The Role of Fringe Benefits in Operator Off-Farm Labor Supply

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The last thirty years have seen a major shift in the share of total compensation paid to workers in the form of nonwage fringe benefits, that is, payments in a form other than currently spendable cash (Chen). Fringe benefits have become increasingly important because they are a source of income which receives preferential tax treatment, and can often be offered at group savings, as in the case of purchase of life and health insurance.

The tax and group rate advantages of fringe benefits as compensation for work become available to most farm households only through off-farm employment. Thus, it is important to understand the relationship between non-wage compensation and off-farm labor supply. Concentration on the role of money wages in inducing off-farm labor supply neglects the potential effect of additional income in the form of fringe benefits.

Off-farm work by members of farm households has become a well-established strategy for using farm-based labor resources. In 1983, 45 percent of employed farm residents in the U. S. worked solely or principally in nonagricultural industries, up from 34 percent in 1960 (U. S. Dept. of Commerce, 1961; 1984). Fifty-five percent of all farm households reported off-farm employment by the operator and/or spouse in 1979 (U. S. Dept. of Commerce, 1982). Thus, a significant number of farm persons receive compensation for time spent in off-farm activities.

This paper focuses on the contribution of fringe benefits to off-farm labor supply. We examine the types of benefits received by persons working off-farm, and develop a model of operator off-farm labor supply which explicitly takes account of the fringe benefit component of off-farm compensation. Data from the 1981 U. S. Department of Agriculture Family Farm Survey in Mississippi and Tennessee are used to describe the composition of benefits received, and estimate parameters in a labor supply model.[1]

The outline is as follows: first, the role of fringe benefits as a form of compensation is discussed; second, the off-farm labor supply model is described; third, empirical evidence on the role of fringe benefits in operator off-farm labor supply is presented; and finally, conclusions are drawn with respect to the role of fringe benefits.

Fringe Benefits as Compensation

The standard view of fringe benefits is that they, like non-pecuniary characteristics of jobs, provide a substitute for money wages (Ehrenberg and Smith). That is, workers are willing to accept a lower money wage in return for more fringe benefit compensation. Two factors account for a relative price differential which favors receiving some income in the form of employer-paid benefits. First, employer-provided fringe benefits are not taxed as income. Second, lower per unit costs may be achieved by employer group purchase of the commodity or service provided as fringes. Other institutional factors have a strong effect on whether fringe benefits are offered, for example, industry type, union activity, and length of time of worker employment.

There is some empirical support for the hypothesis that wage payments and fringe benefits are substitutes, particularly in the case of pension

benefits (Woodbury). Just like wages, non-wage compensation enhances income, and hence well-being. Although their actual value to the individual may be less than the cost of providing the benefit, in most cases the employee can opt out of receiving the benefit should the value be negative.

The lack of consistently unambiguous findings regarding the effect of fringe benefits on labor supply has been attributed to the importance of labor market institutions affecting the type of benefit compensation, and the fact that employees themselves may not be fully informed about the value of fringe benefits.

Off-Farm Labor Supply

The distinguishing feature of the off-farm labor supply decision is that in allocation of the scarce resource time the individual's time spent in nonfarm market work competes directly with time spent working on the farm. (See, for example, Huffman; Sumner.) Thus, the important criterion for off-farm labor supply is that the marginal return from time spent in off-farm work is greater than (or equal to) the marginal return from time spent in farm activities (or other household activities, including leisure). Factors which increase marginal productivity in off-farm work relative to farm work or household work are associated with increased off-farm labor supply.

Time allocated to farm work yields an implicit return equal to the value of the marginal product of the labor input. In competitive labor markets, time allocated to market work, that is, to off-farm employment, is paid the value of its marginal product - and compensated in the form of direct market wages or indirectly as "fringe benefit" compensation. Other time is allocated to household activities, and is valued at its opportunity

cost, which is equal to the (highest) value of alternative use. The farm individual allocates time to market work when the marginal return (including wages and benefits) from time in market work is greater than the marginal return from time spent in farm work. Commuting costs, as well as other negative job characteristics, detract from this return, while positive, nonpecuniary job characteristics enhance the return. Fringe benefits viewed in this context increase the return from off-farm work above the level of the money wage.

Empirical Evidence

The data used in this analysis are from the 1981 USDA Family Farm Survey. The survey was based on a stratified cluster sample design which yielded usable questionnaires from 1,087 farm families in 23 counties in North Mississippi and 6 counties in Southwest Tennessee.[2]

Agriculturally, the area is typical of much of the South insofar as a significant proportion of the land is in farms, and agriculture is dominated by small operations. The survey site contains no large metropolitan centers, although there are a number of small and medium size towns that provide some employment opportunities for farm residents. Low population density in the survey area has not encouraged either a strong service sector, or generally diversified economic activities.

