MICRO-LEVEL ANALYSIS OF THE RELATIONSHIPS BETWEEN HOUSEHOLD INCOME AND RURAL FARM AND NON-FARM ASSET HOLDING IN SOUTHEASTERN NIGERIA

R. N. Echebiri . S. N. Chukwuma
Department of Agricultural Economics
Michael Okpara University of Agriculture, Umudike
PMB 7267 Umuahia, Abia State, Nigeria

ABSTRACT

A sample of 777 rural households was drawn from four states of Southeastern Nigeria, and data were collected on a repeated interview basis for 12 calendar months. Data were collected on relevant household socio-economic variables such as occupation, farm size, income and rural asset holding. Obvious variations were observed in farm size and occupational distribution of the sample households. Striking disparities in asset distribution, which tended to conform to variations in household socio-economic profiles, were equally observed in the sample. The regression analysis showed that farm and non-farm income had strong correlation with rural asset-holding, but the latter was relatively stronger. This poses a great challenge for agricultural and rural sector development planning with particular regard to increasing farm productivity through an appropriate policy framework. It is equally suggested that rural non-farm activities be encouraged through adequate capacity building, to ensure balanced growth in the sector.

Keywords: ***Micro-level, Household Income, Rural Assets, Poverty Reduction, Southeastern Nigeria***

INTRODUCTION

Rural households differ greatly from those of the urban areas in terms of asset holding and investment (Adeniyi, 1999). This disparity is caused by factors prevalent in rural areas such as lack of stable income, weak and often complete in access to land and other productive assets, and over population. Over 60 percent of the Nigerian population is living in the rural areas with the attendant poverty-linked characteristics like high dependency ratio, and low labour participation rate. It is shown in the literature, that asset holding is central to the economic productivity of households. The importance of asset holding to man can therefore be viewed through its contributions to household income. Income does not only solve the problem of consumption but is also a determinant of a household's investment capacity. The adequacy of asset holding determines a country's success or failure in diversifying production and investment at the local level which can be in agriculture or non-agricultural sectors, as well as expanding trade, coping with population growth, and reducing poverty (Reardon *et al*, 1995; Reardon and Berdegue, 1999; Jayne *et al*, 2001).

While evaluating the importance of assets in stimulating growth in subsistence economies, World Bank (1993) stated that, if the poor cannot access capital in various forms, little progress would result from apparently good macro-economic policies. Policies that encourage broad-based growth will have a greater impact on the poor if they have opportunities to build their own human capital, if they have access to financial services and land, and if the quality of land is sustainable". Obadan (1997) stressed that a key factor for

ensuring a sustainable way of life is a more equitable distribution of physical assets (e.g. land) and greater access to production. Dike (1997) also posited that the complete lack or impaired access to productive resources leads to absolute low income, unemployment and underemployment. Singh (1993) found that land distribution in rural India was strongly linked with income. The kind of assets held in a place determines the pattern of income distribution, the growth of farm productivity, and rural non-farm employment (Adams, 1996).

Gugerty and Timmer (1999) used a sample of 69 countries to show that a skewed distribution of assets can adversely hamper the contribution of subsequent economic growth to poverty reduction. They found that, in countries with an initial "good" distribution of assets, growth in both agricultural and non-agricultural sectors benefited the poorest households slightly more in percentage terms. In countries with a "bad" distribution of assets, however, economic growth benefits accrued mostly to the richer households, meaning that the gap between the rich and poor increased. This finding was largely corroborated by a study of smallholder income and land distribution in Africa conducted by Jayne *et al* (2001) across five countries; Kenya; Ethiopia; Rwanda; Mozambique; and Zambia. They concluded, among other things, that (1) poverty among smallholder households was not particularly a geographic phenomenon; and (2) there were serious disparities in incomes and land allocation at the local level.

In Nigeria, greater proportion of the rural households tends to have some amount of assets, but still suffers conditions of extreme poverty (Canagarajah *et al* 1994; Echebiri, 1997). Against this backdrop, studies on the asset profiles of typical rural households and the relationships between their income and asset-holding become very instructive and timely. The study therefore undertook to achieve the following objectives: (a) identify, classify and determine the value of assets held by rural households; (b) determine the relationship between rural asset holding and various forms of rural income; and (c) highlight policy issues relevant to the results of the foregoing and make appropriate suggestions thereunto.

