DETERMINANTS OF PARTICIPATION OF FARM HOUSEHOLDS IN NON-FARM ENTERPRISE ACTIVITIES IN RURAL NIGERIA

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Abstract

This paper uses the Nigerian nationally representative household level data to examine the factors influencing the decision of farm household to engage in non-farm enterprise (NFE) activities in rural Nigeria. The model was estimated using Tobit regression, and the result shows that NFE participation decision of the household significantly depends on its head's education, household size, community level infrastructures and its distance to market. Unique to this study, we found that households having access to social and financial capital can overcome the NFEs entry barriers. This suggests that for the development of rural entrepreneurship in the country, the farm households need to be provided with basic education, community infrastructures, effective micro-credit and social network.

Keywords: Non-farm enterprises; Non-farm sector; Farm household; Rural Nigeria; Income Diversification

INTRODUCTION

Non-farm enterprises (NFEs) are gaining considerable attention among farm households in Sub-Saharan Africa due to increasing inability of the farm sector to provide them with their basic needs. Evidence from the region suggests that the share of non-farm sources has been increasing over years and accounts for about 30−45 percent of the income of their farm households (Reardon et al., 1992; Haggblade et al., 2007). Literature revealed that the non-farm

sector plays a vital role in enhancing the wellbeing of rural households by providing them with income diversification opportunities that helps in slowing down rural-urban migration, reducing poverty, and improving their food security status (Haggblade et al., 2007; Lanjouw, 2007; Ali and Peerlings, 2012).

Despite mounting evidences on the contribution of NFEs to household welfare, the factors influencing the decision of farm households to engage in NFE activities are substantially left unexplored (Lanjouw and Lanjouw, 2001; Woldenhanna and Oskam, 2001; Loening et al., 2008). Existing studies (Deininger and Olinto, 2001; Reardon et al., 2007; Babatunde and Qaim, 2009) focused more on non-farm work. However, literature suggests that non-farm work is not the dominant source of income diversification in sub-Saharan Africa, especially in their rural areas where the vast majority of the households are self-employed in family enterprises (Barret, 2001; Rijkers and Costa, 2012).

Moreover, most of the existing studies (Deininger and Olinto, 2001; Reardon et al., 2007; Babatunde and Qaim, 2009) neglects the effect of entry barriers on household participation in NFE activities in spite of its potential effect on household diversification decision. Such barriers include access to social capital, formal capital and market information. The current situation makes it difficult to suggest policies that would promote NFEs as a measure of improving household wellbeing in rural areas of developing countries.

The purpose of this study is to examine the determinants of participation of farm households into NFE activities, using a nation-wide survey data of Nigerian rural households. In line with the literature, this study sees NFEs as an allocation of household productive assets to all forms of owned businesses and self-employed economic activities that are undertaken in the non-farm sector of the economy. Such activities include local manufacturing, mining, trading, construction, transportation and all other forms of self-employed human services. It is worthy to note that this study is limited to rural households that choose – either to specialize in farming or diversify into NFE activity as a means of sustaining their livelihood. The outcome of this study would be of immense benefit to policy makers, development planners and other stakeholders who seek to promote rural development in African communities.

The rest of the paper is organized as follows. Next section provides a review of literature on determinants of participation of farm households in non-farm activities. Section three presents the conceptual framework. Section four describes the data and the method used in estimating the factors that influenced farm household to engage in non-farm enterprise activities. Section five presents and discusses the empirical findings, while the last section concludes.

LITERATURE REVIEW

Non-farm enterprises have been widely recognized as one of the strategies that farm household used to improve their wellbeing in developing countries (Ellis, 1998; Schwarz, 2005; Owusu et al., 2011). The stream of income obtained from non-farm enterprise activities by the farmers supplement the income they generate from the farm sector. It also provides liquidity that can be used for the development of the agricultural sector. The households partake in non-farm enterprise activities because non-farm income have less uncertainty when compared to farm income. It is also less correlated with agricultural activities, making them preferable to diversifying through agricultural portfolio investment or through participation in the agricultural labor market.