Sixty-two percent of the households discussed in this report reported off-farm work by the operator and/or spouse in 1980; 48 percent of the operators, and 37 percent of the spouses worked off-farm. Most persons employed off-farm reported full-time wage or salary jobs. As is the case of employment in many rural labor markets, these jobs were generally low-

skilled. They paid, on average, $5.60 per hour; 14 percent of workers earned less than $3.10 per hour.

Four fringe benefits were commonly reported: paid vacation and/or sick leave; health insurance; private pension plans; and life insurance. Thirty percent of all workers received all four of the benefits; 53 percent received at least three; and 23 percent received none. As reported in table 1, full-time workers, those in durable goods manufacturing, and those with higher wage rates were most likely to receive benefits. Intermittent employees (those working less than 1152 hours per year) were least likely to receive the benefits.

An operator labor supply model was estimated in which hours of off-farm work were assumed to be a function of both the fringe benefit and wage component of compensation, among other variables.

The empirical specification of the wage, benefits, and hours of market work equations are of the form:

$$(1) \quad \ln W_j = \sum_{i=1}^{k} \beta_i X_{ij} + U_{1j}$$

$$(2) \quad B_j = \sum_{i=1}^{m} \gamma_i S_{ij} + U_{2j}$$

$$(3) \quad T_{mj} = \delta_1 \widehat{\ln W_j} + \delta_2 \hat{B}_j + \sum_{i=3}^{s} \delta_i Z_{ij} + \xi_j \quad , \text{ where:}$$

$j = 1, \ldots, n$ individuals

$\ln W_j$ = natural log of wage

B_j = fringe benefits

U_{1j}, U_{2j}, ξ_j = random errors

X_i = exogenous variables affecting wages

S_i = exogenous variables affecting benefits

Z_i = exogenous variables affecting hours of off-farm labor supply (T_m), including those that affect operator on-farm productivity.

Estimated wages and estimated benefits enter the "hours" equation as instrumental variables. Equations (1) and (2) were estimated in a two-stage procedure in order to take account of potential sample selection bias.[3] The sample of working farm operators was used in the estimation of equations (1), (2), and (3). A significance level of .20 is used as a criterion in the following discussion.

Both wages and benefits were estimated as functions of operator human capital, and labor market characteristics (table 2). In the wage equation, age and age squared had the expected nonlinear effect (+, -); the effect of education on wages was positive; being white increased wages. There was no significant sample selection bias.

In the estimation of benefits, which were measured as the probability of receiving health insurance, operator age, education, and the industry characteristics of the operator's employment were included as explanatory variables. The equation was estimated as a probit function using the maximum likelihood technique. The most significant determinants of benefits received were the industry variables. Operators employed in manufacturing, especially durable manufacturing, were more likely to receive benefits. Sample selection was significant in this estimation.

The estimation of hours of labor supplied (3) using ordinary least squares allows testing for the significance of wages and benefits as deter-

minants of off-farm hours of work. The estimated values of wages and benefits (holding constant sample selection) enter the equation (table 3). Both had a positive effect on operator hours of off-farm work, indicating that both money wages and benefits induce off-farm labor supply. This is consistent with the economic valuation of fringes. As expected, unearned income has a negative effect on labor supply, as does operator education. That is, more education makes the operator more productive on the farm, holding compensation constant. The negative effect of having children over 18 suggests the presence of intra-family allocation decisions.

Discussion

Fringe benefits from off-farm employment are an important aspect of the off-farm work decision. The empirical analysis found that benefits (as well as wages) have a positive effect on operator off-farm labor supply. As off-farm work has become a tool of management for farm-based labor resources, it is important to evaluate work off of the farm in light of its full return.

Descriptive data, as well as the estimation of the probability of receiving health insurance, show that institutional factors in the labor market play an important role in benefit availability. From a rural development perspective, the finding that certain industries, like manufacturing, offer relatively more fringe benefits, and that these benefits themselves induce off-farm labor are important considerations in evaluating the effects of industry location. In addition, the clear distinction in availability of fringes to those working more than intermittently suggests the greater value to farm households of increased commitment to off-farm work.

Several problems arise in evaluating the role of benefits in operator off-farm labor supply. The appropriate measure of benefits received should be a dollar value. Such a value is difficult to determine both theoretically and empirically, and was not available in the data. As such, it was impossible to estimate a willingness to substitute fringe benefits for wages. However, this may be a less important phenomenon in a labor market characterized by limited local opportunities. We have little information on the specific labor market which each individual faced.

In addition, the household decision-making process may involve joint decisions. By looking only at the operator decision, possible interdependence with the spouse's decision with respect to off-farm labor supply and fringes is lost.