MATERIALS AND METHODS

A multi-stage sampling procedure was adopted in collecting primary data from a random sample of rural households in four states of Southeastern Nigeria: Abia, Anambra, Ebonyi and Imo States. The communities selected were: Nkwoegwu, Oloko (Abia State); Agulu, Ihiala (Anambra State); Amagu, Enyigba (Ebonyi State); Ezi-Orsu, Orsu-Obodo (Imo State). A sample of two hundred (200) rural households was drawn from each of the four states, and this gave a total sample size of eight hundred (800) households who participated in the primary data collection. At the end of the exercise, however, only seven hundred and seventy seven (777) households satisfactorily completed the data collection exercise.

Data collection was done for a period of thirteen (13) calendar months (Oct. 2003 – Oct. 2004), using the cost-route technique, which involved repeated interview visits to the respondents to revalidate their responses. However, at the end of the exercise, the data for October 2003 were discarded as trial run, hence only data for November 2003 to October

2004 were used. It was necessary to conduct the process over a period that covered both farming and non-farming seasons, since the study involved farm and non-farm investments. The relevance of repeated visits (cost-route) approach has been widely enunciated in the literature (Spencer, 1989; Deaton, 1997; Coulombe *et al*, 1997).

Data on the socio-economic characteristics of respondents were analysed by means of descriptive statistics and cross-tabulations. Reproductive value and earning power assets were used in imputing value to non-financial assets held by households. Income was regarded as the sale of crop, livestock, and non-farm income of residents from November 2003 to October 2004. Net income from crops was calculated as the product of self reported crop output and the imputed producer prices for each crop, minus cash input costs. It was not possible to use labour costs because the farmers could not really quantify family labour. The same applied to income from livestock. Income from livestock actually included all sales of livestock and livestock products minus cash input costs. Non-farm income was computed as business income minus business expenses, hired labour income in cash and kind, and remittances from non-resident family members and all forms of transfer payments.

For the analysis of the relationships between household asset and the various forms of rural income, a multiple regression was formulated with total value of household asset (HTA); value of farm assets (HFA); and value of non-farm assets (HNFA). The explanatory variables were (a) farm income in the current year (X_1); (b) farm income in the previous year (X_2); (c) non-farm income in the current year (X_3); (d) non-farm income in the previous year (X_4); (e) total remittances in the current year (X_5); (f) total remittances in the previous year (X_6); and (g) credit (X_7). Credit was included in the equation because it enhances the financial capacity of a beneficiary to acquire assets.

The ordinary least squares (OLS) technique was used to derive estimates of the parameters of economic and statistical relationships from the data. Since theory does not give firm indication of the appropriate functional forms, four functional forms, ordinary linear, semi-logarithmic, exponential and double logarithmic. The choice of lead equations was based on the magnitude and signs of the parameter estimates and their meeting economic and econometric expectations.

RESULTS AND DISCUSSION

Occupational Distribution of Household Heads: Nine primary occupational groups were identified as follows: (a) farming; (b) artisanship; (c) trading; (d) public services; (e) sundry wage labour; (f) transportation; (g) specialized services and contracting; (h) religious workers; and (i) unclassified business and politics.

Primary occupation was taken as the economic activity in which a respondent spent about 75% or more of his working time and from which the individual earned a greater proportion of his income. The data however showed that even where the primary

occupation of the male household head was not farming, yet most of such households cultivated sizeable areas of farmland to diversify income and raise food security.
A distribution of surveyed households according to primary occupation of household head and gender is presented in Table 1. Farming was the most dominant occupation in the entire sample. It constituted about 41% of reported primary occupation. The data showed that majority of households with low aggregate incomes had farming as the primary occupation of the household head.

Four broad sources of household income were identified alongside occupation. These included primary occupation, secondary occupation, remittances and other transfer payments, and sundry sources which were majorly comprised of rental earnings and addition to inventory of capital goods. The primary occupation for a respondent was any of the nine occupational types discussed under occupational distribution of household heads. Secondary occupation was taken as the next occupation, which took some considerable proportion of a respondent's working time and from which such a person earned some reasonable income. A respondent's secondary occupation was also chosen from among the nine occupational types. A percentage distribution of household income according to sources is presented in Table 2.

