

DETERMINANTS OF FARM AND OFF-FARM INCOMES AND SAVINGS OF FOOD CROP FARMERS IN IMO STATE, NIGERIA: IMPLICATIONS FOR POVERTY ALLEVIATION

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ABSTRACT

There has been a long standing problem of declining agricultural production and per capita income trends with a resultant escalating poverty in the rural economies of Nigeria. This gave impetus to this study on the determinants of farm income, off farm income and savings amongst food crop farmers in Imo State. Primary data from 75 food crop farmers were subjected to a simultaneous equation analysis by the two stage least squares method. Results indicate that farm size; household labour, education and training, and savings were directly related to farm income while off farm income and hired labour were inversely related to it. Sex had a significant influence on farm income with the male gender performing better. Household labour, education, savings, age and membership of cooperatives/village associations directly influenced off- farm income while farm income inversely influenced it. Also, sex significantly influenced off farm income with the male farmers performing better. Savings were influenced directly by age, off farm income and interest earnings and inversely by education, farm income, household size and membership of cooperatives/village associations. Sex significantly influenced savings with the female gender performing better. Policies for tackling endemic and pervasive poverty in the rural economy through enhanced farm and off farm income generation, savings mobilisation and capital formation were recommended.

Key words: Rural savings, farm and off-farm income

INTRODUCTION

In the Nigerian rural economy, two major activities are performed: farm and non-farm economic activities (Alimba, 1995). Available statistics (Okoro, 1987; Ihimodu, 1991; Afolabi and Bandipo, 2001) have shown that rural Nigerian economy is dominated by agricultural enterprises. Okoro (1987) further indicated that smallholder farmers who constitute about 94 percent of all farmers and produce about 90 percent of all the nation's food and fibre dominate farming in the country. Accordingly, the rest of the rural farmers, (about 6 percent) are employed in rural medium- or large-scale farm activities.

However, off-farm economic activities are fast gaining prominence as integral components of rural economies of Nigeria (Eboh, 2002; Eboh and Ocheoha, 2002). Arising from decreasing production trends and declining per capita arable land occasioned by population increase with the concomitant intensified use of agricultural production resources, the rural people are

increasingly turning to non-farm economic activities as supplementary income sources. Alimba (1995) observed that the non-farm economic activities which are most common in rural Nigeria are petty trading such as food stuff retailing, hotel enterprise, local wine selling, cobbling, dressmaking, gin distilling and wine tapping, craft making such as blacksmithing, wood and calabash carving, carpentry, pot making, leatherworking, and weaving. Most rural people combine some farming with these off-farm activities in varying degrees. This presents a relationship for the resource endowments of the rural entrepreneurs generally and the farmers in particular. The economic problem therefore subsists in how to optimally simulate this relationship.

There are strong interlinkages between farm and off farm enterprises, which is a major determinant of the extent to which they contribute to income redistribution, savings, poverty alleviation, and rural development. According to Bagachwa and Stewart (1992), Islam (1997) and Eboh (2000), these interlinkages, which may be forward or backward, are often considered in terms of the flow of goods and services, capital, labour and consumption. On one hand is the demand

savings, poverty alleviation, and rural development. According to Bagachwa and Stewart (1992), Islam (1997) and Eboh (2000), these interlinkages, which may be forward or backward, are often considered in terms of the flow of goods and services, capital, labour and consumption. On one hand is the demand by farm households for consumer goods and services and intermediate and capital goods. For instance, a growing and technology driven agricultural production and processing is a very vital linkage to the off farm enterprises. On the other hand, off farm enterprises generate demand for the resources of the farm sector as raw materials. In addition to providing strategic employment options outside the farm, off-farm economic activities reduce rural urban migration, promote income diversification, equitable income distribution and intersectoral linkages capable of leading to a vibrant rural economy and enable the farmers handle the problems arising from seasonality of agriculture as it pertains to labour, outputs and income (Islam, 1997; FMARD, 2001; Eboh, 2002; Eboh and Ocheoha, 2002).

A major problem confronting rural production in Nigeria arises from the fact that the farmers and indeed rural entrepreneurs generally are economically weak with little or no capital for investment (Nwaru, 2004). very few farmers, rural artisans and

And cottage industrialists in Nigeria can save enough money from their meager earnings to take full advantage of the ever increasing range of improved rural production technologies. They produce very little output and, hence, sell and receive small amounts, which in turn cannot help them to expand their operations, acquire new production technology or enjoy a prosperous living. Although the amount of financial capital required may be small, at very low levels of income, it is difficult to accumulate even that amount (Hossain, 1988). So capital accumulation through savings has been problematic. Given the important relationships between savings, capital accumulation, investment, increased productivity and incomes, this has been pin pointed as a causative factor for the recalcitrant nature of endemic and pervasive poverty in rural parts of Nigeria.

