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AND RURAL DEVELOPMENT

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Farm Family Household Production and Rural Development:

An Alternative View of the U. S. Small Farm Policy

J. C. O. Nyankori, Thomas A. Lyson and E. D. Wynn

Introduction

Despite the increase in the average farm size and a decline in the number of farms over the past few decades, there is still a significant number of small farms. Small farms are, in this, instance, those with less than $20,000 annual sales.

Most of the small farms are in the Southeast and, consequently, the small farm problems, though not peculiar to the South, are most heavily felt in that region.

There is an increasing volume of literature on the U. S. small farms. These focus onto the characteristics, production and marketing problems of small farms, and prescriptive public and private avenues of action designed to improve the economic welfare small farm operators. Note that the national food and fiber production is secondary to the small farm family welfare considerations.

In an earlier study, Guither found that a higher proportion of those who quit farming were under 35 and over 64. Most of them had off-farm work experience and grossed under $10,000 in farm sales. They left farming because the income was not high enough, and farming appeared to be highly risky with dim future income prospects. Some of these saw greater expected opportunity off-farm, but others left because of problems arising from debt, credit restriction, health, aging, limited land resources and family situations.

This paper focuses on those still in farming and attempts to deter-

mine the likelihood of discontinuing farming given family and farm back-
ground characteristics.

A model of household resource allocation is specified to determine
the household and market forces which constrain the operations of small
farms. More specifically, the empirical problem is that of identifying,
specifying and estimating the likelihood of farm families quitting farm-
ing given the household and farm characteristics. The results have
important implications to public policy regarding small farms, community
and rural development.

The rest of the paper is organized as follows. In section II the
model of household resource allocation is described in order to identify
the socioeconomic factors for the empirical analysis. The model is spec-
ified and the results are reported in section III, and finally, a dis-
cussion and policy implications are presented in section IV.

II. Household Resource Allocation

The unit of analysis is the household or family farm. The household
owns and operate a farm, with possibility of off-farm employment. The
households differ in personal background and human capital characteris-
tics. Specifically, there are differences in household size, farm
income, total household income, farm size (acreage), farm organization,
tenure and the way the household acquired the farmland.

The heads of household differ in the level of education, age, and
race. Furthermore, there are differences in family composition, off-farm
labor force participation by members of the family and household con-
sumption expenditure patterns.

Subsequent discussion of the household behavior makes the following

simplifying assumptions. The household produces market and home goods using household and farm labor of family members and purchased inputs. The market goods are farm products offered for sale and the home goods consist of an array of goods and services which include food, home care, child care and other goods and services produced specifically for family use.

The household is endowed with human time and human capital; and the former is allocated to farm labor, market (non-farm) labor, household labor and leisure. Human capital is attributed to education, experience, and age of husband and wife, and the number and age composition of children.

The household receives income from the sale of farm products and from off-farm earned income which is spent on purchased inputs for household and farm production.

Consequently, the behavior of the household is directed towards attaining certain goals subject to the constraints on human time, human capital, income and a joint farm-household production schedule.

Economic theory is explicit on the conditions under which the optimal household resource alloaction is full time farming, part time farming and part time off-farm employment, or full time off-farm labor force participation.

Consider for the moment the decision to continue or discontinue farming. The household by selling the farm, retiring and moving off the farm or leasing the land to others has, in effect discontinued farming. The empirical question is that of explaining the likelihood of discontinuing farming given the household charateristics, household and farm production and the personal attributes of the head of household. This is

treated exclusively in the next section.

III. Data and the Model

The analysis uses data from the '1982 Survey of Farmer Attitudes, Farm Operation, and Off-Farm Employment' conducted by the Department of Agricultural Economics and Rural Sociology at Clemson University. The data were collected via a 12-page mail questionnaire that was sent to each farm operator from a statewide sample of 1207 South Carolina farmers. One week after the initial dispatch of the questionnaires, a remainder postcard was mailed, and two weeks after the postcards, a replacement questionnaire was sent to nonrespondents. A total of 693 individuals returned usable questionnaires, a 67.5 percent response rate.

