

NIGERIAN AGRICULTURAL JOURNAL *ISSN: 0300-368X* Volume 55, Number 3, December 2024, Page 392-403 Available online at: http://www.ajol.info/index.php/naj

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Analyses of Market Demand for Non-Institutional Agricultural Credit among Rural Farmers in Anambra State, Nigeria

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Abstract

Farmers participate in the credit market to get access to financial resources, and the extent of access will determine their farming decisions. This study focused on determinants of informal agricultural credit demand among rural farmers in Anambra State, Nigeria. Data were collected with a structured questionnaire. In the absence of sample selection bias, the probit model was used to analyse the data collected. The study finds that rural farm households obtain credit for their agricultural activities from various informal sources within their reach. Findings of the probit regression analysis indicates that variables that significantly influenced decision to participate in informal credit market with their coefficients were: gender (p<0.01); age (p<0.01); education (p<0.01); income (p<0.01); distance (p<0.01); household size (p<0.01); farm size (p<0.05); major occupation (p<0.05); interest rate (p<0.05); and social capital (p<0.05). To ease the credit constraints often faced by rural farm households, stakeholders should make an effort to increase the presence of informal financial institutions in rural areas. The study also recommends that participation of farmers in the informal credit market should be encouraged through farmer's association, this will help in involvement of borrowers in both operational and policy decisions which constitutes strong participatory elements in management of credit and also, help to unleash the inherent social capital and information advantages for improved informal financing.

Keywords: Informal credit demand/participation, rural farmers, probit, Anambra State

Introduction

Notwithstanding the enviable position of the oil sector in the Nigerian economy over the past three decades, the agricultural sector is

arguably the most crucial sector of the economy, which holds a lot of potential for the future economic development of the nation (Oyetoro *et al.*, 2020; Abdulraheem &

Iderawumi, 2019). In the development of the agricultural sector in Nigeria, agricultural credit has been identified as a major input as it enhances the ability of rural farmers to expand their production and develop their capacity, as this would raise their profit and ability to settle debt (Okezie et al, 2021^a). Credit enhances productivity and promotes the standard of living by breaking the vicious cycle of poverty of small-scale farmers, thus, the need for the provision of agricultural credit to farmers and rural areas is universal (Okezie and Kwekowe, 2016; Barry & Robison, 2001). Demand for credit affects household welfare outcomes through alleviation of the capital constraints on business and increases the ability of poor households with little or no savings to acquire necessary inputs (Okezie et al., 2021^b). The inability of poor farmers to self-finance their activities due to price uncertainties and low output associated with farming business has led to farmers' participation in either formal or non-formal credit market (Wayne, Joseph & Isaac 2000).

The economies of third-world countries such as Nigeria operate with dual financial institutions. On one hand are groups which function through direct government control, known as formal financial Institutions such as commercial banks, insurance companies, and mortgage banks. On the other hand, there are those financial institutions that are not directly controlled by the government, called informal financial institutions such as moneylenders, thrift, rotating, and savings associations, and loan societies, etc. (Okezie, 2019^a). Informal financial services refer to all transactions, loans, and deposits that take place outside the regulated monetary system. This includes activities of intermediaries such as relatives and friends, traders, money moneylenders. Informal financial institutions are also defined as individuals and or groups that are collectively owned and managed by members.

These groups mobilize savings from individuals and provide short-term loans to members, and sometimes to non-members, at varying interest rates, depending on their structure (Okezie and Aguyi, 2022).

The majority of the population are poor, have inadequate access to formal credit resources because of barriers imposed by lenders and relatively high transaction costs for small-size loans that discourage lending and they predominantly engaged in the informal sector where there is no guarantee for income and capacity to provide collateral/security for credit facilities, thus perpetuating poverty among them (Okezie, et al., 2021^b). To alleviate poverty among the poor and farmers in rural areas, many development-oriented policies have been implemented in Nigeria, especially in the agricultural sector since independence. The Federal Government has made some institutional and policy reforms targeted at improving the socio-economic status of the farmers. This, among others, includes the Agricultural Credit Guarantee Fund Scheme (ACGSF) and Nigerian Agricultural Cooperative Rural and Development Bank (NACRDB) in 2000 for easy access to credit by farmers (Akanji, 2001; Okezie, 2019^b). However, 52% of adult Nigerians are financially excluded from formal finance (EFInA, 2018), leading to inadequate demand for formal credit resources. The informal sector remains the leading provider of agricultural credit in Nigeria, and the Informal market contributes about 85% of the total rural savings and credits in Nigeria (Adegoke, 2014). Thus, "Puzzled" by the flourishing of non-formal finance where the formal financial system fails, it is therefore pertinent to analyze the factors that farmers' determine decisions to demand/participate in the non-formal credit market in Anambra State, Nigeria.