Upton (1996), Adewunmi (1996) and Yaron, *et al*, (1997) noted that poverty persists in many countries because of people's inability to use appropriate instruments to mobilise savings. Savings here refer to the part of income not spent on the consumption of goods and

Services. Gupta (1970) defined rural savings as a residual of income minus consumption in the rural economy. Classical economic theory teaches that savings depend on income. It usually includes physical productive resources like seeds, tubers, etc. kept for next year's production and financial forms (Desai and Mellor, 1993). The relationship between savings and income is the propensity to save or the savings function. Economic literature considers price and non-price factors that determine savings.

Price factors are represented by some expected real rate of return termed the incentive to save (Desai and Mellor, 1993). Gupta (1970); Ong (1972); Desai (1975) and Hyun, Adams and Hushak (1979) revealed that when this rate improves, savings increase and current consumption declines. Mauri (1983) however pointed out that security of savings deposits is a basic requirement common to all savers and that no kind of reward or incentive will be effective unless the savers have total confidence that their savings are safe. Non-price determinants of savings include permanent and transitory income, wealth

(as a proxy for initial endowment), family size, source of income, liquid assets, foreign savings or capital flight and inflation (Desai and Mellor, 1993). Desai (1975) reported that family size is the most important determinant of rural savings followed by lagged current income, then interaction of expected rate of return and income, wealth and lastly the inverse of lagged current consumption. However, Ong (1972) reported that expected income is the most important.

Therefore, farm and non-farm economic activities can only be mutually reinforcing in the national march towards savings and capital accumulation, rural poverty alleviation and sustainability of the rural resource base. Off farm enterprises provide opportunity for additional income for the rural households already engaged in agriculture. In this way, they help the rural households to cope with the risk and uncertainties that are found in agricultural production, which cause fluctuations in agricultural income especially where the savings, credit and insurance systems for dealing with such fluctuations are non-existent or inefficient. Therefore, this study attempted to examine the determinants of farm income, off farm income and savings amongst arable crop farmers and their implications for poverty alleviation in Imo State of Nigeria.

METHODOLOGY

Imo State was stratified according to the three agricultural zones of the State of Owerri, Okigwe and Orlu. From each zone, 2 blocks were selected by simple random sampling. In all, 6 blocks were chosen. The circles in each chosen block were listed to form the frame from which a circle was chosen per block by simple random sampling. Thus, a total of 6 circles were chosen in all. With the assistance of the village heads and the extension agents of the Imo State Agricultural Development Programme in charge of the chosen circles the listing of arable crop farmers in the chosen circle was done. This list formed the frame from which a sample of 75 arable crop farmers was chosen by simple random sampling. Data collection on the socio-economic characteristics of the respondents by the cost route method was conducted in 2003. Data collection instruments consisting of well structured and pre- tested interview schedule were administered on the chosen sample.

Data analysis consisted of the estimation of the farm income, off farm income and savings functions. The implicit functions were specified as:

$$GFI = f(LHA, OFI, HIR, HHL, PFI, EDU, GEN, SAV, e). \quad (1)$$

$$OFI = f(HHL, EDU, GEN, SAV, HHS, AGE, GFI, CVA, e.) \quad (2)$$

$$SAV = f(OFI, EDU, GEN, HHS, AGE, GFI, CVA, INT, e.) \quad (3)$$

Where in equations (1) to (3),

GFI = gross farm income (N). This was measured by the total amount of sales from crops and by products.

LHA = farm size (in hectares); the total area of land the farmer has brought under arable crop production.

OFI = total income to the farmer from sources other than his farm (N).

HIR = hired labour (mandays).

HHL = total labour from the household (mandays).

PFI = purchased farm inputs like seeds, seedlings, cuttings, agrochemicals including fertilizer (N).

EDU = educational level of the farm household head. This was measured by the total number of years he spent in receiving formal education.

GEN = gender of the farm household head, a dummy variable (female = 1; male = 0).

SAV = farm household savings from all sources of income (N).

HHS = farm household size.

AGE = age of farm household head (years).

CVA = number of cooperatives/village and farmer associations to which the farmer belongs.

INT = interest receivable on amount saved (N).

e_i = error term assumed to fulfill all the assumptions of the classical linear regression model.