The survey provides information on a wide variety of household and farm characteristics, including off-farm work characteristics (part or full time, weeks worked of farm in 1981, weekly hours worked off-farm in 1981, for the husband and wife).

From the discussion of household resource allocation in section II, the following variables are suggested for empirical analysis of the likelihood of discontinuing farming: household income, farm sales, age, education, race, off-farm employment (operator and spouse), and farm land acquisition. The precise definitions of the variables are presented in Table 1.

The empirical model is to be fitted to data for all the sample farm households rather than small farm households. In this way the sample selection bias is minimized and comparative response structures are directly estimable.

Table 1 A Summary of Empirical Definitions of Variables

Variable	Category	Definition
EXIT	Dependent variable	EXIT = 0 if continuing farming EXIT = 1 if discontinuing farming
ACQUIRE	Explanatory variable "	ACQUIRE = 0 if land was in husband's family ACQUIRE = 1 if land was in wife's family ACQUIRE = 2 if land wasnot in the families
AGE	" " " " "	AGE = 0 if head of family under 35 years AGE = 1 if head of family is 34-44 years AGE = 2 if head of family is 44-54 years AGE = 3 if head of family is 54-64 years AGE = 4 if head of family is over 64 years
EDUCATION	" " "	EDUCATION = 0 if head not high school graduate EDUCATION = 1 if head is high school graduate EDUCATION = 2 if head is college graduate
FARMSALES	" " " "	FARMSALES = 0 if farm sales is less than $10,000 FARMSALES = 1 if farm sales is $10,000 - $19,999 FARMSALES = 2 if farm sales is $20,000 - $39,999 FARMSALES = 3 if farm sales is over $39,999
FARMWORK	" "	FARMWORK = 0 if head worked off farm FARMWORK = 1 if head didnot work off farm
GROWUP	" "	GROWUP = 0 if head grew up on farm GROWUP = 1 if head didnot grow up on farm
INCOME	" " " "	INCOME = 0 if family income is under $10,000 INCOME = 1 if family income is $10,000-19,999 INCOME = 2 if family income is $20,000-39,999 INCOME = 3 if family income is over $39,999
RACE	" "	RACE = 0 if head of family is black RACE = 1 if head of family is white
RATIO	" " " " "	RATIO = 0 if total/farm income under 20% RATIO = 1 if total/farm income 20% - 39% RATIO = 2 if total/farm income 40% - 59% RATIO = 3 if total/farm income 60% - 79% RATIO = 4 if total/farm income over 79%
SPWRKTIME	" " "	SPWRKTIME = 0 if spouse didnot work off-farm SPWRKTIME = 1 if spouse worked off-farm part time SPWRKTIME = 2 if spouse worked off-farm full time

Table 2 Estimated Logit Model of the Likelihood of Discontinuing Farming: South Carolina Farm Families