The existing studies have identified many possible factors that influenced farm household to engage in non-farm enterprise activities in developing countries (Ellis, 2000; Barrett et al, 2001; Abdulai and Crolerees, 2001; Woldenhanna and Oskam, 2001; De Janvry and Sadoulet, 2001; Reardon et al., 2007; Owusu, et al., 2011). From the review, the factors that influence non-farm participation decision of the household have been grouped into household characteristics, community characteristics, entry barriers and geographical Location. Household characteristics that influenced non-farm diversification behavior of the household include age, gender, education of the household head and household endowments (Reardon, 1997; Lanjouw etal., 2001; Abdulai and Crolerees, 2001; Escobal 2001; Loening et al., 2010; Owusu et al., 2011; Ali and Peerling, 2012)

The literature havealso shown that the available infrastructures that influenced NFE decision of farm households are roads, electricity and communication facilities (Lanjouw et al, 2001; De Janvry and Sadoulet, 2001; Escobal, 2001; Joshi et al, 2002; Pham et al., 2010).The reviewed also suggests that there are barriers or constraints that mitigate some farm households from diversifying into non-farm enterprise activities. The identified barriers include lack of access to formal credit, social capital and market information. Studies report that the lack of household access to formal credit has a negative influence on non-farm enterprise participation decision (Woldenhanna and Oskam, 2001; Schwarz and Zeller, 2005). In the same vein, Schwarz and Zeller (2005) found that the lack of Proximity to Market information concerning non-farm activities or prices of non-farm products has a negative influence on non-farm diversification behavior of the households.

The reviewed literature revealed that associations such as cooperatives and women's associations encourages participation in non-farm enterprise activities. Such associations provide loans, financial assistance and information on potential business opportunities within and outside their local communities. Geographical location is another key determinant of

household NFE participation decision. The location captures the differences in socio- economic characteristics and resource endowment of the localities of the individual households (Awudu and Croleees, 2001; Pham, et al., 2010; Ali and Peerling, 2012).

CONCEPTUAL FRAMEWORK

The conceptual framework for this study is developed from marginal utility theory. In line with the theory, an individual household is having a single non-separable utility function, which its optimization is subject to budget, time, production, and non-negativity constraints. Households are assumed also to possessed fixed endowments of capital and labour that they allocate for various types of income generating activities. Hence, the framework captures farm households that are faced with two choices –either to continue with farming or diversify into non-farm enterprise (NFE)activity as a means of sustaining their livelihood. Meanwhile, to diversify into NFE activity, the households need to have a minimum level of capital for investment or specific skills for a given non-farm entrepreneurial activity. The utility maximization function of each household is expressed as follows:

$$Max\ U_{T_{fm}\ T_{nf}} = Eu\big(C, T_{leis}\ ;\ Z_h\big) \tag{1}$$

subject to:

$$T = T_{fm} + T_{nfe} + T_{leis} \tag{2}$$

$$C = Y = (P_{qfm} - K_{fm})\,Q_{fm} + (P_{qnfm} - K_{nfm}) + Q_{nfm} + Y_0) \tag{3}$$

$$Q_{fm} = F(T_{fm}\ ;\ L_{fm}\ ,\ B_{fm}\ ,\sigma_{fm}\ ,Z_{fm}) \tag{4}$$

$$Q_{nfm} = F(T_{nfm}\ ;\ L_{nfm}\ ,\ ;\ B_{nfm}\ ;\ Z_{nfm}) \tag{5}$$

$$T_{nfm} \geq 0 \tag{6}$$

Equation (1) represents household expected utility function U; where C represents household consumption; T_{leis} is the time household allocated for leisure; and Z_h represents the vector of household head characteristics.

Equation (2) represents time constraint; where T is the household time endowment; $T_{fm}, T_{nfm}\ and\ T_{leis}$ are the time allocated for farming, NFE and leisure activities respectively.

Equation (3) is the budget constraint. For this condition to hold, total household income must be equal to total household consumption expenditure. In the equation Y represents the total income of the household; where $(P_{qfm} - K_{qfm})Q_{fm}$ indicates net income from farming with P_{qfm} as the price per unit of farm output, K_{qfm} the cost per unit of farm output and Q_{fm} represents the quantity of farm outputs produced by the household; $(P_{qnfm} - K_{qnfm})Q_{nfm}$ represents net income from NFE activities with P_{qnfm} being the price per

unit of NFE output, K_{qnfm} the cost per unit of NFE output and Q_{nfm} represents the quantity of the NFE outputs produced by the household; Y_0 represents exogenous income that the household generate from other sources.

