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SELF-EMPLOYMENT IN RURAL VIRGINIA

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Abstract:

Encouraging small businesses and self-employment has been proposed as a way to create rural employment. A two-step model estimates the probability of employment and then of self-employment for rural residents. Education, good health, vocational training, and wage-job experience increase the likelihood of being employed. Men with children under six are also more likely to be employed, while women are less likely to be employed. Employment probability increases and then decreases with age. The unemployment rate and unearned income decrease the probability of being employed. For men, an employed spouse also decreases the probability of being employed. The employment equation predicts 88 percent of the cases correctly. Education, previous self-employment, parental self-employment, and other sources of income increase the probability of being self-employed. The probability of self-employment decreases and then increases with wage experience. The equation has poor predictive power, suggesting self-employment programs cannot be easily targeted.

SELF EMPLOYMENT IN RURAL VIRGINIA

Increasing rural poverty and a slow recovery from the recessions of the early 1980s, have lead many policy makers to re-examine traditional approaches to rural economic development. Among the new approaches considered are incubation of small business and fostering self-employment. The interest in self-employment and small businesses is due to a growing awareness of the large number of jobs created by small businesses (Birch, 1979; Fisher, 1989; White and Osterman, 1991; Harrison, 1994) and the increasing numbers of self-employed (SBA, 1988). A further impetus to look at small business was the suggestion that self-employment might be an alternative to unemployment(Mangum and Tansky, 1993). Research in the United States suggests that the unemployed are twice as likely to start their own business as are the wage employed (Lichtenstein, 1990). Several European countries have begun programs to help the unemployed make the transition to self-employment (Rees and Shah, 1986).

Studies of small firms have been national in scope or concentrated on urban firms. There are very few studies of rural firms (Miller, 1987; Lin, Buss and Popvitch, 1990). The available studies of self-employment use data from before self-employment began to rise in the 1970s. In addition, most of these studies use only correlation analysis, rather than multivariate techniques, to examine which individual characteristics are associated with self-employment. Thus, policy makers need more information about small firms and self-employment in rural areas before designing policy to revitalize rural areas based on small firms and self-employment. Because most small businesses start with self-employment, an accurate understanding of who self-

employed is vital.

This study concentrates on one aspect of small business in rural areas--the owner of the small business. A model with two probit equations is used to determine the factors that influence the probability of being self-employed. The data are from a random telephone survey of 600 rural Virginia households for 1989. The self-employed are defined as those who own their own firm, whether or not incorporated, and whether or not they have employees.

Literature Review and Model

People decide to seek employment if the marginal revenue product (MRP) of their labor is higher than their returns to leisure, which is their reservation wage (r) (Pencavel, 1986). Once they decide to seek employment they choose the type of employment that offers the highest marginal return to labor. The individual will choose to be self-employed if the marginal revenue product of self-employment (MRP_{self}) is higher than the marginal revenue product for wage employment (w) (Lee, 1965).

When economic decisions are non-marginal, requiring discrete choices, such as being employed or not, the decision can be modeled as a binary choice model. The choice made depends on the individual's reservation wage, which is determined by the characteristics of the individual, of the household, and of the local labor market. If the reservation wage is lower than the marginal returns to labor, the individual chooses to work.

$D = 1$ if $MRP > r$

If the reservation wage is higher than the marginal returns to labor, the individual chooses not to work.

D = 0 if MRP< r

The choice to be self employed will be made if the return to self-employment is higher than to wage employment.

D = 1 if $MRP_{self} > w$

If the wage is higher than the marginal return to self-employment, the individual chooses to be wage-employed.

D = 0 if $MRP_{self} < w$

The second decision is not independent of the first. Because people self-select into employment, those who are most likely to command a higher income through employment than through unearned income (including welfare) will self-select into employment. In other words, based on comparative advantage, people self-select into one group or another and they are not randomly distributed. Thus, they do not have the same probability of being self-employed. The equation for the probability of employment provides a selection factor that will be used in a second equation to determine the probability of self-employment (Heckman, 1979).

Probability of Employment Equation

Factors that affect the probability of being employed include human capital variables, household variables that affect labor supply and labor market conditions that affect demand. To avoid an unduly lengthy paper, the variables justification will be brief to allow for discussion of the model results. The employment equation is similar to others found in the literature (Tockle and Huffman 1991, Heckman, 1979).

Human Capital: Age and age squared are used as proxies for the accumulation and deterioration of job skills over a lifetime and are expected to be positively and

negatively associated with the probability of employment (Lass, Findeis and Hallberg,1989; Reddy and Findeis, 1988; Bowen and Finegan, 1969).