Variable	All Sample	High Income	Low Income
	Likelihood of discontinuing farming:		
SPOUSE WORKS	-0.088	-0.619	0.442
	(0.07)	(0.97)	(0.01)
SPOUSE DOESNT WORK	-0.722	-1.253	-0.480
	(3.38)	(3.59)	(0.82)
NO HIGH SCHOOL	-1.110	-2.102	-0.733
	(6.83)	(7.17)	(1.62)
HIGH SCHOOL	-0.815	-0.738	-0.784
	(3.72)	(1.54)	(1.54)
COLLEGE	-0.384	-0.406	-0.356
	(0.92)	(0.55)	(0.32)
GREW ON FARM	-0.662	-1.023	-0.329
	(0.75)	(0.88)	(0.09)
GREW OFF FARM	-1.258	-1.725	-0.870
	(2.20)	(2.09)	(0.42)
AGE: UNDER 35	-1.131	-0.970	-0.852
	(3.93)	(1.17)	(1.04)
AGE: 35 - 44	-1.616	-1.583	-1.177
	(8.17)	(3.29)	(1.85)
AGE: 45 - 54	-1.682	-1.744	-1.161
	(10.66)	(4.71)	(2.26)
AGE: 55 - 64	-0.724	-0.621	-0.524
	(3.01)	(0.71)	(0.96)
AGE: OVER 64	-0.897	-0.528	-0.914
	(4.27)	(0.44)	(2.94)
FAMILY LAND	1.939	2.453	
	(2.08)	(2.40)	
PURCHASED LAND	1.493	2.141	
	(1.20)	(1.73)	
FARM SALES: UNDER $5000	-1.126	-0.704	0.314
	(0.13)	(1.51)	(0.41)
FARM SALES: $5000-$19999	0.714	0.175	1.294
	(3.50)	(0.10)	(5.39)
FARM SALES: OVER $19,999	0.184	-0.139	0.078
	(0.19)	(0.06)	(0.01)
INCOME: UNDER $20,000	-0.586		
	(3.38)		
INCOME: OVER $19,999	-0.306		
	(0.06)		
RENTSOUT	1.659	1.881	1.482
	(9.06)	(8.26)	(4.31)
RENTSIN	-0.372	-0.063	-0.828
	(1.56)	(0.09)	(2.89)
INTERCEPT	-0.939	-0.441	-0.689
	(0.40)	(0.09)	(0.22)
MODEL CHI-SQUARE	99.31	68.13	35.90

Chi-squares in parentheses.

Table 3 Estimated Logit Model of the Likelihood of Discontinuing
Farming: South Carolina Farm Families With no Off-Farm Incomes

| Variable | Likelihood of discontinuing farming: | | |
	All Sample	High Income	Low Income
SPOUSE WORKS	-0.045	-0.812	0.126
	(0.02)	(1.45)	(0.08)
SPOUSE DOESNT WORK	-0.726	-1.639	-0.322
	(3.07)	(5.24)	(0.34)
NO HIGH SCHOOL	-1.053	-1.668	-0.990
	(5.22)	(3.88)	(2.70)
HIGH SCHOOL	-0.618	-0.517	-0.736
	(1.88)	(0.62)	(1.29)
COLLEGE	-0.244	-0.056	-0.446
	(0.31)	(0.01)	(0.45)
GREW ON FARM	-0.637	-1.270	-0.481
	(0.69)	(1.34)	(0.16)
GREW OFF FARM	-1.323	-2.241	-0.951
	(2.32)	(3.24)	(0.50)
AGE: UNDER 35	-1.161	-1.320	-0.840
	(3.75)	(1.91)	(0.80)
AGE: 35 - 44	-1.608	-1.747	-1.091
	(7.68)	(3.69)	(1.53)
AGE: 45 - 54	-1.942	-2.524	-1.134
	(12.50)	(7.91)	(2.53)
AGE: 55 - 64	-0.793	-1.098	-0.448
	(3.36)	(1.95)	(0.07)
AGE: OVER 64	-1.116	-1.368	-0.978
	(5.94)	(2.38)	(3.66)
FAMILY LAND	2.034	3.019	
	(2.32)	(3.34)	
PURCHASED LAND	1.565	2.662	
	(1.33)	(2.47)	
FARM SALES: UNDER $5000	0.008	-0.417	0.417
	(0.01)	(0.40)	(0.63)
FARM SALES: $5000-$19999	0.959	0.413	1.617
	(5.23)	(0.42)	(7.21)
FARM SALES: OVER $19,999	0.532	-0.339	0.180
	(1.35)	(0.28)	(0.05)
INCOME: UNDER $20,000	-0.521		
	(2.78)		
INCOME: OVER $19,999	-0.456		
	(1.16)		
RENTSOUT	1.809	2.341	1.446
	(38.61)	(25.28)	(11.78)
RENTSIN	-0.472	0.016	-1.054
	(2.17)	(0.01)	(4.16)
INTERCEPT	-1.242	-0.673	-0.529
	(0.68)	(0.13)	(0.12)
MODEL CHI-SQUARE	93.36	67.34	36.87

Chi-squares in parentheses.