An annual average income of N118,840.76 was calculated for the sample during the survey period. Reported income figures for the previous year was also collected, but could not be disaggregated by sources. An average of N109,783.22 was calculated for the previous year. As expected, primary occupation contributed the largest proportion of household

Table 1: Distribution of Households by Primary Occupation of Household Heads

Occupation	Number of Households	Percentage
Farming	319	41
Artisanship	132	17
Trading	163	21
Public Service	54	7
Transportation	16	2
Sundry Wage Labour	54	7
Specialized Services and Contracting	23	3
Religious Services	8	1
Unclassified Business and Politics	8	1
Total	777	100

Source: Survey Data

income with a share of 57% during the survey period. The data further showed that the percentage contribution of primary occupation tended to decrease among high income

households. This shows a reinforcing synergy between income earning capacity and diversification opportunities.

Table 2: Distribution of Household Income and Income Sources among the Surveyed Households

Source of Income	Annual Average (N)	Percentage of Annual Average
Primary Occupation	67,739.33	57
Secondary Occupation	24,956.56	21
Remittances and Sundry Transfer Payments	21,391.34	18
Sundry Sources	4,753.63	4
Total (Annual Average((N)	118,840.76	100

Source: Survey Data

When the primary income data was disaggregated among the nine occupational types, it was found that trading contributed more than the average annual income (109%). Specialized services and contracting also contributed more than the average income (101%). Other occupations contributed less than the average income. It is important to note that although farming was found to be the most predominant occupation (Table 5), its overall contribution to household income was relatively low (only 72% of average income). This could have resulted from the low income earning capacity of farming and the lack of access to agricultural production assets and inputs, as well as inefficient agricultural marketing systems, which put farmer at a disadvantage. This implies that strategies to enhance rural incomes must articulate practical measures to increase the productivity of rural peasant farmers.

Farm Holdings: Majority (48%) of the households cultivated less than 1 hectare of cropland during the survey period. Households whose farm sizes ranged from 1 to 3 hectares constituted 34%, while six percent, six percent, three percent, two percent and one percent had crop holdings of sizes ranging from 4 to 6 hectares, 7 to 9 hectares, 10 to 12, 13-14 and 15 hectares and above respectively. There were clear indications that operational farm holdings will decrease in the region owing to increased population growth and urban encroachment. Several rural communities in the region had lost arable land to development projects and urbanization. In the face of readily growing population which only necessitates agricultural intensification, the policy implication of low farm size will perhaps relate to improvements in farming technologies and provision of modern inputs. This entails enhanced capacity to acquire more non-land production assets by farmers.

Assets Held In The Surveyed Rural Communities: Households held a wide range of productive assets in the surveyed sample. The physical assets could easily be classified into farm and non-farm assets. The financial assets comprising cash in hand and cash in bank and credit were classified into farm and non-farm assets depending on the reported investment plans of the respondents. They were generally classified as current assets. The

intermediate and fixed assets were classified according to the criteria given earlier in the literature. Table 3 shows the percentage distribution of household assets by type.

Table 3: Percentage Distribution of Household Farm Assets by Type and Value

Assets Type	Value (N)	Percentage of Total Asset Value
Current	21,000	4.40
Intermediate	88,000	18.30
Fixed	372,000	77.34
Total (Average Value of Assets)	481,000	100

Source: Survey Data

The farm fixed assets were of appreciable value in Abakaliki (Enyigba) and Oguta (Ezi-Orsu and Orsu-Obodo) areas where farming was practiced on a commercial scale by some of the respondents.

Table 4 contains the percentage distribution of non-farm assets by type and value. A cursory comparison of Tables 3 and 4 will show that non-farm assets had higher value in the surveyed communities. Most household heads who were primarily engaged in trading and small scale processing and specialized services had very valuable assets. That they also belonged to the group of high and medium income respondents suggests further that the assets held by them yielded more returns than farm assets.

Table 4: Percentage Distribution of Household Non-Farm Assets by Type and Value

Non-Farm Assets	Value (Naira)	Percentage of Total Asset Value
Current	109,816	18.50
Intermediate	222,600	37.50
Fixed	261,184	44.00
Total	593,600	100.00

Source: Survey Data

The higher nominal and percentage values of farm fixed assets over non-farm fixed assets was due to the fact that landholdings was common among the respondents. The non-farm fixed assets were not common but acquired only by those who needed them.