Education, measured as years of formal schooling, is expected to be positively associated with the probability of employment because it provides access to higher paying occupations and higher wages within a given occupation (Becker, 1984; Rungeling et al., 1977; Mincer, 1974; Hill, 1973). The impact of education is expected to be higher for men than for women because of the documented wage gap between men and women with the same education (Tockle and Huffman, 1991; Hersch, 1991; Scott, Smith, and Rungeling, 1977).

Vocational training increases productivity and, consequently, the wage rate (Mincer 1974). Non-farm vocational training is defined as a binary variable (1=has; 0= does not have), and is expected to increase the probability of employement.

Labor market experience increases the individual's stock of productivity-augmenting skills and the individual's senority, both of which increase wages (Medoff and Abraham, 1980). Increasing years of wage-job experience are expected to increase the probability of employment.

Health problems impair one's ability to work, leading to lower productivity, which discurages employers from hiring the individual. In addition, poor health may undermine satisfaction in one's job performance and lead to early retirement (Hill, 1973; Sumner, 1982). Health is defined as a binary variable (1= good health; 0= poor health), and is expected to increase the probability of employment.

Given the same set of characteristices, men receive higher wages than women (Hersch, 1991; Holzer, 1990; Scott, Smith and Rungeling, 1977). In addition, women

are more likely to be employed in jobs that pay lower wages (Deseran et al,1984; Cautley and Slesinger, 1988). Sex is defined as a binary variable (1=male; 0=female). Men are expected to have a higher probability of employment than women.

Household characteristics: Marriage affects employment decisions, and the literature suggests that it affects men and women differently. For men, marriage implies more financial responsibility, so that married men are more likely to work than single men (Scott, Smith, and Rungeling, 1977; Bowen and Finegan, 1969). Married women are expected to be less likely to work than single women (Holzer, 1990; Lundberg, 1988; Shackett and Slottje, 1986; Mincer, 1962).

Children increase the amount of work needed in the home, while at the same time increasing the need for income. Given the division of labor in the family, the presence of children has different effects on males and females. The presence of children under six (1=yes; 0=no) is expected to decrease female employment and increase male employment (Deseran et al., 1984; Tockle and Huffman, 1991; Scott, Smith, and Rungeling, 1977). While older children (6 to 18) need less supervision, they increase the need for income (Bowen amd Finegan, 1986; Scott, Smith, and Rungeling, 1977). Their impact on the probability of employment is expected to be similar to that of younger children.

Other sources of income for the household are expected to decrease the probability of employment (Lass, Findeis, and Hallberg, 1989; Sumner, 1982). Unearned income is expected to decrease the probability of employment for both men and women. An employed spouse is expected to decrease the probabilty of employment for women (Shackett and Slottje, 1986; Lundberg, 1988; Mincer, 1962).

For men, however, an employed spouse does not appear to negatively affect employment (Lundberg, 1988). Thus, the impact for men, in comparison to women, is expected to be positive. The presence of other employed members of the household is expected to decrease the probability of employment for both men and women.

Labor demand factors: The unemployment rate of the county is used to reflect employment opportunities and conditions that affect the local wage rates (Tockle and Huffman, 1991; Lass, Findeis, and Hallberg, 1989). The unemployment rate is expected to negatively affect the probabilty of employment for both men and women (Holzer, 1990; Bowen and Finegan, 1969; Manser and Brown, 1979).

Rural areas generally have fewer job opportunities than do urban areas. A binary variable reflecting location (1=rural; 0=urban) is expected to be negatively associated with the probability of employment. Counites with a Beale Code of 6, 7,8,or 9 are defined as rural (Butler, 1990).

Probability of Self-Employment Equation

Once an individual has made the decision to work, the next decision is the type of employment--self or wage. Thus, the second decision is not independent of the first. To control for the selection bias that results, the Inverse Mills Ratio, calculated from the first equation, is included as a variable in the second equation (Heckman, 1976 and 1979). Similar variables affect the probability of both employment and self-employment, but often in different ways.

Human capital: The self-employed are older than the wage- employed (SBA, 1986). The rate of entry into self-employment increases with age and at the same time the rate of exit decreases as people near the traditional retirement age (Evans and

Leighton, 1989; Fuchs, 1982; Quinn, 1980). The log of age is used to reflect the low probability of self-employment among young workers and the more rapidly increasing probability with age.