Equation (4) is the farm production constraint; where T_{fm} represents time allocated for farming; L_{fm} refers to farm location characteristics ; B_{fm} are the barriers that household face in undertaking farming; σ_e represents the variation of farm output due to changesin weather condition; and Z_{fm} are farm characteristics.

Equation (5) is the NFE production constraint; where T_{nfm} represents time allocated for NFE activity; L_{nfm} refers to specific characteristics of the location of NFEs; B_{nfm} are the barriers that household face in undertaking NFE activity; and Z_{nfm} are the characteristics of NFEs.

Equation (6) shows the non-negativity constraint on the time allocated to NFE activity. It captures household decision not to diversify into any form of NFE activities.

To derive the optimal solution of the model, we first substitute the constraints (Equation2-5) into the utility function assuming that utility function (U) and production functions $(Q)$are quasi concave, continuous and twice differentiable:

$$Max\ U_{T_{fm}T_{nf}} = EU \left\{ \begin{array}{c} ((P_{qfm} - K_{qfm})\ Q_{fm} + (P_{qnfm} - K_{qnfm})\ Q_{nfm} \\ + Y_0), (\bar{T} - T_{fm} - T_{nfm});\ Z \end{array} \right\} \quad (7)$$

Differentiating of the expanded utility function with respect to T_{fm} , and T_{nfm} gives the following FOCs:

$$\frac{\partial U}{\partial T_{fm}} = -E\frac{\partial U}{\partial T_{leis}} + E\left\{\frac{\partial U}{\partial C}\left(P_{qfm} - K_{fm}\right)\frac{\partial Q_{fm}}{\partial T_{fm}}\right\} = 0 \quad (8)$$

$$\frac{\partial U}{\partial T_{nfm}} = -E\frac{\partial U}{\partial T_{leis}} + E\{\frac{\partial U}{\partial C}\left(P_{qnfm} - K_{nfm}\right)\frac{\partial Q_{nfm}}{\partial Tn_{fm}}\} \leq 0 \quad (9)$$

$$T_{fm} \geq 0, \qquad T_{fm} * \frac{\partial U}{\partial T_{fm}} = 0 \quad (10)$$

The household optimal time allocation decision for leisure, farming and NFE activity is derived by solving the above FOCs:

$$E\{\frac{\partial U}{\partial C}\left(P_{qfm} - K_{fm}\right)\frac{\partial Q_{fm}}{\partial T_{fm}}\} = E\frac{\partial U}{\partial T_{leis}} \quad (11)$$

$$E\{\frac{\partial U}{\partial C}\left(P_{qfm} - K_{fm}\right)\frac{\partial Q_{fm}}{\partial T_{fm}}\} \geq E\{\frac{\partial U}{\partial C}\left(P_{qnfm} - K_{nfm}\right)\frac{\partial Q_{nfm}}{\partial Tn_{fm}}\} \quad (12)$$

The left hand side of equations (11–12) indicates the expected marginal utility of allocating time for farming, while its right hand side represents the marginal utility of allocating time for leisure and NFE activity respectively. Since the time allocated for leisure and farming are assumed to be strictly positive, NFE participation decision equation can be specified as follows:

$$D_i = \begin{cases} 1, & if\ EMU_{fm} <= EMU_{nfm} \\ 0, & if\ EMU_{fm} > EMU_{nfm} \end{cases} \qquad (13)$$

This implies that farm households with access to capital for investment or non-farm entrepreneurial skills can choose to diversify into NFE activities if the expected marginal utility from farming is equal to the expected marginal utility from NFE activity. In contrast, if the expected marginal utility from diversifying into NFE activity is lower than the expected marginal utility from farming, the household will choose to continue relying on only farming.

METHODOLOGY

Source of Data

Data for this study was obtained from the first wave of the nationally representative General Household Panel Survey carried out by the Nigerian Bureau of Statistics in collaboration with the World Bank in 2010/2011.

The survey was designed in accordance with the World Bank Living Standards Measurement Surveys (LSMS) and it covered information on household enterprises, household consumption expenditure, household endowments, community level infrastructures and all other aspects of household living conditions. As this study focuses on farm households in rural Nigeria, we only utilize the farm households' sample of 3257 out of the total sample of 3380 rural households for the survey.