Table 4 Estimated Logit Model of the Likelihood of Discontinuing
Farming: Attitudinal Effects of South Carolina Farm Families

	Likelihood of discontinuing farming:		
Variable	All Sample	High Income	Low Income
AGE HELPS	0.426	0.349	0.608
	(1.21)	(0.46)	(0.95)
AGE HINDERS	0.813	0.553	1.116
	(7.40)	(2.03)	(5.00)
HEALTH HELPS	-0.364	0.093	-0.972
	(1.16)	(0.05)	(2.94)
HEALTH HINDERS	-0.360	-0.283	-0.405
	(1.43)	(0.46)	(0.76)
FAMILY HELPS	-0.393	-0.568	-0.032
	(1.97)	(2.27)	(0.01)
FAMILY HINDERS	-0.194	-0.212	0.213
	(0.16)	(0.09)	(0.10)
UNDERSTANDING TECHNOLOGY	0.306	0.252	0.372
	(1.08)	(0.43)	(0.61)
NOT UNDERSTANDING TECH	0.112	0.273	0.237
	(0.10)	(0.25)	(0.21)
HIGH INTEREST RATE	-0.451	-0.471	-1.042
	(0.75)	(0.38)	(0.01)
HIGH INTEREST RATE HURTS	0.137	-0.337	0.703
	(0.23)	(0.77)	(2.47)
HIGH LAND PRICE	-0.113	0.074	-0.077
	(0.55)	(0.04)	(1.11)
HIGH LAND PRICE HURTS	-0.339	0.066	-1.077
	(4.27)	(0.07)	(6.04)
HIGH LABOR PRICE HELPS	1.041	0.966	0.772
	(4.18)	(1.75)	(1.11)
HIGH LABOR PRICE HURTS	0.943	1.106	0.838
	(9.80)	(6.36)	(3.45)
EXTENSION ADVICE HELPS	-0.067	-0.274	-0.009
	(0.05)	(0.48)	(0.01)
EXTENSION ADVICE HURTS	-0.507	0.217	-1.011
	(0.53)	(0.06)	(0.77)
INTERCEPT	-2.344	-1.896	-2.878
	(61.80)	(20.22)	(36.89)
MODEL CHI SQUARES	31.16	14.29	27.98

Chi-squares in parentheses.

Table 5 Logit Model of Decision to Discontinue Farming: South Carolina Farmers by Off-Farm Employement Categories (All Sample)

Variable	Unemployed Off-Farm	Employed Off-Farm
INTERCEPT	-9.097	-0.197
	(0.01)	(0.01)
SPOUSE WORKS	0.060	-0.821
	(0.02)	(2.06)
SPOUSE DIDNT WORK	-0.909	-1.211
	(2.11)	(3.94)
NO HIGH SCHOOL	-1.655	-0.586
	(5.01)	(0.95)
HIGH SCHOOL	-1.112	-0.713
	(2.14)	(1.44)
COLLEGE	-0.916	-0.171
	(1.48)	(0.10)
GREW ON FARM	0.076	-0.647
	(0.00)	(0.29)
GREW OFF FARM	-0.757	-0.885
	(0.33)	(0.46)
AGE: UNDER 35	-9.072	0.222
	(.)	(0.06)
AGE: 35 TO 44	-8.979	-0.408
	(.)	(0.24)
AGE: 45 TO 54	-2.052	-0.812
	(4.37)	(1.04)
AGE: 55 TO 64	-0.672	-0.400
	(1.46)	(0.29)
AGE: OVER 64	-1.539	0.673
	(7.84)	(0.59)
FAMILY LAND	10.655	0.577
	(.)	(0.09)
PURCHASED LAND	9.850	0.445
	(0.00)	(0.05)
SALES: UNDER $5000	-0.007	-0.258
	(0.00)	(0.25)
SALES: $5000 $19999	0.685	0.556
	(1.36)	(1.02)
SALES: OVER $19999	-0.032	0.092
	(0.00)	(0.02)
INCOME: UNDER $19999	-0.817	-0.769
	(2.75)	(2.96)
INCOME: OVER $19999	-0.087	-0.853
	(0.02)	(2.22)
RENTS OUT	1.191	2.293
	(7.99)	(4.95)
RENTS IN	-0.436	-0.486
	(0.91)	(1.07)
MODEL CHI SQUARES	59.53	69.08

Chi-squares in parentheses.