The probability of being self-employed increases with education because education provides the managerial, organizational, and technical skills to successfully operate a business (Evans and Leighton, 1989; Rees and Shah, 1986; Borjas, 1986; SBA, 1986). The SBA (1986) reports that this association is not as strong for men as for women. Vocational training tends to emphasize production not management skills. Thus, non-farm vocational training (1=has, 0=does not have) is expected to decrease the probability of self-employment.

Two variables are defined to reflect labor market experience. A binary variable indicates whether the individual has previous self-employment experience (1=yes, 0=no) and is expected to increase the probability of self-employment (Evans and Leighton, 1989; Fuchs, 1982). The SBA (1988) also reports that people with more wage experience are likely to be self-employed because they have acquired the assets and skills necessary to run a firm. Fuchs (1982) found that above average years of work experience increased the likelihood of being self-employed. Wage-experience is expected to be negatively related to self-employment, and wage experience squared to be positively associated with self-employment.

Among the employed, those with health problems are more likely to be self-employed because they may have been forced out of the wage market and/or because self-employment allows them to set their own bounds for their capacity (Evans and Leighton, 1989; Fuchs, 1982). A variable reflecting health (1=good health, 0=poor

health) is expected to negatively affect the probability of being self employed.

The self-employment rate is much higher among men than among women (Balkin, 1989; SBA, 1986; Becker, 1984). The variable sex (1=male, 0=female) is expected to increase the probability of self-employment.

The parent's occupation tends to influence the occupational choice of their children. Individuals whose parents were managers or self-employed are more likely to be self-employed (Evans and Leighton, 1989). A binary variable if either parent was (farm or non-farm) self-employed (1=yes; 0=no) is expected to have a positive impact on the probability of being self-employed.

A high proportion of newcomers to rural areas start their own business (Bradshaw and Blakely, 1983). A variable, residence, was defined if the person or their spouse grew up in the county in which they currently live (1=yes, 0=no) and is expected to be negatively associated with the probability of self-employment.

Factors affecting labor supply: Married persons are more likely to be self-employed than are single persons (SBA, 1986; Rees and Shah, 1986; Borjas, 1986). This association is stronger for men than for women. Marriage (1=married, 0=not married) is expected to increase the probability of self-employment.

The literature on farm self-employment indicates that men are more likely to seek wage employment (a more stable source of income) with children under six in the family, while women are more likely to be self-employed on the farm (Lass, Findeis and Hallberg, 1989; Deseran, Falk and Jenkins, 1984). Self-employment allows the woman to combine income-earning with caring for young children (Lichtenstein, 1990). Children under six are expected to decrease the probability that a man will be self-

employed and increase the probability for women. While older children (6-18) require less care than younger ones, their impact on the probability of self-employment is expected to be similar to that of younger children. Both variables are binary variables with one indicating the presence of children in that age group, and zero indicating that no children in that age group are present.

Other income sources decrease the family's risk of self-employment and also may provide the capital needed for self- employment (Evans and Jovanovic, 1989; Evans and Leighton, 1989). Unearned income, an employed spouse (Balkin, 1989), and the presence of other employed household members are expected to increase the probability of self employment. The latter two variables are binary variables (1=yes, 0=no).

Labor demand factors: In areas with low wages or high unemployment, more people enter self-employment (Lichtenstein, 1990; Evans and Leighton, 1989). These findings are the basis for programs targeted to the unemployed to start their own businesses. An increase in the county's unemployment rate is expected to increase the probability of self-employment.

Self-employment, including farming, is nearly twice as common in rural as in urban areas (Block, Naylor and Phillips, 1983; Bradshaw and Blakely, 1983; Shapira, 1983). Even when farming is excluded, non-farm self-employment remains an important source of both primary and secondary income in rural areas (Block, Naylor and Phillips, 1983; Bryant, Dudley and Shoemaker, 1980). A binary variable reflecting location (1=rural; 0=urban) is expected to be positively associated with the probability of employment. Counties with a Beale Code of 6, 7, 8, or 9 are defined as rural (Butler,

1990).

Model Results

The model results are presented in tables 1 and 3. Goodness of fit tests for the equations are presented in tables 2 and 4. A one-tail t-test is used to determine coefficient significance because the direction of impact is hypothesized.

Employment Equation

Eleven of 20 coefficients in the equation estimating the probability of employment are significantly different from zero, and were of the predicted sign.

Several of the human capital variables significantly affect the probability of being employed. As expected the probability of being employed increases and then decreases with age. Wage-job experience increases the probability of being employed, as does good health. Education significantly increases the probability of being employed. For men, the coefficient was of the expected sign, but not significantly different from zero, indicating that the effect of education on men is no different than that for women. Vocational training also significantly increases the probability of employment.