Income Determinants of Rural Asset-Holding: Seven income variables were regressed against each of the three dependent variables, viz, total value of household assets (HTA); value of household farm assets (HFA); and value of household non-farm assets (HNFA). Four linearized functional forms, ordinary linear, semi-log, double-log and exponential

forms, were fitted using the ordinary least squares (OLS) method. Results of the various forms of the estimated models are presented in Appendices I, II and III.

Income Determinants of Total Value of Household Asset-holding: The double-log model was chosen as the lead equation for this relationship. The explicit form of the relationship is as follows:

$$\text{Ln HTA} = \underset{(9.940)}{1.140^{***}} + \underset{(8.484)}{0.235\ln X_1^{***}} + \underset{(5.775)}{0.181\ln X_2^{***}} + \underset{(9.279)}{0.282\ln X_3^{***}}$$

$$+ \underset{(7.429)}{0.164\ln X_4^{***}} + \underset{(2.105)}{5.276E\text{-}02\ln X_5^{*}} + \underset{(0.542)}{1.881E\text{-}02\ln X_6} + \underset{(5.845)}{0.139\ln X_7^{***}}$$

($R^2 = 0.931$, ($R^{-2} = 0.930$ n = 777, F-ratio = 14777.632***; ***, * = significant at 1% and 10% respectively; and ( ) = t-values)

Farm income in both current and previous years, non-farm income in both current and previous years, and credit were positively correlated with total value of household assets. Remittances did not exert a strong influence on value of household assets, particularly with respect to previous year's remittances. Remittances in the current year (year of survey) exerted some fairly significant influence on value of assets at the 10 percent level. The strong positive correlation of the various incomes other than remittances was expected because of the usual impetus higher incomes gives to asset acquisition. This result agrees with the conclusions reached by Reardon and Berdegue (1999). It was however expected that both farm income and non-farm income in the previous year should have exerted stronger correlation with the dependent variable, but the reverse was the case. This could have been due to improvements in input delivery and the general good performance of agriculture in the last three years arising from the concerted effort of government to encourage domestic production of basic staples. It is important to note that both farm income and non-farm income demonstrated near equal capacity in influencing rural asset-holding in the sample. This lends further credence to the results obtained by Reardon and Berdegue (1999) that, the share of non-farm income in total household income rises with household income. This result also corroborates an earlier result obtained by Echebiri (2002) that a substantial proportion of low-income households in rural Southeastern Nigeria was engaged primarily in rural non-farm enterprises (RNFEs). This means that efforts to enhance rural income earning capacity in the area should comprise measures to improve the productivity of RNFEs.

That remittances were not particularly significant does not really mean they did not impact on rural asset acquisition. Even though such remittances may have been used for direct consumption and household welfare, their overall effect could positively transmit through better health and education in the long run. Credit in the previous year was very

significantly correlated with asset-holding. This result was expected, and it goes a long way to show that rural households in Southeastern Nigeria would make efficient use of credit if such is made readily accessible to them.

Income Determinants of Household Farm Asset-holding: For this relationship, the double-log model also was used as the lead equation. The explicit form of the equation is presented as follows:

$$\text{Ln HFA} = 1.528^{***} + 0.123\ln X_1^{**} + 0.201\ln X_2^{***} + 0.111\ln X_3^{*} + 0.114\ln X_4^{***} + 6.611\text{E-}02\ln X_5 + 0.107\ln X_6 + 0.279\ln X_7^{***}$$

(6.727) (2.243) (3.227) (1.840) (2.620) (1.333) (1.554) (5.929)

($R^2 = 0.747$, $R^2 = 0.744$, n = 777, F-ratio = 323.976) ***, ** and * = significant at 1%, 5% and 10% respectively, ( ) = t-values).

Three explanatory variables were particularly significant and positively correlated with value of household farm assets. These were farm income in the previous year, non-farm income in the previous year and credit in the previous year. Farm income in the current and non-farm income in the current year were significant at 5% and 1% levels respectively. Again, remittances were positively correlated but not significant. These results satisfy a priori expectations. It is a known fact that previous year's farm income has more significant influence on current year's production than income in the current year. The relevance of current year's income in the model derived from the fact that the data were collected over a reasonably long period which could enable the respondents make production decisions based on the year's income. The same trend was also observed for non-farm income in the previous year, which was much stronger than that of the current year. Even though both farm income and non-farm income in the previous year were very significant, a closer look at the model indicates that the former was relatively stronger. This suggests that households in the sample behaved very normally in ploughing back the benefits of their farm enterprises into greater farm production activities. It also suggests that greater productivity of farm enterprises would provide a strong incentive for farm growth in Southeastern Nigeria.

