize that farmers consider farm work a "first choice" and off-farm work as a second. Studies of farmers' goal structures (Barnett, Blake and McCarl; Patrick, Blake and Whitaker) have shown that farmers try to achieve nonmonetary as well as monetary goals in their behavior. However, none of these studies relates nonpecuniary effects of farming directly to labor allocation decisions. One contribution of this paper is to adapt previous off-farm labor supply models to incorporate nonmonetary considerations.

Adapting the Off-farm labor supply model

Following Huffman, the farm household maximizes a utility function which depends on: leisure (L), purchased goods (Y_1), and exogenous factors such as age and education (Y_2). The function is assumed ordinal and strictly concave:

(1) $U = U(L, Y_1; Y_2)$, $(U_i = \partial U/\partial i > 0, i = L, Y_1)$.

The model can be adapted to incorporate non-pecuniary benefits accruing to farm work by adding to the utility function an additional term (N), which represents nonpecuniary benefits such as outdoor work, family lifestyle, and sense of self-sufficiency associated with farm work. The adapted utility function is:

(2) $U = U(L, Y_1, N; Y_2)$, $(U_i = \partial U/\partial i > 0, i = L, Y_1, N)$,

where N is determined by time spent working on the farm (X_1) and a vector of exogenous factors (X_4), such as farm type in the following production function:

(3) $N = N(X_1; X_4)$, $(n = \partial N/\partial X_1 > 0)$.

The constraints on the utility function are the same as in the Huffman formulation. Each farm member is endowed with total available time (T^o), to be allocated to farm work (X_1), off-farm work (T_{of}) and leisure (L):

(4) $T^o = X_1 + T_{of} + L$.

The household has the following sources of income to fund the consumption of a bundle of market goods (Y_1) with an associated price vector (P_1): off-farm income earned at a wage rate (W_{of}), net farm income ($PQ - W_2X_2$), and nonearned income (V):

(5) $W_{of}T_{of} + PQ - W_2X_2 + V = P_1Y_1$

where Q is farm output, X_2 is a vector of variables inputs and P and P_2 are the associated price vectors. Total output is determined by farm labor inputs (X_1), a vector of variable purchased inputs (X_2), and a vector of exogenous factors (X_3), such as operator age, experience, and local soil conditions, in the following production function:

(6) $Q = F(X_1, X_2; X_3)$, $(f_i = \partial Q/\partial Xi > 0, i = 1,2)$.

In maximizing (2), the farm operator's problem is to choose the optimal consumption of leisure (L), purchased goods (Y_1), and nonpecuniary benefits (N), subject to the resource constraints of (4) and (5), as well as the technical constraints of (3) and (6). Thus, the choice variables are on-farm work (X_1), off-farm work (T_{of}), leisure (L), variable inputs (X_2), and consumption of purchased goods (Y_1).

Assuming interior solutions and substituting (6) into (5) for Q, and (3) into (2) for N, the first orders conditions associated with the choice variables are:

(7) $-\gamma + U_N n + \delta f_1 = 0$

(8) $-\gamma + \lambda W_{of} = 0$

(9) $-\gamma + U_L = 0$

(10) $-\lambda W_2 + \delta f_2 = 0$

(11) $UY_1 - \lambda P_1 = 0$

where $-\gamma$ and λ are the Lagrangian multipliers associated with (4) and (5), respectively and thus can be interpreted as the marginal utility of time and the marginal utility of income.

Equation (7) indicates that on-farm work should be supplied to the point where the sum of of marginal utility from nonpecuniary benefit and the value of the marginal produce of on-farm labor equal the marginal utility of time. As shown, the nonpecuniary aspect of the return from farming is explicitly considered in the decision making process. Equations (8) and (11) depict the traditional marginal conditions. Equation (8) suggests that off-farm labor be supplied up to the point where marginal utility of wage income equals marginal utility of time, while (9) suggests the marginal utility of leisure equals the marginal utility of time. Equation (10) indicates that the VMP of variable inputs be set to their corresponding market prices and (11) requires that marginal utility associated with consumption of purchased goods be equal to the marginal utility derived from the associated market price.

Combining equations (7),(8), and (9), yields:

(12) $U_N n + \delta f_1 = \lambda W_{of} = U_L = \gamma$

In other words, the time allocation is such that, at the optimum, the marginal utility from farm work, non-farm work, and leisure are set to equal one another and to the marginal utility of time.