Empirical Estimation

Tobit model was used to assess the factors that influenced farm households to engage in non-farm enterprise activity. The model has been found to be more appropriate in examining the determinants of enterprise decision of the households as not all of them farm diversifies into non-farm activities. Thus, the share of farm households that engaged in non-farm activities is censored at zero (De janvry and Sadoulet, 2001). Following equation 13, the Tobit model for non-farm participation decision is specified as:

$$D_i = \begin{cases} > 0, & if\ EMU_{nfm} \geq EMU_{fm} \\ 0, & if\ EMU_{nfm} < EMU_{fm} \end{cases} \qquad (14)$$

Where

$$D_i^* = \beta_0 + \boldsymbol{\beta_1}\boldsymbol{Z_{i,}} + \boldsymbol{\beta_2}\boldsymbol{L_{i,}} + \boldsymbol{B_i} + e_i \hspace{4cm} (15)$$

where D_i^* is a latent dependent variable that denotes non-farm participation decision. D_i^* is measured by the share of household members that engaged into non-farm activity. The variable takes either a positive value or zero depending on the share of household members that participate into non-farm activity in the household. $\boldsymbol{Z_i}$ represents a vector of household level characteristics; it comprises of head's gender, head's age, average years of education of adult members, the share of adults, share of dependents in the household and its farm size.; $\boldsymbol{L_i}$ indicates a vector of community level characteristics, which encompasses of communal access to electricity, public transportation, mobile phone services and household geographical location. $\boldsymbol{B_i}$ represents a vector of entry barriers to non-farm enterprise activities, which includes access to financial capital, social capital and market information.

Measurement of Variables

The dependent variable in this study is non-farm enterprise participation decision, which is measured by the share of the household members that engaged in all forms of self-employed activities that are carried out in the non-farm sector of the economy. From the survey, each and every member of the household was asked whether in the past 12 months he has engaged/operated any form of own business; trading activity; worked as a or self-employed/professional or craftsman. Based on their responses, the study computes the share of household members that engaged in non-farm enterprise activities during the period.

The independent variables used in this study are grouped into household characteristics, household endowments, community characteristics, entry barriers and geographical location. Household characteristics are peculiar to the household head and the household members. Variables that measured household characteristics include head's gender, head's age, and years of education of the adult members of the household.

Gender is coded as a dummy variable with a value one for male headed household and zero otherwise. The age of household head is measured in years. Education is measured in terms of the average years of education of the adult members of the household. Household endowments were measured by household size and farm size. Household size was measured by the total number of people in the household, while farm size is measured in terms of the size of cultivated land owned by the household (in hectares).

Table 1. Measurement of Variables

Variable	Measurement
Non-farm enterprise participation decision	Share of the household members that engage in self-employed activities that are carried out in the non-farm sector of the economy
Household Characteristics	
Gender	A dummy variable that takes a value 1 for male headed household and 0 otherwise.
Age of Head	Years of household head
Age of Head Square	Square of years of household head
Education	Average years of education of the adult members of the household
Education Square	Square of average years of education of the adult members of the household
Household Endowments	
Household Size	Total number of people in the household
Farm Size	Size of farm land owned by household (in hectares)
Entry Barriers	
Formal Credit	Proportion household members that have access to formal credit
Social Capital	Proportion of household members that are registered with various forms of associations
Proximity to Market	Distance of household to the nearest product market (in kilometers).
Community Characteristics	
Mobile Phone	A dummy variable that takes a value 1 if household had an access to mobile phone services and 0 otherwise
Electricity	A dummy variable that takes a value 1 if household had an access to electricity and 0 otherwise
Public Transport	A dummy variable that takes a value 1 if household had an access to public transport and 0 otherwise
North	A dummy variable that takes a value 1 if household resides in Northern Nigeria and 0 otherwise

Entry barriers these are constraints that inhibits some interested household members' people from partaking in non-farm activities, particularly the poor ones. Such barriers include lack of access to social capital, financial capital and market information. Access to social capital is measured by the proportion of household members that are registered with various forms of associations. Access to formal credit is measured by the share of household members that had access to formal credit. Proximity to Market is measured in terms of the distance of household to the nearest product market (in kilometers).

Community Characteristics are captured by household access to electricity, public transportation and mobile phone services. All the community level infrastructures are coded as dummy variables. Lastly, geographical location is assigned a dummy variable with a value one if a household is residing in northern Nigeria and zero otherwise.