Equations 1, 2 and 3 were subjected to simultaneous equation analysis. The identification conditions of this system of equations were considered using both order and rank conditions (see Koutsoyannis 1977; Spanos, 1986). They were found to be over identified and were, therefore, estimated using the two stage least squares method.

RESULTS AND DISCUSSION

The estimated farm income, off farm income and savings functions are summarized and presented in Table 1.

Estimated farm income function:

The F-ratio is statistically significant at 1 percent implying that the estimated farm income function is adequate for use in further analysis. The R^2 value implies that 97 percent of the variation in farm income is explained by farm size, off farm income, hired labour, family labour, purchased inputs, education, gender and

Savings. However, hired labour and purchased inputs were statistically significant even at 10 percent.

Arable land is a very important resource in farming in Nigeria. Unfortunately, a major problem to the transformation of agriculture in Nigeria is the atomistic and scattered nature of farm holdings in the Country. Farm size is highly significant and positive implying that the employment of more land resources would lead to higher income from arable crop farming. This agrees with *a priori* expectations and the results from Emerole (2004). This points to the need for appropriate policies and sustainable structures and the political will for arable land mobilization, consolidation and redistribution in Nigeria.

Off farm income is statistically significant at 1 percent but negatively related with farm income. Emerole (2004) reported a similar negative although insignificantly result between off farm and farm incomes. The current result is according to *a priori* expectations. The farmers' funds, manual labour and cash-convertible stored produce are mobile and can be re-allocated from farm to off farm enterprises and vice versa. Emerole (2004) reported a higher daily real wage differential in which off farm is higher than farm real wage and deduced that farmers will most likely favour other self-employments that give them higher

financial returns. This seems to underpin the current high rate of rural-urban migration that has severely afflicted rural economies in Nigeria.

Household labour was statistically significant at 1 percent and positive according to *a priori* expectations. Nwaru (2004) reported a similar positive result between farm income and family labour and pointed out that farm operations in Nigeria have remained labour intensive. Nwaru (2004) further pointed out that farmers would count more on their household labour than on hired labour.

Education had a highly significant and positive relationship with farm income. This conforms to *a priori* expectations and to the results from Alimba and Akubuilu (2000). Nwaru and Ekumankama (2002) posited that education and training produce a labour force that is more skilled and adaptable to the needs of a changing economy. Nwaru (2004) pointed out that education helps to unlock the natural talents and inherent enterprising qualities of the farmers because, according to Obasi.

Table 1: Estimated Off-Farm Income, Farm Income and Savings Functions

Variables	Farm Income	Off Farm Income	Savings
Intercept	-936684.000 (-9.07)***	-1728430.000 (-87.46)***	1782181.000 (34.54)***
Farm size	18052.000 (25.41)***		
Off Farm Income (+)	-0.565 (-9.32)***		1.052 (37.38)***
Hired Labour	-27.249 (-0.38)		
Household Labour	120.911 (3.70)***	494.000 (7.44)***	
Purchased Inputs	0.007 (0.07)		
Education	4661.912 (10.62)***	8072.585 (13.35)***	-8385.824 (-19.20)***
Gender	-10114.000 (-4.01)***	-14795.000 (-2.15)***	35140.000 (8.07)***
Savings (+)	0.690 (27.40)***	0.754 (15.54)***	
Household Size		979.870 (0.60)	-9516.505 (-9.99)***
Age		717.049 (1.95)**	972.940 (4.21)***
Farm Income (+)		-0.452 (-5.24)***	-0.150 (-2.04)**
Cooperatives/Village associations		3486.930 (1.74)*	-6522.055 (-5.30)***
Interest Earning			4.619 (15.32)***
R ²	0.9739	0.9479	0.9809
R ²	0.9707	0.9416	0.9786
F-ratio	307.27***	150.15***	424.35***
n	75	75	75

Source: Computed from survey data, 2003.

(.) = t statistic computed

(+) from reduced equation

***, **, * = Statistically significant at 1%, 5% and 10% respectively

(1991), education enhances the farmer's ability to understand and evaluate new production techniques. This translates into higher farm productivity and incomes. Therefore, policies for tackling deficiency of education amongst farm entrepreneurs through enhanced formal and informal educational programmes will positively impact on farm income.

The coefficient for gender is statistically significant at 1 percent and negatively signed. Given that this is a dummy variable (female =1 and male = 0), the male gender generated farm income more than the females. Given the same conditions, male-headed farm households will earn more than female headed ones. This must have been predicated on the use of superior technology and higher efficiency in resource mobilisation and use.