Furthermore, the optimal choice variables can be obtained by solving the first order conditions simultaneously. In particular, a supply function for off-farm work equation can be derived by expressing the choice variable T_{of} as a function of all the exogenous variables of the system:

(13) $T_{of}^* = F(X_4, Y_2, X_3, P_1, P, T^o, W2, V, W_{of})$.

The Data and the Empirical Model

The data used in this study are taken from the U.S. Department of Agriculture's 1981 Family Farm Survey. USDA interviewed 1087 family farms in 23 counties in Northeast Mississippi and six counties in Southwest Tennessee. This study used 247 observations for which off-farm work by the operator was reported.[1] An advantage of the data for the purposes of the study is that both production and off-farm labor information were collected for every household.

Average annual gross sales for the farms in the sample ranged from $1000 to about $300,000, with a mean of $12,712. Mean values for additional characteristics are included in Table 1 for the whole sample and three subgroups: small (less than $5,000 in annual gross sales), medium ($5,001 to $20,000), and large (greater than $20,000).

The sample is characterized by small farms run by older operators (mean of 48 years) who have on average about 21 years of farm experience. On average, producers in the sample live 17 miles from work, spend 1787 hours a year working off the farm, and earn a off-farm wage of about $6.60.

The model specified in the previous section provides a supply equation with all the exogenous characteristics that affect the marginal value of the operator's time allocations. The following discussion describes the measurement of variables for estimation purposes, including a description and justification of tractable proxies where appropriate.[2]

The off-farm wage rate

Although the argument is made here as elsewhere (Sumner) that the wage offer is independent of the number of hours worked off the farm, it is still reasonable to expect some correlation between the error term of the wage equation and the error term of the hours equation. For example, if an individual were by nature a hard worker, it would likely affect the number of hours worked and the wage offer in the same direction. Thus, following previous work (Sumner), predicted wage was used as an instrumental variable for W_{of} even though accurate hourly wage data was reported in the survey.

---

1. Estimates presented in the study are conditional on participation in the off-farm work force. As such, they are not biased, however omission of non-participating farmers (i.e., those with no off-farm work) may lead to sample selection bias in the context of the total labor supply. For example, Heckman has shown that estimating behavioral relationships using nonrandomly selected samples results in biased estimates. Here the interest is in the conditional supply function.

2. Price vectors P_1, P, and W_2 of (13) are omitted from the discussion. There is not enough variation in price data across the sample.

TABLE 1. Mean Values for Variables, By Farm Size

VARIABLE NAME	ALL FARMS Mean (S.D.) n=247	SMALL FARMS < $5000 n=108	MEDUM FARMS $5000-$20,000 n=99	LARGE FARMS > $20000 n=40
GROSS SALES	12712 (24308)	2529	9765	47497
CROP ACRES	74 (134)	18	59	266
FARM WORK BY OPERATOR (Annual)	1355 (1000)	984	1451	2122
OPERATING CAPITAL	4644 (9248)	1245	3528	16579
LIVESTOCK CAPITAL	8661 (12108)	5884	9713	13551
OPERATOR FARM EXPERIENCE (Years)	21 (13)	21	22	22
OFF-FARM WAGE (Hourly)	6.57 (3.29)	6.55	6.28	7.3
JOB TRAINING (=1 if any)	0.065	0.05	0.08	0.05
HIGHSCHOOL EDUCATION (=1 if only highschool)	0.37	0.47	0.28	0.3
COLLEGE EDUCATION (=1 if college)	0.24	0.17	0.27	0.33
OFF-FARM WORK EXPERIENCE (No. years during 1975-1980)	4.7 (.89)	4.7	4.8	4.4
OPERATOR AGE	48 (11)	49	48	48
RACE OF OPERATOR (1=Black, Otherwise=0)	0.18	0.21	0.17	0.12
MARKET VALUE OF FARM ASSETS	30782 (51534)	14991	25641	86143

TABLE 1 (Continued)

NO. 1 GOAL = INCREASING PRODUCTION (=1 if yes)	0.39	0.32	0.39	0.53
NO. 1 GOAL = HAVING FARM LIFESTYLE (=1 if yes)	0.223	0.27	0.2	0.13
OFF-FARM WORK HOURS (Annual)	1797 (679)	1956	1691	1257
UNEARNED INCOME	1112 (3123)	1082	1394	496
MILES TO OFF-FARM JOB	17 (19)	17	18	16