EMPIRICAL RESULTS AND DISCUSSION

Descriptive statistics

Table 2 presents the descriptive statistics of the variables in the NFE participation decision model. The study disaggregates the sample into those that diversified into non-farm enterprise activities and those that depend solely on farming as a means of their livelihood.

Table 2. Descriptive Statistics

Variables	Diversified		Undiversified		Diff.in Mean
	Mean	SD	Mean	SD	
NFE Participation Decision					
Household Characteristics					
Gender	0.89	0.31	0.85	0.36	0.04***
Age	48.0	14.29	50.0	16.30	- 2.00***
Age Square	2596	1528	2862	1774	- 266***
Education	4.67	5.49	3.97	5.47	0.70***
Education Square	51.90	80.76	45.67	80.53	6.23**
Household Endowments					
Household Size	6.26	3.15	5.39	2.99	0.87***
Farm Size	1.71	57.4	2.05	42.6	-0.34**
Community Characteristics					
Mobile phone	0.15	0.36	0.13	0.34	0.02
Electricity	0.47	0.35	0.45	0.33	0.02**
Transportation	0.57	0.49	0.54	0.49	0.03
Entry Barriers					
Social Capital	0.24	0.42	0.15	0.36	0.09***
Formal Credit	0.28	0.44	0.25	0.43	0.03*
Proximity to Market	0.29	0.23	0.37	0.28	0.14**
Locational Factor					
North	0.63	0.48	0.53	0.49	0.10***

Source: GHS- Panel Survey conducted by Nigerian Bureau of Statistics in 2010- 2011.

Note: Exchange rate as at 2011 is USD1= NGN150.

***, ** and * denotes statistical significance at 1%, 5% and 10% levels respectively.

The descriptive result shows that 46% of the farmers are diversified into NFE activities and 54% depend on only farming as a means of their livelihood. The NFE participation rate obtained in this survey is almost similar with the sub-Saharan African average rate of 42% reported by Haggblade et al. (2007).The significance level of the variables in the model indicate that there are differences between the diversified and undiversified households in terms of their characteristics. Diversified households tend to have higher number of years of formal education than undiversified households. On the contrary, the farm size of undiversified households is higher than that of diversified households.

The percentage of diversified households having access to community level infrastructures and residing closer to market tends to be higher than that of undiversified households. However, the mean of access to formal credit for both groups reveals that rural households in Nigeria are experiencing low level of credit availability. This may be one of the possible reasons for low household participation level in NFE activities in rural Nigeria despite its potential contribution to their wellbeing. The population of diversified households with access to social capital outweighs that of undiversified households. This indicates the importance social networking to NFEs.

Determinants of NFE Participation Decision

The result of Tobit regression for NFE participation decision model presented in Table 3 shows that the coefficients of almost all the variables in the model are having significant effect on NFE participation decision with the exception of farm size. On gender perspective, female headed households are more likely to diversify into NFE activity than their male counterparts. This corroborates with the findings of Ali and Peerlings (2012); and Abdulai and Delgado (1999) from Ethiopia and Southern Ghana respectively. High involvement of females in NFE activities in rural areas of developing countries may reflect cultural gender bias against women participation in other income generating activities, particularly those that are carried out in the formal sector.

Table 3. Probit Estimates of NFE Participation Decision Model

Independent Variables	Coefficients	Marginal Effects
Household Characteristics		
Gender	-0.33***	-0.12
	(0.11)	(0.04)
Age	0.02**	0.01
	(0.01)	(0.01)
Age Square	-0.01***	-0.01
	(0.01)	(0.01)
Education	0.06***	0.02
	(0.01)	(0.01)
Education Square	-0.01***	-0.01
	(0.01)	(0.01)
Household Endowments		
Household Size	0.03***	0.01
	(0.01)	(0.01)
Farm Size	-0.05	-0.01
	(0.04)	(0.01)
Community Characteristics		
Mobile Phone	0.16**	0.06
	(0.06)	(0.02)
Electricity	0.13**	0.05
	(0.06)	(0.02)

Table 3….