Savings has a highly significant and positive relationship with farm income. Mejeha (2005) pointed out that individual and household savings constitute an essential part of the process of capital accumulation. That is, savings greatly influence the process of capital accumulation, which in turn determine productivity and income. Therefore, economic policies and programmes that stimulate the propensity to save amongst the rural farmers will have positive impacts on the development of the rural economy.

Estimated Off- Farm Income

Function: The F-ratio is statistically

significant at 1 percent. This implies that the estimated off farm income function is adequate and can be used for further analysis. The R^2 of 0.9479 implies that 95 percent of the variation in off farm income is explained by household labour, education, gender, savings, household size, age, farm income and membership of cooperatives/village associations. Only household size is statistically insignificant.

Household labour was statistically significant at 1 percent and positive. This conforms to *a priori* expectations. Households would easily reallocate excess labour from its members to off farm economic activities as a rational strategy to optimize the use of excess available labour force, diversifying household income and as a tool against poverty. This result parallels that of Emereole (2004) who reported a positive though insignificant relationship between off farm income and household labour.

The coefficient for education is statistically significant at 1 percent and positive. This conforms to *a priori* expectations and to the results from Eboh and Ocheoha (2002). Higher educational attainment therefore caused higher off farm income. Vijverberg (1995) explained that the years of schooling of

Entrepreneurs and workers and the education of other household members even if they are not directly employed in the enterprises of the household have direct impact on the supply response, productivity and incomes of such enterprises. This is a desirable result because according to Nwaru (2004), education helps to unlock the natural talents and inherent enterprising qualities of the entrepreneurs. Education and training produce a labour force that is mobilized, more skilled, amenable to risk taking and change and adaptable to the needs of a changing economy. This kind of labour force, *ceteris paribus*, would allocate farm resources better and re-allocate them more easily to off farm income sources. This implies that policies for making the existing educational programmes sustainable would serve well in tackling the problem of low entrepreneurship, which has been the bane of agricultural and non agricultural enterprises in the rural economy.

Gender roles in rural production activities have occupied conspicuous position in discussions amongst academics, policy makers and researchers. The coefficient for gender is statistically significant at 1 percent and negative. Since this was specified as a dummy (female = 1 and male = 0), the female farmers earned less income from off farm income source than their male counterparts.

The coefficient for the farmer's age is

statistically significant at 10 percent and positive. This is contrary to *a priori* expectations. The optimism and the mental and physical energy required in entrepreneurship declines with increasing age. However, Onu, Amaza and Okunadewa (2000) explained that experience correlates positively with age. Nwaru (2004) defined experience as knowledge and skill gained by contact with facts and events. The number of years a farmer has been in the farming business may give an indication of the practical knowledge he has acquired on how to cope with the inherent farm production activities. If properly channeled, this leads to higher levels of efficiency. Thus, the same level of farm output is produced with a lower bundle of household resources, the balance being redirected to off farm income sources.

The coefficient for farm income is highly significant but negatively related to off farm income. This agrees with *a priori* expectations and with the result from Emereole (2004) who reported a negative but significant relationship between farm income and off farm income. Farm and off farm enterprises compete for the scarce resources of the farm household.

Membership of cooperatives/village associations has a coefficient that is statistically significant at 10 percent and positively related with off farm income. This conforms to *a priori* expectations and to the results from Alimba and Akubuilu (2000). Cooperatives/village associations present healthy fora for the

farmers to interact with his fellow farmers and other entrepreneurs in his locality. These are good sources of quality inputs, information on economic activities in that locality and beyond and organized marketing of products. This translates into higher efficiency in farm resource use, a condition that favours the release of more resources for off farm enterprises.

Estimated Savings Function: The F-ratio is statistically significant at 1 percent implying that the estimated savings function is adequate for use in further analysis. The R^2 value indicates that 98 percent of the change in savings is caused by changes in off farm income, education, gender, household size, age, farm income, cooperatives/village associations and interest.

The coefficient for off farm income is statistically significant at 1 percent and positive. This agrees with *a priori* expectations and the finding of Mejeha (2005) in Abia State that disposable income is statistically significant at 1 percent and positively related to savings. *Ceteris paribus*, off farm income is reaped by the farm households as extra earnings from resources released from the regular farm operations. The implication is that it would enhance the household disposable income. Schmidt Hebbert, *et al*, (1992) noted that income and wealth are the basic determinants of savings. They stated that the best means to raise household savings was by increase of their income.