Wages were estimated as a linear function of job training, work experience, operator age, race and education. All variables were expected to have a positive effect on wage, except age, which was expected to have expected to behave in a quadratic fashion and race, which was included due to the possibility of job discrimination in the off-farm job labor market. Job training was a dummy variable, equal to 1 if the operator reported any training. Work experience and age were reported in years. Education was measured with two dummy variables, where the first was equal to one if there was high school education, and the second was equal to one if college training was reported. Race was also a dummy variable, with the observation equal to one if the operator was black. Results of the estimated wage function were used to calculate a predicted wage to be entered as an instrumental explanatory variable in the off-farm supply function.

Fixed farm characteristics

Choosing independent variables to represent fixed farm characteristics is essentially an issue of the short run versus the long run. Since the theoretical model shows that variable inputs to farming are simultaneously determined with the labor allocation, explanatory variables relating to production must reflect decisions that are longer term than the labor allocation decision.

Ideally, some measure of long term capital stock would be desirable, since it would reflect the longer term decision made by the farm operator about size and type of farm. However, available data does not offer a direct measurement of fixed capital stock. The literature offers two alternatives: use predicted total farm revenue and assume it represents the profit maximizing output level (Huffman), or incorporate variables such as farm type (Sumner) and value of total assets as a proxy for fixed capital stock.

To compare these alternatives, two versions of the off-farm labor supply were estimated. In the first approach, total revenue was estimated and the predicted value used as an instrumental variable in the supply function. Total revenue was estimated as a function of labor, land and capital expenses, using a Cobb-Douglas functional form[3]. Operator, spouse, and family labor were measured in hours. The value of hired labor was an additional variable. Land was measured in acres of crop land and acres of woodland. Human capital was measured in years of operator farm experience. The market value of livestock was used as a proxy for capital associated with the livestock part of operations. All variables were expected to have a positive affect on total revenue.

One problem with using the predicted value of total revenue as an instrumental variable is that it may be argued that some of the inputs used in the estimation procedure are simultaneously determined with the choice variable of interest (hours of off-farm work). The argument is based on the view that the farm input decisions are of the same term

3. Experiments were carried out using a multiple enterprise function form (Huffman) but the simple Cobb-Douglas function yielded the best statistical results.

(short term) as the off-farm labor allocation decision, and therefore cannot be considered exogenous.

As an alternative, the second model included directly in the supply function the following variables: the market value of farm assets[4], and the percentage of the farm receipts coming from beef production.[5] Farm assets were expected to reflect the long term size of operation and thus would be negatively correlated with hours of off-farm work. Beef production was considered a farm type that would have a positive influence on off-farm hours, since it would be less operator intensive.

Nonpecuniary benefits and life cycle considerations

Equation (13) specifies that off-farm labor allocations will be affected by X_4, exogenous influences on the nonpecuniary benefits of farm work. While those influences are difficult to identify and measure, the survey contained a reasonable proxy in the form of a question on goal ranking. Operators were asked to rank the most important goal for their operation, given the following choices:

- Increasing production per acre or getting better producing livestock

- Getting out of debt

- Getting labor saving equipment

- Expanding the size of the farm

- Having an attractive farmstead

- Living on a farm

Farmers ranking either the attractive farmstead or the farm lifestyle as the number one reason for farming, were assumed to receive relatively high nonmonetary benefits from farm work. Using the responses to this question, a dummy variable was created, equal to 1 if farmers ranked an attractive farmstead or living on a farm as their principal goal. Expectations were that the variable would be negatively correlated with the dependent variable.

The ranking question was also used to create a farm life cycle variable, equal to 1 if the operator ranked increased produc·ion or

---

4. This variable includes the market value of land, which may raise the question of simultaneity problems. However, it can be argued that land ownership is a long run decision as compared to the actual number of acres planted to crops in a given year. In addition, market value of land may reflect the exogenous characteristic of farmland quality.

5. Revenues from corn, soybean, and cotton production were also considered as possible variables. However, the only variable that had significant explanatory value was the beef revenues variable.

expansion as their number one goal. For example, if the farm were in a growth cycle, it would be expected that off-farm labor supply would be negatively effected.