Transport	-0.11**	-0.04
	(0.05)	(0.02)
Entry Barriers		
Social Capital	0.23***	0.09
	(0.06)	(0.02)
Formal Credit	0.04**	0.03
	(0.02)	(0.01)
Proximity to Market	-0.02***	-0.01
	(0.01)	(0.01)
Locational Factor	0.23**	0.08
North	(0.05)	(0.02)
Number of observations	3360	
Wald chi square	234***	
Pseudo R^2	0.39	

Note: Dependent Variable: NFE Participation Decision

Robust standard errors are reported in parenthesis.

***, ** and * denotes statistical significance at 1%, 5% and 10% levels respectively.

Age of household head has a significant influence on NFE participation decision. Households with younger heads are more likely to diversify into NFE activities, while those with ageing heads are less likely to diversify into NFE activities. This result is consistent with the findings of Abdullai and Crolerees (2001) in their study of households in Mali, who reported that the likelihood of diversification into NFE activities first rises with age and then declines after reaching peak age.

The estimates on education show that the effects of formal education on NFE participation decision are indeed non-linear. The nonlinear effect of education on NFE participation decision is consistent with the finding of Loening et al. (2008) on NFE participation in rural Ethiopia. The effects are significantly positive up to a certain educational level and it becomes negative thereafter, as indicated by the square coefficient. This may implies that household heads with low level of education are more likely to diversify into NFE activities than those with high level of education. The positive effect of basic education on NFE participation decision may reflect the co-existence of NFEs that required little skills and training in rural areas of developing countries.

Household size is another significant factor influencing NFE participation decision. Households with larger family are more likely to be involved in NFE activities than households with smaller family. This finding is similar to Reardon et al. (1992) who reported that households with large family tends to incur higher expenditure, which intensifies their participation in NFE activities. Households' land size has the expected negative sign but is not significant. This result

falls short of our expectation as we anticipated the coefficient to be negative and also significant because there is a lack of well-functioning land market in rural Nigeria and households with large land sizes are better off farming than engaging in NFE activities.

Access to infrastructure plays an important role in determining NFE participation decision. Households with access to electricity and mobile phone services are more likely to diversify into NFE activities than those without access to such facilities. The mobile phone services assist in providing easy access of information on enterprise activities. Similar studies suggest that access to transportation and electricity have significant positive impact on NFE activities in developing countries (Reardon et al., 1992; Lanjouw, 2001; Escobal, 2001; Ali and Peerling 2012).

The result of entry barriers shows that households having access to social and financial capital are more likely to diversify into NFE activities than those without access to such facilities. This portrays that associations such as cooperatives provide loans, financial assistance and information to their members, thereby encouraging participation in non-farm entrepreneurial activities. In line with this finding, Zhang and Li (2003)suggested that social network is one of the most important factors that influence household participation in non-farm activities in China, next to gender.

The coefficient of access to formal credit is positive and significant indicating the importance of formal credit to the development of non-farm enterprises in rural areas. In support of this finding, Abdulai and Crolerees, (2001) reveal that the nonexistence of an effective formal credit market in developing countries is one of the factors has affected the development of NFE activities in the region. The result revealed that proximity to market is one of the factors that influenced NFE participation decision. Households residing in communities near to market are more likely to diversify into NFE activities than those living in areas far from market. In support of this finding, Abdullai and Crolerees (2001) pointed out that households with access to market are in a better position to overcome market constraints and develop private market initiatives that promotes NFE activities.

Finally, locational factor is found to be another key determinant of NFE participation decision. The finding shows that households residing in rural parts of northern Nigeria are more likely to diversify into NFE activities than their southern counterparts. The result confirms the differences in socio- economic characteristics and resource endowment of the north and south zones of rural Nigeria. This is also an expected finding given that the northern region usually experience rainfall for only three to four months in a year while the rainfall in the southern region is almost nine month in a year.

CONCLUSION

This study used the nationally representative survey data of rural households from Nigeria to examine the determinants of participation of farm households into NFE activities. The Tobit result shows that NFE participation decision of the households is determined by household head characteristics, household endowments, community level characteristics and entry barriers. Gender, marital status, age, health status and educational qualification of the individual household heads are having significant impact on NFE participation decision. Household size as one of the endowments of rural household is having a positive and significant effect on NFE participation decision. Similarly, community infrastructures has an important influence on household decision to engage in NFE activities. The results also indicate that households residing closer to local markets are more likely to diversify into NFEs than their counterparts in remote areas. The unique finding of this study of is that rural households having access to social and financial capital have managed to overcome the barriers associated with entry into NFE activities. This is an interesting finding which has not been given much attention in previous studies and it portrays the importance of social networking and loans in promoting NFE activities in rural Nigeria.