The strong positive correlation shown by non-farm income in the previous year is also a very healthy indicator for rural enterprise growth. It suggests strong inter linkages between farm and non-farm activities. Thus, improvements in the earning capacity of one reinforce growth in the other. Credit had the strongest positive influence on value of household farm assets. This was quite expected. It agrees with the current emphasis on the provision of micro-credit to smallholders. The data showed that majority of the households did not actually have credit from the formal sector. The little they had from cooperatives and other informal sources was however utilized in farm production activities through acquisition of

assets. This is consistent with the position expressed by Reardon et al (1995) that net returns and relative returns affect farm productivity.

Income Determinants of Rural Non-farm Asset-holding

In this relationship, the double log function was again chosen as the lead equation. Four out of the seven explanatory variables were significant at 1% and positively correlated, while the rest were not significant at all. The four were farm income in the current year, non-farm income in the current year, non-farm income in the previous year and credit in the previous year. The equation had the following explicit form:

$$\begin{aligned} \text{LnHNFA} = {} & -2.302^{***} + 0.278\ln X_1^{***} + 6.902\text{E-}02\ln X_2 + 0.463\ln X_3^{***} \\ & (-6.781) \quad (3.416) \quad (0.752) \quad (5.220) \\ & + 0.295\ln X_4^{***} - 8.591\text{E-}02\ln X_5 + 0.110\ln X_6 + 0.181\ln X_7^{***} \\ & (4.596) \quad (1.176) \quad (1.088) \quad (2.610) \end{aligned}$$

($R^2 = 0.695$, $R^{-2} = 0.692$; n = 777; F-ratio = 248.474; *** = significant at 1% level; ( ) = t-values).

The results further demonstrate the relevance of net returns on asset acquisition. Non-farm income in both the current and previous years was very significant, thus suggesting that the household heads were actively committed to raising their enterprises as incomes increased. It is equally noteworthy that farm income in the current year was strongly influential, thus re-affirming the inter-linkages between rural farm and non-farm enterprises in the study area. Increases in the earning power of rural non-farm enterprises provided a stronger impetus for more farm production activities, and vice versa. The policy implication of this lies in the domain of enunciating a comprehensive rural economic development programme that enhances rural farm and non-farm linkages. Again, credit proved very strong in influencing non-farm rural asset acquisition. This was quite expected. However, there were no ready credit programmes available in most of the study locations. Only informal sources were available with the usual limitations.

CONCLUSION AND POLICY IMPLICATIONS

There were clear indications that occupation of household heads, farm size, and household income, had obvious disparities in the sample. These disparities were most likely the major intervening factors determining the magnitude and direction of flow of rural assets. It is important to note in particular that results of earlier studies in other parts of Sub-Saharan Africa and elsewhere confirm the causal influence of such variations on rural economic indices. Therefore, strategies to enhance access to productive assets by rural people must adequately address socio-economic and human asset development variables.

The regression results confirm the reinforcing inter-relationship between rural income and asset holding. It is most instructive to note that farm and non-farm asset holdings in the rural sector are both compatible and complementary in rural production. Non-farm income

appeared stronger in influencing household asset holding despite the fact that greater proportion of the sample was engaged in agriculture. This poses a great challenge for agricultural and rural sector development planning with particular regard to increasing farm productivity through an appropriate policy framework. It is equally suggested that rural non-farm activities be encouraged through adequate capacity building to ensure balanced growth in the sector.

REFERENCES

Adams, R.H. 1996. *Remittances, Income Distribution, and Rural Asset Acquisition*, FCND Discussion Paper No. 17, Washington, DC International Food Policy Research Institute.

Adeniyi, P.O. 1999. *Research Capacity Building for Sustainable Development in Nigeria: Problems, Challenges and The Way Forward.* Lagos: University of Lagos, Nigeria.

Canagarajah, S.T. Ngwafon and S. Thomas 1994. *The Evaluation of Poverty and Welfare in Nigeria.* Population and Human Resources Division, West-Central Africa Development. Washington, D.C. The World Bank.