Other variables

The remaining variables indicated by the theoretical model include exogenous factors that affect household utility (Y_2), total time available (T^o), and non-earned income (V). Operator age and age squared were included as variables to reflect family life cycle considerations. Some increase in off-farm hours was expected as age increased (family in the expansion and consumption stage) and then to decrease at some point (as members move off and gain economic independence). Total time available was considered constant over the cross section and thus not included. Non-earned income was measured in dollars as all sources of income available to the household outside the farm business. The substitution effect was expected to dominate, yielding an inverse relationship between nonearned income and off-farm labor.

Several additional variables were included to reflect additional monetary benefits and costs to off farm work. The presence of health benefits was represented by a dummy variable[6] and was expected to positively affect the number of off-farm hours. Also, the miles commuted to work was included as a variable reflecting an implicit cost of working off the farm. Conflicting effects were expected, since the implicit cost of long commuting distances could be outweighed by the fact that farm operators would likely drive long distances only if they had a substantial work commitment.

The results

Wage function

Results of estimating the linear off-farm wage function (to be used in constructing an instrumental variable for the supply function) are shown in Table 2. Education emerged as a very important positive influence on wage levels, a result that agrees with previous research (Sumner). The presence of a high school degree adds 83 cents to the wage, while post-high school education increases the wage by $2.26. Another significant positive influence were the presence of nonfarm training, which adds $1.70 to the wage. Another confirmation of previous work is that the age of the operator reflects a quadratic pattern (Sumner), with a peak at 49 years. The dummy variable representing race showed a negative correlation with wages, evidence that suggests the possibility of discrimination in the off-farm job market.

---

6. Jensen and Salant argue that benefit levels are simultaneously determined with off-farm hours. One approach would be to estimate a health benefit function. However, the variable was of secondary importance to this paper and thus the problem of simultaneity was ignored.

TABLE 2. Off-farm Wage Function
(Dependent Variable = Off-Farm Wage)

VARIABLE NAME	ESTIMATED COEFFICIENT (Standard Error)
JOB TRAINING (=1 if any)	1.695 (0.8134)
HIGHSCHOOL EDUCATION (=1 if only highschool)	0.826 (0.4710)
COLLEGE EDUCATION (=1 if post highschool education)	2.256 (0.5384)
OFF-FARM WORK EXPERIENCE (No. years during 1975-1980)	0.1614 (0.2248)
OPERATOR AGE	0.1942 (0.1243)
SQUARE OF OPERATOR AGE	-0.002 (0.001)
RACE OF OPERATOR (=1 if Black)	-0.854 (0.5259)
CONSTANT	1.5021

n=	247
R2=	0.15
Adj. R2=	0.12
F-statistic=	5.82

The total farm revenue function

Results of estimating the Cobb-Douglas total farm revenue function are reported in Table 3 and were used to construct an instrumental variable (predicted total revenue) for the off-farm labor supply function. Crop acres and operator labor were found to have a positive significant effect on total farm revenue. The parameter estimates for all variables had the expected sign, except for spouse labor, family labor and livestock capital.

The off-farm labor supply function

The results of estimating the linear off-farm labor supply function are reported in Table 4. Model 1 includes two instrumental variables: predicted wage, and predicted total revenue. Model 2 includes one instrumental variable, predicted wage, and two production-related variables: market value of total assets and the percent of revenue coming from beef farmers. Both models produced results in agreement with other research which showed a positive response of off-farm labor supply to wage rates (Huffman, Sumner).

Of special importance to this study is the explanatory value of the dummy variable representing nonmonetary influences on the off-farm work supply. As expected, in both models a goal structure that places primary importance on farm lifestyle considerations has a negative impact on the supply of off-farm work. This result provides important evidence that nonmonetary benefits associated with farm work should be considered in exploring the labor allocation decisions of farm operators.

In Model 1, other significant influences on the supply of farm work were predicted farm revenue, the presence of health benefits, and miles commuted to the off-farm job. Age and nonfarm income both showed a quadratic pattern. In the latter case, high levels of nonfarm income may be correlated to bigger supplies of off-farm labor because with the resulting larger income would increase investment opportunities (and thus nonfarm income). The dummy variable representing increased production as the operator's primary goal was negatively correlated with off-farm work.