In contrast to previous studies, after accounting for other variables, men did not have a higher probability of being employed than did women. Marital status also did not affect the probability of being employed.

Children under six years of age significantly decrease the probabillity that a woman is employed. For men the relationship was significant and positive. Children between 6 and 18 do not significantly affect the probablity of either men or women being employed.

In general, other sources of income for the family are expected to reduce the probability that an individual will be employed. Unearned income reduced the probability of being employed. Women with an employed spouse were expected to be less likely to be employed. Instead, an employed spouse did not significantly affect the probability of a woman being employed. The predicted impact of an employed spouse on the probability that a man would be employed was positive. Having additional employed members of the household did not affect the probability of employment.

The equation provided a relatively good fit to the data. The log-likelihood ratio is statistically significant. Eighty-eight percent of the cases were correctly predicted. The equation, however, more accurately predicted the employed than the not-employed.

Self-employment Equation

The estimated equation for the probability of being self-employed, given that one is employed, is presented in table 3. Eight of the 24 variables are significantly different from zero. Others have the hypothesized sign, but are not significantly different from zero.

Several of the human capital variables significantly affect the probability of self-employment. Education positively influences the probability of self-employment. Its impact on men is not significantly different than for women. Previous self-employment experience increases the probability of being self-employed. In addition, individuals whose parents were self-employed are more likely to be self-employed. As expected increasing wage experience beyond some threshold (33 years), increases the probability of self-employment.

Other human capital variables: age, health, non-farm vocational training, sex,

and residence, had no impact on the probability of being self-employed. Age, health and residence were of the expected sign.

Married males have a higher probability of being self-employed than married females. The presence of children did not significantly affect the probability of being self-employed for either males or females.

An employed spouse did not affect the probability of self-employment for either males or females. But employment of another member of the household significantly increased the probability of self-employment. Increasing unearned income also increased the probability of being self-employed. Other sources of incomes can both provide capital for the business and reduce the risk of self-employment by diversifying family income.

The unemployment rate and a rural location did not significantly affect the probability of being self-employed. The insignificance of the unemployment rate suggests that, while the unemployed become self-employed at a higher rate than the employed (Lichtenstein, 1990), they do not remain self-employed.

The Inverse Mills Ratio estimated from the employment equation was included to correct for potential sample selection bias. It functions as an omitted variable to test whether there are unobserved differences between the employed and the not-employed that are not captured by the variables in the first equation. The variable is not statistically significant, suggesting that any differences between the two groups are adequately captured by the variables in the equation.

The McFadden pseudeo R^2 statistic of 0.13 indicates a weak fit. The chi-square value for the model, however, is significant. The overall prediction success rate of 84

percent, indicates a reasonably good model (Table 4). The overall rate, however, is misleading. The model correctly predicts 98 percent of the not-self-employed, but correctly predicts only 19 percent of the self-employed. The low prediction success may indicate a growing similarity between the self- and wage-employed. A poor fit also suggests that the readily available demographic and socio-economic variables, cited in the literature as being associated with self-employment, do not actually determine who is or is not self-employed. Results from similar research have reached a similar conclusion. Rees and Shah (1986) found only age and previous self-employment experience to be significantly related to the probability of self-employment in Great Britain.

Model testing

The model reported here included a male slope variable for those variables where previous research had suggested that a difference between men and women could be expected. A restricted model, which assumed no differences between males and females, was also estimated. A log-likelihood ratio test suggested that there were significant differences between the two equations. A third model, which included male slope dummies for all variables, was also estimated. That model was not significantly different in explanatory power from the reported model.

Conclusions

This research is the only known study to date that examines the probability of being self-employed in rural areas. Given that a person is employed, education, previous self-employment experience, parental self-employment experience, above average wage experience, and access to other sources of income positively influence

the probability of being self-employed. For men, being married also increases the probability of being self employed.

The unemployment rate had no influence on the probability of being self-employed, suggesting that even if the unemployed enter self-employment, they do not remain there for long. Programs that aim to increase employment by helping the unemployed start their own business, may not be feasible.

The poor predictive power of the self-employment equation suggests that the self-employed do not differ significantly from the wage employed on the variables in the equation. It may also mean that the self-employed are not identifiable using the readily available demographic and socio-economic factors suggested by the literature as being associated with self-employment. In general this research suggests the need for more information about the self-employed before programs to increase employment can be built around them.