Table 6 Logit Model of Decision to Discontinue Farming: South
Carolina Farmers by Income and Off-Farm Employement Categories

Variable	High Income:		Low Income:	
	Unemployed Off-Farm	Employed Off-Farm	Unemployed Off-Farm	Employed Off-Farm
INTERCEPT	2.752	1.053	-10.944	8.878
	(0.01)	(0.19)	(0.01)	(0.01)
SPOUSE WORKS	-2.634	-1.268	0.502	-1.317
	(2.76)	(1.81)	(0.74)	(1.98)
SPOUSE DIDNT WORK	-3.814	-1.608	-0.430	-2.281
	(4.15)	(2.88)	(0.32)	(4.31)
NO HIGH SCHOOL	-5.119	-1.148	-0.796	-0.194
	(6.04)	(1.38)	(0.64)	(0.04)
HIGH SCHOOL	-2.235	-0.670	-1.039	-0.454
	(1.84)	(0.71)	(0.92)	(0.19)
COLLEGE	-3.014	0.173	-0.312	-1.317
	(3.23)	(0.07)	(0.08)	(1.28)
GREW ON FARM	-11.626	0.460	8.405	-16.336
	(0.01)	(0.09)	(0.01)	(0.01)
GREW OFF FARM	-12.603	0.205	8.483	-17.289
	(0.02)	(0.01)	(0.03)	(0.16)
AGE: UNDER 35	-6.795	-1.008	-9.124	1.915
	(0.00)	(0.75)	(0.01)	(1.23)
AGE: 35 TO 44	-8.179	-1.373	-8.750	1.058
	(0.02)	(1.65)	(0.04)	(0.38)
AGE: 45 TO 54	-2.920	-1.755	-0.484	0.308
	(2.24)	(2.97)	(0.13)	(0.04)
AGE: 55 TO 64	0.512	-1.290	-0.712	0.731
	(0.11)	(1.73)	(1.18)	(0.23)
AGE: OVER 64	-0.217	-1.770	-1.982	1.655
	(0.02)	(1.11)	(8.59)	(1.13)
FAMILY LAND	14.750	-0.534	2.393	5.783
	(0.01)	(0.12)	(0.00)	(0.09)
PURCHASED LAND	13.186	-0.490	1.448	4.981
	(0.07)	(0.09)	(0.00)	(0.05)
SALES: UNDER $5000	-2.494	-0.350	0.470	-0.648
	(1.95)	(0.26)	(0.54)	(0.42)
SALES: $5000 $19999	-1.303	0.251	0.957	1.022
	(0.65)	(0.13)	(1.59)	(0.93)
SALES: OVER $19999	-2.504	0.313	0.467	-6.663
	(2.11)	(0.16)	(0.22)	(0. 2)
RENTS OUT	2.347	2.252	1.204	3.033
	(5.38)	(20.05)	(4.27)	(12.30)
RENTS IN	1.168	-0.515	-0.972	-0.282
	(0.71)	(0.83)	(2.12)	(0.08)
MODEL CHI SQUARES	47.36	44.71	32.03	69.08

Chi-squares in parentheses.

Using the variables defined in Table 1, a logit model is specified for estimation. The model together with the results are shown in table 2.

The empirical questions are: which of the explanatory variables have have signficant effect on the decision to discontinue farming? For a given variable, are there categorical differences in the effect on the decision to discontinue farming? Finally, for a given pair of the explanatory variables, are there significant interaction effects on the decision to discontinue farming?

Results

The estimated parameters of the logit model are shown in Tables 2 - 5. Tables 2 and 3 contain three sets of the estimates of farm and family background factors in relation to discontinuing farming. The three sets of estimates are for all farmers, farmers with less than $20,000 annual family income (hereafter low income families) and those those with over $19,999 annual family income (high income families).