Education has a coefficient that is statistically significant at 1 percent and negatively signed. This result is contrary to *a priori* expectations because those with higher formal education are expected to earn higher income and therefore save more. Mejeha (2005) reported a direct relationship between the level of education and the amount of savings. Perhaps, the current result reflects the case of underemployment of resources in the rural economy.

The coefficient for gender is statistically significant at 1 percent and positive. Since this variable was specified as a dummy (female = 1 and male = 0), this result implies that the females saved more than the males. This is contrary to the result from Odurukwe and Okorji (2002) who reported that the male headed households saved more. This is an interesting result given that the men generated more gross farm and off farm incomes. The implication is that women have higher propensity to save. Given the importance of savings in capital accumulation and rural production, women empowerment has great potentials in triggering off the much-desired rural industrial take off.

Household size has a coefficient that is statistically significant at 1 percent and negative, which implies that rural people save less the larger their households. This conforms to *a priori* expectations and the results from Desai (1975) and Odurukwe and Okorji (2002) but contradicts Mejeha (2005) who found a positive

relationship between household size and non-cash saving and explained it on the grounds of security of food and property, accessibility and ease of liquidity. The fact that rural households earn low income (Mejeha, 2005) makes the burden of household sustenance and subsistence heavier for larger households, leading to reduced household saving.

The coefficient for age is statistically significant at 1 percent and positive, implying that people save more as they grow older. This result deviates from that from Odurukwe and Okorji (2002) and conforms to the observations and research findings of Skinner (1988), Zeldes (1989), Loayza, *et al*, (2000) and Mejeha (2005). However, it tends to disagree with the life cycle hypothesis, which hypothesized that savings are low at young age, high at middle age and low again at old age.

Farm income maintained a significant and inverse relationship with savings. This result is contrary to *a priori* expectations and to Odurukwe and Okorji (2002) and Mejeha (2005) who reported a positive relationship between household disposable income and savings. It is expected that low-income earners have high marginal propensity to consume and low marginal propensity to save (Jhingan, 1985) and when they fail to provide for their daily needs, they go into borrowing or use up previously accumulated savings (Upton, 1996). The current result may be explained by the fact that gross farm income might increase, while net farm income, which

gives the farmer the basis to save more, is decreasing. In this case, economic policies and programmes to tackle the problems of low savings and poor capital accumulation amongst the rural farm entrepreneurs should include as a vital component farm product price subsidies.

The coefficient for membership of cooperatives/village associations is statistically significant at 1 percent and negative. This is contrary to *a priori* expectations and the results from Mejeha (2005) that rural savings and membership of organized groups are significantly and directly related. Nwaru (2004) observed that the number of socioeconomic associations like cooperatives, age grade, farmer associations to which a farmer belonged is expected to help him receive and synthesize new information on economic activities through increased interactions with other entrepreneurs within his locality.

The coefficient for nominal interest earning is statistically significant at 1 percent and positive. This result is consistent with *a priori* expectations, and the report from Mejeha (2005). Savers consider interest receivable as price or dividend for their resource. That is, interest payment is considered as incentive to save. However, on the side of the savings mobilization agency, interest payment is considered as the cost of savings mobilization. hence Mejeha (2005) reported an inverse relationship between savings mobilized and interest

st payment. Therefore, optimal interest regime is necessary for savings mobilization and capital accumulation, which is necessary for triggering off increased rural production.

CONCLUSION

The relevance of farm income, off farm income and savings to increased production, income poverty alleviation and development of the rural economy cannot be over-emphasized. The two stage least squares were used in estimating farm income, off farm income and savings functions in a simultaneous equation analysis. The determinants of the estimated functions, gave pointers to policy directions in the development of the rural economy of Imo State.

Policies and programmes for increasing incomes and reducing poverty amongst the rural farmers should strive at increasing farm size, efficiency of household labour use, ensure optimal consumption and savings decisions, target male farmers more and encourage education and enlightenment amongst the farmers. Such policies should also be targeted more at older farmers and aim at

optimally mobilizing cooperatives /village associations, simulating their activities in order to yield optimal benefits to their members.

Capital accumulation is a very important pre-cursor for the much-desired industrial take-off in the rural economy of Imo State of Nigeria. This is achieved

through increased and sustainable marginal propensity to save. Economic policies that encourage savers to save more and savings mobilization agencies to be more efficient in savings mobilization should be put in place. Such policies should be good enough to discourage the farmers from resource waste; this can be achieved by stimulating them to invest optimally in their farm operations and reallocate the extra resources to off farm enterprises. They should be women and youth friendly. Such policies should de-emphasize formal education, large household size and membership of cooperatives/village associations.

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