Model 2 yielded similar results to Model 1 in the age, non-farm income, health benefits, operator goal structure, and commuting distance variables. A positive sign resulted for the market value of assets, while revenues from beef were significant and negatively correlated with the supply variable. This provides some evidence that beef producers can more easily combine their farm and off-farm work activities.

Additional Results on Farm Lifestyle Considerations

To explore how various groups in the sample compared with respect to farm level characteristics, the sample was divided into three groups defined by their primary goal for farming. The first group, (hereafter called pro-lifestyle) was composed of those respondents who identified a farm lifestyle or an attractive farmstead as their primary goal. The

TABLE 3. Total Farm Revenue Function
(Dependent Variable = Gross Sales)

VARIABLE NAME	ESTIMATED COEFFICIENT (Standard Error)
CROP ACRES	0.325 (0.0437)
WOODLAND ACRES	0.021 (0.0265)
OPERATOR LABOR	0.1289 (0.0644)
SPOUSE LABOR	-0.028 (0.0254)
FAMILY LABOR	-0.007 (0.0244)
OPERATING CAPITAL	0.0346 (0.0371)
LIVESTOCK CAPITAL	-0.015 (0.0165)
OPERATOR FARM EXPERIENCE	0.0597 (0.0710)
CONSTANT	6.3883

n=	247
R2=	0.48
Adj. R2=	0.46
F-statistic=	24

TABLE 4. Off-farm Work Supply Function
(Dependent Variable = Hours of Off-Farm Work)

VARIABLE NAME	MODEL 1 ESTIMATED COEFFICIENT (Standard Error)	MODEL 2 ESTIMATED COEFFICIENT (Standard Error)
PREDICTED WAGE	87.7312 (34.2219)	53.555 (36.7759)
PREDICTED TOTAL FARM REVENUE	-0.0390 (0.00496)	--------
MARKET VALUE OF ASSETS	--------	-0.0030 (0.00075)
PERCENT OF REVENUE FROM BEEF PRODUCTION	--------	226.973 (88.5668)
INCREASED PRODUCTION IS NUMBER 1 GOAL	-164.69 (79.2391)	-181.70 (83.9538)
FARM LIFESTYLE IS NUMBER 1 GOAL	-186.54 (95.2389)	-122.60 (100.974)
OPERATOR AGE	56.5772 (22.3643)	61.1891 (23.7068)
SQUARE OF OPERATOR AGE	-0.6523 (0.24351)	-0.7422 (0.25812)
UNEARNED INCOME	-0.0780 (0.03018)	-0.0705 (0.03194)
SQUARE OF UNEARNED INCOME	0.00004 (0.00001)	0.00004 (0.00001)
HEALTH BENEFITS (=1 if reported any)	319.774 (72.3492)	332.229 (77.1700)
MILES TO OFF-FARM JOB	2.98813 (1.82402)	4.15108 (1.92247)

TABLE 4 (Continued)

OFF-FARM INCOME FROM SPOUSE	0.00324 (0.00608)	0.00434 (0.00646)
CONSTANT	1.50214	115.221
n=	247	247
R2=	0.4	0.33
Adj. R2=	0.38	0.30
F-statistic=	14	10