Table 4 contains the estimated results of attitudinal factors on the likelihood of discontinuing farming by income classification. Finally, table 5 reports the results for farm families by income classification and labor force participation status.

For ease of exposition the estimated coefficients of the explanatory variables are classified into three groups: neutral, contributive, and counteractive factors. Neutral factors are all those whose estimated coefficients are not statistically significant. All statistically significant coefficients with possitive signs are classified as contributive and those with negative signs are counteractive to the likelihood of discontinuing farming, respectively.

6

Farm and Background Characteristics

For farm families in general and for both low income and high income farm families, spouse off-farm employment, college education, and farm upbringing are neutral factors to the likelihood of discontinuing farming. However, education (high school or lower), age (under 54 years), is a counteractive factor for all income classifications. Similarly, renting land out is a contributive factor for both low and high income farm families.

For low income farm families, spouse unemployment off-farm, and farm sales (under $5,000), are counteractive for high income but neutral for low income families. On the other hand, age (over 64 years) and renting in land are counteractive and farm sales ($5,000 to $19,999) is contributive for low income families but neutral for high income families.

For household heads with no income from off-farm sources, education (lower than high school) and age (under 54 and over 64 years) are counteractive but renting out land is contributive to discontinuing discountinuing farming for both low and high income farm families. farming.

For high income farm families, spouse labor force status, farm or farm upbringing, age (under 35 and 55 to 64 years) are counteractive but these are neutral for low income farm families. For low income families, renting in land is counteractive and farm sales ($5,000 to $19,999) is contributive to discontinuing farnming yet neutral for high income farm families.

Considering low and high income families on the basis of labor force participation of the heads of families, there are no differences in the categorical sets of forces influencing the likelihood of discon-

tinuing farming between those with and those without off-farm
employment.

Attitudinal Factors

All farmers, both low income and high income who consider age, and
labor price hinderances to the survival of their farms are likely to
discontinue farming within a forseeable future. Low income farmers more
than the rest are likely to discontinue farming on account of high
interest rate and lesss likely to discontinue farming on the account of
health considerations and land prices.

IV. Summary and Conclusions

The likelihood of discontinuing farming by low income farm families
is influenced by age and production control over owned farm land. Fami-
lies headed by those under 44 years and over 64 years have a greater
likelihood of discontinuing farming within the forseeable future. Simi-
larly, farm families renting out their farm land have a greater likeli-
hood of discontinuing farming.

Two sets of farm and background factors, however, are negatively
associated with the likelihood of discontinuing farming. Specifically,
the labor force status of the spouse and college education. Of the atti-
tudinal factors, age considerations, interest rate, land and labor
prices weigh towards discontinuing farming but health considerations is
an important factor in continuing farming.

In general the results do not predict undue exit from farming given
the farm and background characteristics and the attitude of farmers

towards the socioeconomic factors.

The persistence of small farm operations in the light of market, policy and technological factors oriented towards large scale operations suggests that over the years there emerged a dual agricultural structure in the U. S. These consisted of large scale operations by relatively few farmers who produced, more than proportionately, a larger share of the regional or national agricultural output and earned the larger share of the aggregate farm income.

The other component consists of a larger number of farmers with small individual farm operations and does not, under normal circumstances, influence the national agricultural supply situation significantly. They are, consequently, less competetive in the existing national agricultural marketing activities and receive relatively less benefits from agricultural programs.

Additionally the results suggest the viability of small farming operations which is explained more adequately in terms of the new home economics. This, therefore, calls for different evaluation criteria and strategic policy formulations which relies more on optimal allocation of household resources rather than farm production per se and reflect a maximization of family welfare and not necessarily net farm profits.

A policy element consistent with this scenario is the one which generates additional income sources for small farm families. Specifically, off-farm employment opportunities is and has been demonstrated to be a critical factor in enhancing the welfare of small farm families. This is not to exclude policies and programs aimed at increasing net farm income.

Off-farm income opportunities for farm families is possible through

a program of community and rural development which entails net
additional investments in non-farm production activities in locations
accessible to the small farm families.

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