Given the roles that NFEs play in improving the wellbeing of farm households in rural areas developing countries, it is obvious that policies seeking to address food insecurity and poverty in this region should go beyond just food production measures. They should also consider enhancing the ability of farm households to diversify into NFE activities. This can be facilitated by increasing household access to formal credit by introducing rural banking scheme with simple collateral requirement. Associations such as cooperatives, women associations and business associations should be encouraged among the rural households as they promote NFE activities. Rural households should also be equipped with basic formal education by introducing programs such as free basic education and adult education in rural areas. The significance effect of community infrastructures on NFE participation decision suggest the need for the government to ensure that it provides all the necessary infrastructures in the rural areas of developing countries.

REFERENCES

Abdulai, A. and Crolerees, A. (2001). Determinants of income diversification amongst rural households in Southern Mali. *Food Policy*, Vol. *26*, pp. 437–452.

Abdulai, A. and Delgado, C. L. (1999). Determinants of non-farm earnings of farm-based husbands and wives in Northern Ghana. *American Journal of Agricultural Economics*, Vol. 81, pp. 117–130.

Ali, M. and Peerlings, J. (2012). Farm households and non-farm activities in Ethiopia : does clustering influence entry and exit ? *Agricultural Economics*, Vol. 43, pp. 253–266.

Babatunde, R. O. and Qaim , M . (2009). Patterns of income diversification in rural Nigeria : determinants and impacts. *Quarterly Journal of International Agriculture*, Vol.48, pp. 305–320.

Babatunde, R. O. and Qaim, M. (2010). Impact of off-farm income on food security and nutrition in Nigeria. *Food Policy*, Vol.35, pp. 303–311.

Barret, C.B., Reardon, T. and Webb, P. (2001). Non-farm income diversification and household livelihood strategies in rural Africa: concepts, dynamics, and policy implications. *Food Policy*, Vol.26, pp. 315–331.

Becker, S. O. and Ichino, A. (2002). Estimation of average treatment effects based on propensity scores. *The Stata Journal*, Vol. 2, pp. 358–377.

Chang, H. H.and Mishra, A. (2008). Impact of off-farm labor supply on food expenditures of the farm household. *Food Policy*, Vol. 33, pp. 657–664.

Deininger, K. and Olinto, P. (2001). Rural non-farm employment and income diversification in Colombia. *World Development*, Vol.29, pp. 455–465.

Ellis, F. (2000). The determinants of rural livelihood diversification in developing countries. *Journal of Agricultural Economics* Vol.51, pp. 289–302.

Escobal, J. (2001). The determinants of non-farm income diversification in rural Peru. *World Development*, Vol. *29*, pp. 497–508.

Fabusoro, E., Omotayo A. M., Apantaku, S. O. and Okuneye, P. A. (2010). Forms and Determinants of Rural Livelihoods Diversification in Ogun State, Nigeria. *Journal of Sustainable Agriculture,* 34:4, 417 – 438.

Gladwin, C.H., Thomson, A.M., Paterson, J.S. and Anderson, A.S. (2001). Addressing food insecurity in Africa via multiple livelihood strategies of women farmers. *Food policy* 26(2), 177-207.

Haggblade S., Hazell P. and Reardon T. (2002). "Strategies for stimulating poverty-alleviating growth in the rural non-farm economy in developing countries" EPTD Discussion Paper, No. 92, Rural Development Department, The World Bank, Washington, DC

Haggblade, S., Hazell, P. and Reardon, T. (2007). Transforming the Rural Non-Farm Economy: Opportunities and Threats in the Developing World, *International Food Policy Research Institute.* Baltimore: Johns Hopkins University Press, USA.

Haggblade, S., Hazell, P. and Reardon, T. (2010). The rural non-farm economy: prospects for growth and poverty reduction. *World Development*, Vol.38, pp. 1429–1441.

Holden, S., Shiferaw, B. and Pender, J. (2004). Non-farm income, household welfare, and sustainable farmmanagement in a less-favored area in the Ethiopian highlands. *Food Policy*, Vol.29, pp. 369–392.