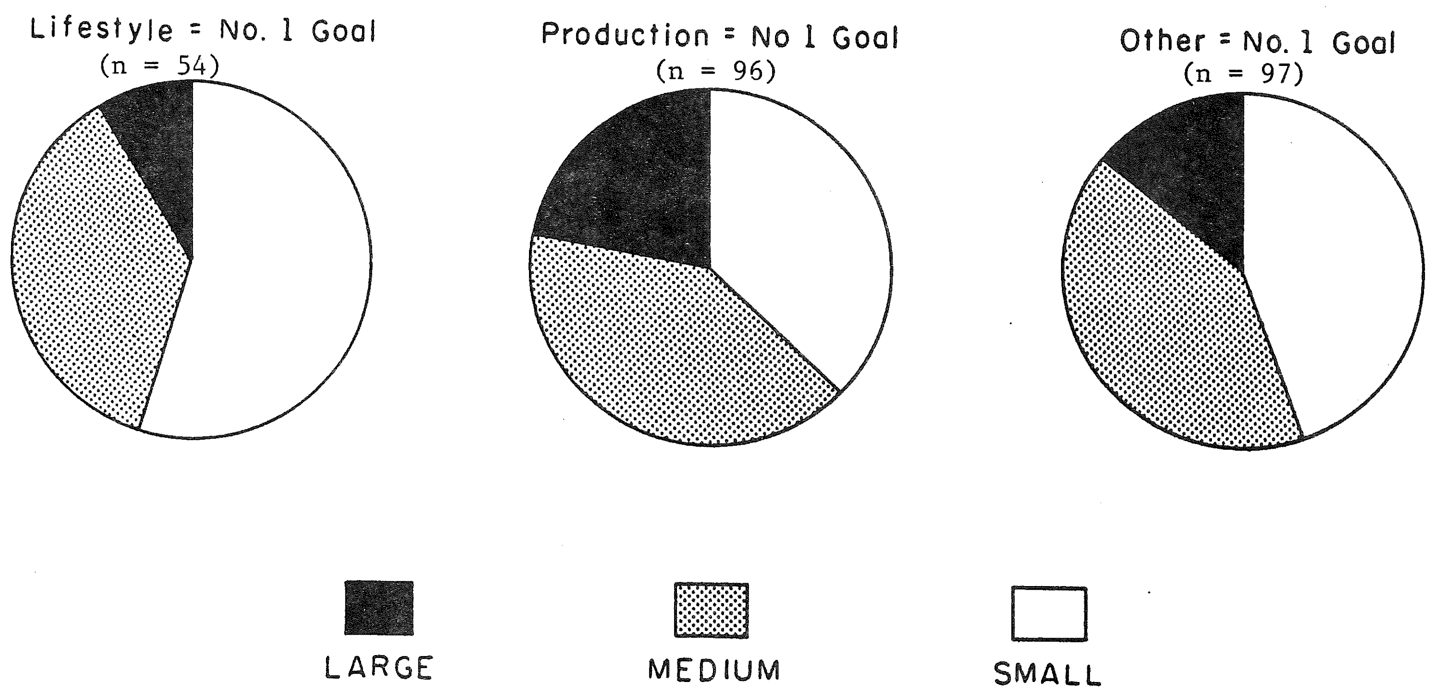
second group (hereafter called pro-production) indicated increasing production as their primary goal. Farmers indicating a different goal as their primary motivation made up a third group (called other).

Figure 1 shows the farm size distribution for each subgroup of farms. Note that there is a higher proportion of small farmers and a lower proportion of large farms among the pro-lifestyle farmers than the other two subgroups. However, as seen in Table 1, small farmers on average work more hours off the farm than others. A possible explanation is that these small operators are primarily off-farm workers but that lifestyle considerations keep them in farming.

Another important consideration is the association between pro-lifestyle attitudes and proximity to populated areas. Data limitations made it difficult to explore the distance of farmers from specific urban areas, but it was possible to consider the miles commuted to the off-farm job. Pro-lifestylers were spread evenly across short, medium, and long commuting distances. This suggests that even farmers who are close to populated areas may receive some nonmonetary benefits from a farm lifestyle. However, further investigation might illuminate whether proximity to an urban area affects the level of nonmonetary benefits.

Land tenure of farmers in the sample is predominantly owner-operated. About 70% of the farmers in the sample own more than half the acres they operate. Among the three subgroups, the pro-lifestyle farmers have the highest proportion of ownership. It is not surprising that those who value a farm lifestyle would also emphasize land ownership, but it is far more complicated to determine the effect of ownership on the stability of farm families.

FIGURE 1. FARM SIZE DISTRIBUTION FOR OPERATORS WITH DIFFERENT GOALS



Conclusion

This study presents a variation on the standard neoclassical model of off-farm labor supply of farm operators by adding nonmonetary benefits from on-farm work to the utility function. The resulting reduced form equation for the supply of off-farm work includes exogenous influences on nonpecuniary qualities of farm work. The econometric evidence presented here supports the argument that farmers have a preference for farm work over off-farm work. Furthermore, that preference may have a pronounced effect on their labor allocation decisions.

For policy makers, the implication is that in order to shift rural resources, off-farm opportunities will have to compensate farmers for the loss the nonpecuniary benefits that they incur when shifting labor as well as the foregone farm income. Alternatively, measuring well-being on farms should incorporate the concept that there are positive nonmonetary benefits that accrue to operators through farm work.