Coulombe, H.A. Mckay and J.J. Round 1997. Estimating the Contribution of Household Production Activity to GDP: With an Application to Ghana Mimeo: Department of Economics, University of Warwick, Warwick.

Deaton, A. 1997. *The Analysis of Household Surveys. A Microeconomic Approach to Development Policy.* The World Bank. John Hopkins University Press, Baltimore and London.

Dike, N. 1997. Understanding the Multidimensional Nature of Poverty. In: *Poverty Alleviation in Nigeria.* Ibadan: Nigerian Economic Society, pp. 157-176.

Echebiri, R.N. 1997. The Structure of Income Inequality and Poverty in Rural Southeastern Nigeria. In: *Poverty Alleviation in Nigeria.* Ibadan: Nigerian Economic Society. Pp. 55-72.

Echebiri, R.N. 2002. *An Analysis of the Influence of Socio-economic Variables on Household Income, Consumption Expenditure and Savings in Rural Southeastern Nigeria.* PhD. Thesis. Dept. of Agric. Econs. Univ. of Nig. Nsukka, Nigeria.

Gugerty, M.K. and C.P. Timmer 1999. Growth, Inequality and Poverty Alleviation: Implications for Development Assistance. Washington, D.C.: USAID. Mimeo.

Jayne, T.S., T. Yamano, M. Water, D. Tschirley, R. Banfica, D. Neyen, A. Chapoto, and B. Zulu 2001. Smallholder Income and Land Distribution in Africa: Implications for Poverty Reduction Strategies MSU International Development Paper No. 24.

Obadan, M. 1997. Analytical Framework for Poverty Reduction: Issues of Economic Growth Versus Other Strategies. In: Poverty Alleviation in Nigeria. Ibadan: Nigerian Economic Society, pp. 1-18.

Reardon T. and J. Berdgue 1999. Rural Non-farm Employment and Incomes in Latin America. Paper presented at the BIID Seminar at Santiego, Chile.

Reardon, T.E. Crawford and V. Kelly 1994. Link Between Non-Farm Income and Farm Investment in Africa Households: Adding the Capital Market Perspectives. *American Journal of Agricultural Economics*, vol. 76, pp. 1172-1176.

Singh, R.P. 1993. Inter-generational Transfer of Land. Some Policy Issues Related to Land Reform. *Journal of Rural Development*, Vol. 12, No. 4, pp. 373-401.

Spencer, D.S.C. 1989. Collecting Meaningful Data on Farm Size and Labour Use for Economic Analysis Associated with On-farm Trials in Sub-Saharan Africa. Workshop on the Design and Analysis of On-Farm Trials, International Institute of Tropical Agriculture, Ibadan.

World Bank 1993. Implementing the World Bank Strategy to Reduce Poverty: Progress and Challenges. Washington DC: World Bank.

Appendix I: Regression Statistics for Income Determinants of Rural Asset-holding in Southeastern Nigeria (Dependent Variable; Total Value of Household Assets (N))

Independent Variables	**Function Forms**			
	Linear	Exponential	Double log+	Semi-log
Constant	5889.172* (1.826)	11.222*** (411.782)	1.140*** (9.940)	-2265077*** (-45.796)
Farm income in the current year	0.776*** (5.491)	3.380E.06*** (3.180)	0.235*** (8.484)	42711.275*** (3.563)
Farm income in the previous year (N)	1.918*** (9.382)	5.979E-06*** (3.888)	0.181*** (5.775)	45601.909*** (3.440)
Non-farm income in the current year (N)	1.320*** (8.668)	5.569E-06*** (4.859)	0.282*** (9.279)	73517.363*** (5.609)
Non-farm income in the previous year (N)	0.271*** (3.506)	2.671E-06*** (4.588)	0.164*** (7.429)	-2815.737 (-0.296)
Total remittances in the current year (N)	0.679*** (2.932)	-5.252E-08 (-0-030)	5.276E-02* (2.105)	8300.296 (0.768)
Total remittances in the previous year (N)	-2.035*** (-4.445)	-0.030E-06*** (-2.622)	1.881E-02 (0.542)	25671.196 (1.715)
Credit	5.667*** (8.507)	1.455E-05 (2.904)	0.139*** (5.845)	59227.297*** (5.786)
R-Square	0.932	0.750	0.931	0.803
Adjusted R-Square	0.932	0.748	0.930	0.801
F-Ratio	1511.780***	329.851***	1477.632***	446.665
N	777	777	777	777