Huffman, W. E. and Lange, M. D. (1989). Off-farm work decisions of husbands and wives : joint decision making. *The Review of Economics and Statistics*, Vol.71, pp. 471–480.

IFAD (2009). Federal Republic of Nigeria, Country Programme Evaluation Report. No. 1959-NG, International Fund for Agricultural Development.

IFAD (2011). Non-Farm Opportunities from Smallholder Agriculture, Conference on New Directions. ://www.ifad.org/events/agriculture/doc/papers/non-farm.pdf.

Jonasson, E. (2007). *Non-agricultural employment as pathway out of rural poverty ? Evidence from Peru,* Draft report. Department of Economics, Lund University, Sweden pp. 1–27.

Lanjouw, J.O. and Lanjouw, P. (2001). The rural non-farm sector issues and evidences' *Agricultural Economics*, Vol.26, pp. 1–23.

Lanjouw, P. (2007). Does the Rural Non-Farm Economy Contribute to Poverty Reduction, In T. Haggblade, S., Hazell, P.B.R., Reardon (Ed.), *Transforming the rural non-farm economy: Opportunities and threats in the Developing World*. International Food Policy Research Institute. Baltimore: Johns Hopkins University Press, USA.

Liedhom, C. (2007). Enterprise Dynamics in Rural Non-farm Economy, In T. Haggblade, S., Hazell, P.B.R., Reardon (Ed.), *Transforming the rural non-farm economy: Opportunities in the Developing World*. International Food Policy Research Institute. Baltimore: Johns Hopkins University Press, USA.

Loening, J., Rijkers, B. and Soderbom, M. (2008). *Non-farm microenterprise performance and the investment climate : Evidence from rural Ethiopia',* Policy Research Working Paper 4577. The World Bank.

National Bureau of Statistics (2012). *Nigerian General Household Survey: Basic Information Document,* Abuja Nigeria.

Owusu, V., Abdulai, A. and Abdul-rahman, S. (2011). Non-farm work and food security among farm households in northern Ghana. *Food Policy*, Vol.36, pp. 108–118.

Reardon, T. (1997). Using evidence of household income diversification to inform study of the rural non-farm labor market in Africa. *World Development*, Vol. 25, pp. 735–747.

Reardon, T., Delgado, T.C. and Malton, P. (1992). Determinants and effects of income diversification among farm households in BurkinaFaso. *Journal of Development studies*, Vol. 289, pp. 264–296.

Reardon, T., Stamoulis, K. and Pingali, P. (2007). Rural non-farm employment in developing countries in an era of globalization. *Journal of Agricultural Economics*, Vol. 37, pp.173–183.

Reardon, T., Stamoulis, K., Balisacan, A., Cruz, M.E. and Berdegue, J. (1998). Banks, B. Rural Non-farm Income in Developing Countries. *The State of Food and Agriculture*. Food and agricultural organization of the United Nations, Rome, pp. 283-356.

Rijkers, B. and Costa, R. (2012). Gender and rural non-farm entrepreneurship. *World Development*, Vol. 40, pp. 2411–2426.

Rosenbaum, P. R. and Rubin, D. B. (1985). Constructing a control matched group using multivariate samplingmethodsthat incorporate propensity score. *The American Statistician*, Vol. 39, pp. 33–38.

Sen, A. (1999) *Development as Freedom.* New York: Alfred A. Knopf.

Sianesi, B. (2004). Evaluation of the active labor market programs in Sweden. *The Review of Economics and Statistics* Vol. 86, pp. 133-155.

Vijverberg, W. and Haughton, J. (2004). Household enterprises in Vietnam: Survival, growth, and living standards. In N. Agrawal, D. Dollar, & P. Glewwe (Eds.), Economic growth, poverty, and household welfare in Vietnam. Washington, DC: World Bank.

Woldenhanna, T. and Oskam, A. (2001). Income diversification and entry barriers : evidence from Tigrayregion of northern Ethiopia. *Food Policy*, Vol. 26, pp. 351–365.

World Bank (2001). *World Development Indicators,* Washington DC: World Bank

Zhang, X. and Li, G. (2003). Does Guanxi matter to non-farm employment ? *Journal of Comparative Economics*, Vol. 31, pp. 315–331.