This research assumed a two-step employment-decision process. It is possible that the decisions are made simultaneously rather than sequentially. The authors plan to use a bivariate probit model to test whether the decisions are made simultaneously.

Table 1: Probability of Employment Equation

Independent Variable	Expected Sign	MLE Coefficient	t-ratio	Marginal Probability
Intercept		-0.90610	-0.950	-0.28354
Age	+	+0.05507	+1.685**	+0.01723
Age-Squared	-	-.0.00125	-3.789**	-0.00039
Good Health	+	+0.43423	+2.472**	+0.13587
Education	+	+0.08922	+2.830**	+0.02791
Male and Education	+	+0.00903	0.199	+0.00283
Training	+	+0.28992	+2.192**	+0.09072
Wage-Job Experience	+	+0.04468	+6.887**	+0.01398
Male	+	-0.07202	-0.117	-0.02254
Married	-	+0.14751	0.563	+0.04609
Male and Married	+	-0.31087	-0.0745	-0.09727
Children < 6	-	-0.62092	-2.639**	-0.19429
Male with Children < 6	+	+0.62645	+1.611**	+0.19601
Children 6 to 18	+	-0.01910	-0.108	-0.00598
Male with Children 6-18	+	-0.02201	-0.075	-0.00689
Unearned Income ($1000)	-	-0.03	-4.049**	-0.01
Employed Spouse	-	-0.19518	-0.800	-0.06107
Male with Employed Spouse	+	+0.80708	-2.529**	+0.25253
Other EmployedHousehold Member	-	+0.19981	1.069	+0.62520
Unemployment Rate	-	-0.07044	-2.188**	-0.02204
Rural	-	+0.14650	0.829	+0.04584

Log-likelihood ratio = -267.57; Chi-squared (20) = 517.27
McFadden's Pseudo R^2 = 0.491; Number of observations = 851

* 1-tail t-test, statistically significant at the 10 percent level (>1.28)
** 1-tail t-test, statistically significant at the 5 percent level (>1.64)

Table 2: Prediction Success for the Employment Equation

	Actual Total	Predicted		Prediction Success Rate
		Employed	Not Employed	
Total	851	629	222	88%
Employed	588	556	32	94%
Not-employed	263	73	190	72%

Table 3: Probability of Self-Employment Equation

Independent Variable	Expected Sign	MLE Coefficient	t-ratio	Marginal Probability
Intercept		-2.954	-1.790**	-0.70589
Log (Age)	+	+0.59632	+1.175	+0.14249
Good Health	-	-0.21004	-0.858	-0.05019
Education	+	+0.06706	+1.641*	+0.01602
Male and Education	+	-0.02413	-0.451	-0.00512
Training	-	+0.01991	0.143	+0.00476
Wage-Job Experience	-	-0.08109	-3.099**	-0.01938
Wage-Job Experience Squared	+	+0.00122	+2.672**	+0.00029
Male	+	+0.12853	0.175	+0.03071
Previous Self-Employment	+	+0.60375	+3.251**	+0.14427
Parents' Self-Employment	+	+0.18529	+1.381**	+0.04428
Residence	-	-0.09185	-0.619	-0.02195
Married	+	-0.46229	-1.144	-0.11047
Male and Married	+	+0.90018	+1.709**	+0.21511
Children < 6	+	-0.13366	-0.433	-0.03194
Male and Children < 6	-	+0.20959	0.564	+0.05008
Children 6-18	+	+0.10505	0.508	+0.02510
Male and Children 6-18	-	-0.12287	-0.446	-0.02936
Unearned Income ($1000)	+	0.02	+1.534*	0.01
Employed Spouse	+	+0.07002	0.196	+0.01673
Male with Employed Spouse	+	-0.35588	-0.841	-0.08504
Other Employed Household Member	+	+0.36102	+2.029**	-0.02195
Unemployment Rate	+	-0.04179	-1.155	-0.00999
Rural	+	+0.20656	1.139	+0.04936
SELF-SELECTION TERM (λ)		+0.30306	0.72	+0.07242

Table 3. continued

Log likelihood ratio = -240.42; Chi-squared (24) = 70.964
McFadden's Pseudo R^2 = 0.13; Number of observations = 588

* = Statistically significant at the 10 percent level (> 1.28)
** = Statistically significant at the 5 percent level (>1.64)

Table 4: Prediction Success for the Self-Employment Equation

	Actual Total	Predicted		Prediction Success Rate
		Self-Employed	Not-Self	
Total	588	27	561	84%
Self-Employed	105	20	85	19%
Not self-employed	483	7	476	98%

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