Note ( ) Figures in Parenthesis are t-values

*** = Significant at 1 percent level

** = Significant at 5 percent level

• = Significant at 10 percent level

- = Lead equation

Source: Derived from Regression Analysis of Survey Data

Appendix II: Regression Statistics for Income Determinants of Rural Farm Asset-holding in Southeastern Nigeria (Dependent Variable; Value of Household Farm Assets (N))

Independent Variables	**Function Forms**			
	Linear	Exponential	Double-log+	Semi-log
Constant	19564.210*** (5.401)	10.578*** (288.213)	1.528*** (6.272)	-966188.7*** (-28.695)
Farm income in the current year (N)	0.389*** (2.754)	1.555E-06 (1.086)	0.123** (2.243)	30.522.080*** (3.740)
Farm income in the previous Year (N)	2.138*** (10.460)	7.276E-06*** (3.513)	0.201*** (3.227)	44089.640*** (4.781)
Non-farm income in the current year (N)	-7.012E-03 (-0.045)	3.443E-06** (2.230)	0.111* (1.840)	12062.086 (1.352)
Non-farm income in the previous year (N)	-0.350*** (-4.525	2.249E-06*** (2.858)	0.114** (2.620)	-32714.429*** (-5.058)
Total remittances in the current year (N)	7.128E-02 (0.308)	4.926E-02** (2.099)	6.611E-02 (1.333)	964.438 (0.131)
Total remittances in the previous year (N)	0.825* (1.803)	-4.149E-06 (0.895)	0.107 (1.554)	27167.083*** (2.666)
Credit	7.913E-02 (0.119)	9.021E-06 (0.104)	0.279*** (5.929)	300090.111*** (4.318)
R-square	0.736	0.577	0.747	0.643
Adjusted R-square	0.733	0.573	0.744	0.640
F-Ratio	305.767***	149.799***	323.976	197.798***
N	777	777	777	777

Note ( ) Figures in Parenthesis are t-values

*** = Significant at 1 percent level

** = Significant at 5 percent level

• = Significant at 10 percent level

- = Lead equation

Source: Derived from Regression Analysis of Survey Data

Appendix III: Regression Statistics for Income Determinants of Rural Non-farm Asset-holding in Southeastern Nigeria (Dependent Variable: Value of Household Non-farm Assets in Naira (N))

Independent Variables	Functional Forms			
	Linear	Exponential	Double-log+	Semi-log
Constant	-15858.061 (-3.582)	10.114*** (204.441)	-2.302*** (-6.781)	-1272750*** (-29.397)
Farm income in the current year (N)	.175 (-1.016)	2.572E-06 (1.343)	0.278*** (3.416)	4215.600 (0.402)
Farm income in the previous year (N)	-.459 (-1.837)	1.244E-06 (0.449)	6.902E-02 (0.752)	-10470.953 (-0.883)
Non-farm in the current year (N)	1.366*** (7.334)	1.025E-05*** (4.961)	0.463*** (5.220)	55323.085*** (4.822)
Non-farm in the previous year (N)	.636*** (6.721)	4.584E-06*** (4.369)	0.295*** (4.596)	28176.395*** (3.388)
Total remittances in the current year (N)	.843*** (2.979)	-8.626E-06*** (-2.747)	-8.591E-02 (-1.176)	7257.132 (0.767)
Total remittances in the previous year (N)	-2.911*** (-5.204)	-2.355E-05*** (-3.796)	0.110 (1.088)	20934.195 (1.598)
Credit	6.860*** (8.428)	5.360E-05*** (5.937)	0.181*** (2.610)	36290.302*** (4.051)
R-square	0.746	0.573	0.695	0.626
Adjusted R-square	0.744	0.575	0.692	0.617
F-Ratio	322.713***	150.210***	248.474***	179.386***
N	777	777	777	777

Note ( ) Figures in Parenthesis are t-values
*** = Significant at 1 percent level
** = Significant at 5 percent level
• = Significant at 10 percent level
- = Lead equation
Source: Derived from Regression Analysis of Survey Data