While we did find that fringe benefits induce more operator off-farm labor supply, it is important to recognize that the operator may not be well informed about the value of benefits. Thus, any labor supply response to benefits is related to the operator's specific knowledge of the benefits' contribution to off-farm income.

Table 1. Worker and Employment Characteristics, By Benefits Received

Item	Total Workers[a/]	Workers Reporting Benefit			
		Paid Leave	Health Insurance	Life Insurance	Pension Plan
	percent				
Operator status					
Operator	52	68	60	46	48
Spouse	48	69	59	40	43
	100				
Employment off-farm[b/]					
Intermittent	20	25	20	16	21
Part-time	20	65	55	40	56
Full-time	60	85	73	52	50
	100				
Industry					
Manufacturing					
Durable	18	93	85	74	60
Nondurable	13	80	72	43	41
Service	34	57	46	31	48
Trade	11	47	37	27	11
Other	24	65	60	42	49
	100				

(Table 1, continued)

Item	Total Workers[a/]	Workers Reporting Benefit: Paid Leave	Health Insurance	Life Insurance	Pension Plan
	percent				
Wage rate per hour					
Less than $3.10	14	41	31	24	24
$3.10-4.49	37	70	62	39	36
$4.50-5.99	15	77	69	49	43
$6.00-8.99	22	77	64	46	64
$9.00 or more	12	67	68	63	68
	100				

a/ Only operator and spouse are included as workers here.

Source: 1981 USDA Family Farm Survey.

b/ Intermittent refers to less than 1,152 hours in 1980; part-time refers to at least 1,152 but less than 1,680 hours; full-time refers to 1,680 hours or more.

Table 2

Estimated Coefficients for Operator Off-farm Compensation

Explanatory Variables	Wages		Benefits	
	Estimated Coefficient	Standard Error	Estimated Coefficient	Asymptotic Standard Error
CONSTANT	-.153	.424	.996	1.349
AGE	.066	.016	-.017	.053
AGESQ	-.00077	.00018	.0001	.0006
EDUCATION	.045	.008	.030	.027
NONFARM TRAINING	.077	.096		
RACE (White = 1)	.099	.077		
HEALTH PROBLEM	-.059	.126		
INDUSTRY				
TRADE			-.338	.243
CONSTRUCTION			-.192	.270
MANUF-NONDUR			.521	.302
MANUF-DURABLE			1.098	.242
SAMPLE SELECTION	.081	.080	.966	.259
Dependent variable	LNWAGE		HEALTH INSURANCE (0, 1)	
Estimation technique	OLS		Probit/Maximum Likelihood	
Number of observations	301		301	
Adjusted R-Square	.17			
Log of likelihood function			-170	
-2 (log of likelihood ratio)			68 (df=8)	

Source: 1981 USDA Family Farm Survey

Table 3. Hours of Off-Farm Work: Estimated Coefficients from Ordinary Least Squares Regression

Explanatory Variables[a]	Estimated Coefficients	Standard Errors
CONSTANT	-249.52	592.34
AGE	[b]	
AGESQ	-.03	.06
EDUCATION	-49.50	21.96
HEALTH PROBLEM	6.80	185.33
RACE (White = 1)	201.78	130.04
EDUCATION SPOUSE	-15.25	18.74
MARRIED	375.46	261.36
CHILD UNDER 6	14.79	121.01
CHILD 6-17	27.22	81.66
CHILD 18+	-155.51	86.67
UNEARNEDY (000)	-29.62	18.09
ESTWAGE	1072.70	381.98
ESTBENEFIT	360.65	228.12
Dependent variable	HOURS	
Number of observations	301	
Adjusted R-squared	.26	

[a] The set of farm type and specialization variables are not reported here. They are available from the authors.

[b] AGE did not meet the tolerance test (= .01) and was not entered into the estimated model.

Source: 1981 USDA Family Farm Survey

Footnotes

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1. The estimation is reported in detail in a forthcoming USDA Economic Research Service staff paper.
2. For purposes of this report, a farm is defined as a business that produced agricultural sales of at least $1,000 in 1980, or would have done so under typical growing conditions. The farm operator was designated as the person responsible for major administrative and managerial functions, as well as for day-to-day decisions on the farm. See Salant for more information on the sample design.
3. We are concerned that any estimations based only on observations of operators working off-farm will be biased because these operators may not provide random observations. Our sample may be non-random because operators without off-farm jobs have been "censored". That is, the errors of the estimated compensation functions are not independent of the errors in the sample selectoin criteria. The regression functions on compensation are conditional on the criteria for selecting an operator working off-farm. First participation was estimated for the entire sample using all exogenous variables determining relative marginal productivity of time. This estimation yields a term (referred to as "sample selection" in table 2) to be included in the subsequent estimation of compensation to test for sample selectivity bias (Heckman).

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