It is conceivable that the nonpecuniary benefits production function will change as the structure of agriculture changes. That is to say, if ownership structure, environmental conditions, or quality of life aspects to farming undergo radical change, performing farm work will no longer yield the same (or any) nonmonetary benefits.

For researchers, the implications of the study are twofold. The first is that the traditional model is adaptable to the study of nonmonetary benefits. The second is that nonmonetary influences are important and that further research on off-farm work should include such considerations. Data problems will continue to be a limitation, and thus there is room for research to determine alternative measurements of nonpecuniary benefits.

References

Ahearn, Mary. Financial Well-Being of Farm Operators and Their Households. U.S. Department of Agriculture, Economic Research Service. Agricultural Economic Report Number 563, 1986.

Barnett, Douglas. "A Study of Farmers' Goals and Constraints: Their Effects on the Cultivation of Crops in Sine, Saloum, Senegal." M.S. thesis, Purdue University, 1979.

Barnett, Douglas, Brian Blake and Bruce A. McCarl. "Goal Programming via Multidimensional Scaling Applied to Senegalese Subsistence Farms." American Journal of Agricultural Economics. 64(1982): 720-727.

Baumgartner, H.H.W. "Potential Mobility in Agriculture: Some Reasons for the Existence of A Labor-Transfer Problem." American Journal of Agricultural Economics. 47(1965):74-82.

Becker, G.S. "A Theory of the Allocation of Time." The Economic Journal. 75(1965):493-517.

Bollman, Ray D. "Off-farm Work by Farmers: An Application of the Kinked Demand Curve for Labour." Canadian Journal of Agricultural Economics. 27(1979): 37-60.

Colman, Gould P., Laurie Konigsburg, and Leslie Puryear. "How Farm families Make Decisions." Department of Rural Sociology, Cornell University, A.E. Res. 79-7, March 1979.

Deaton, Brady J., Larry C. Morgan, and Kurt R. Anschel. "The Influence of Psychic Costs on Rural-Urban Migration." American Journal of Agricultural Economics. 64(1982):177-187.

Fuguitt, Glenn. V. "Part-time Farming and the Push Pull Hypothesis." The American Journal of Sociology. 64(1961):375-379.

Gronau, Reuben. "The Intrafamily Allocation of Time: The Value of the Housewives' Time." American Economic Review. 63(1973):634-636.

Heckman, James. J. "Shadow Prices, Market Wages and Labor Supply." Econometrica. 42(1974): 679-694.

Heckman, James J. and Thomas E. Macurdy. "A Life Cycle Model of Female Labour Supply." Review of Economic Studies. 47(1980): 47-74.

Huffman, Wallace E. "Farm and Off-Farm Work Decisions: The Role of Human Capital." The Review of Economics and Statistics. 62(1980):14-18.

Jensen, Helen H., and Priscilla Salant. "The Role of Fringe Benefits in Operator Off-Farm Labor Supply." American Journal of Agricultural Economics. 67(1985):1095-1099.

Mincer, Jacor. "Labor Force Participation of Married Women: A Study of Labor Supply." in Aspects of Labor Economics. Princeton: Princeton University Press, 1962.

Patrick, George F., Brian Blake and Suzanne H. Whitaker. "Farmers' Goals: Uni- or Multi-Dimensional?" American Journal of Agricultural Economics. 65(1983):315-320.

Polzin, Paul and Peter MacDonald. "Off-Farm Work: A Marginal Analysis." Quarterly Journal of Economics. 85(1971): 540-545.

Schuh, G. Edward. "Should States Enact Minimum Price Legislation for Agricultural Commodities?" Unpublished paper, University of Minnesota, 1983.

Sharir, Schmuel. "Income Leisure Model." The Economic Record. 51(1975):93-98.

Simpson, Wayne and Marilyn Kapitany. "The Off-farm Work Behavior of Farm Operators." American Journal of Agricultural Economics. 65(1983):801-805.

Smith, James P. "Family Labor Supply Over the Life Cycle." Explorations in Economic Research 4. 2(1977): 205-276.

Sumner, Daniel A. "The Off-Farm Labor Supply of Farmers." American Journal of Agricultural Economics. 64(1982):499-508.