Conceptual framework Definition of credit demand/participation and access

A household participates in the credit market if it borrows from that source of credit (Diagne & Zeller, 2001). Demand for credit by farmers occurs when farmers indicate interest and apply for such a facility, which is participation (Okezie, 2019). Loan demand is of particular salience in the context of agriculture. This is because agriculture engages approximately 70% of the Nigerian population in the labour force (Okuneye, 2002). Agricultural loans cannot be treated as an ordinary commodity whose demand is characterized by a competitive, equilibrium solution. Therefore, the differentiating factor between loan and the demand demand for other commodities is that debt contributes to financial risk to the farm and business risk to the lender. Demand for credit tends to be derived demand, which indicates that the borrowers will demand credit based on the need for it and the utility to be derived (Udoh, 2005). For instance, farmers may borrow to increase their farm size, meet family needs, earn more income, create jobs, maintain their existing farms, and increase savings.

The demand for credit tends to increase with every passing year and however, influenced by several factors such as personal attributes, these attributes affect individuals differently, irrespective of their gender such that what might determine the demand for credit by a particular female farmer might be different from what determines credit demand by another female farmer. In demanding for loan, farmers sometimes fail to constitute an effective demand. That is, most often farmers' demand for credit is not backed by the ability of the farmer to meet with loan requirements with proof of repayment ability (Nweke *et al.*, 2002). Okurut (2006) defined 'credit accessibility' as the supply side phenomenon of credit markets because it is the lender who decides whether borrowers can access or be denied credit. The credit process involves two stages. First, borrowers who demand credit(participate) decide how much to apply for, and from which particular lender (the formal or informal sector) at the prevailing market interest rates. This process constitutes the demand side. In the second stage, the lenders decide who can access the credit and what amount, based on their financial viability, which represents the supply side. Similarly, focusing on the supply Diagne (2009) argued that the side, household's accessibility to certain types of credit is determined by the lender's choice of credit limit to a large extent. The credit limit is the maximum that the lender is willing to lend, and is a subjective assessment of the likelihood of default and the borrower's characteristics. He pointed out that every potential borrower faces a credit limit owing to asymmetric information between the borrower and lender, and the imperfect enforcement of loan contracts. He defined that a household has access to a certain type of credit "when the maximum credit limit for that credit type is strictly positive" and a household lacks access to credit from a given source "when the maximum credit limit for that source of credit is zero".

Access to credit and participation of the farm households in the credit market are the main areas of concern, and most of the credit market literature makes a distinction between them. Access to the credit is, as the farm household can borrow from a particular source, whereas participation in the credit market is, if it borrows from that source of credit, which is the main area of concern in this study. This implies that there are two types of constraints impacting the credit market, internal and external. The internal factor is related to the decision made by the farm household to participate in the credit or not, while access to credit can be a constraint externally imposed on the farm households. Thus, there are two factors mainly related to participation of the household in the credit market, namely, expected rate of return of the loan and/or risk consideration in the presence of credit availability (Diagne & Zeller, 2001). The need to accumulate the assets (precautionary savings), yielding poor or negative returns, is negatively related to the ability of the household to borrow.

Methodology

The study was carried out in Anambra State, which is one of the 36 States of the Federation and one of five States in the South-East geopolitical zone of the country. It is located on latitude 60 09'N and longitude 0 60 47'E. Anambra State has a total land area of 4,416 sq kilometers with an estimated population of 4.18 million people (NPC, 2018). Anambra State has 21 Local Government Areas (LGAs) and four agricultural zones (AZs), thus Aguata, Awka, Anambra, and Onitsha.

A multistage sampling technique was used to select the representative sample. The first stage involved simple random selection, the study selected two agricultural zones from the four zones - Anambra and Aguata. In the second stage, in each of the agricultural zones selected, one LGA was randomly selected. They are in Anambra East in the Anambra agricultural zone, and Orumba South in the Aguata agricultural zone. Thirdly, two communities from each LGA were randomly selected, making a total of four communities studied. And lastly, from each selected community, based on the list of farmers who participated in informal credit markets obtained from resident Agricultural Development Programme (ADP) Officers and enumerators, twenty-five farmers who have

borrowed from informal institutions in the last two years before data collection were randomly sampled. A total of one hundred respondents were sampled. Primary data were collected from respondents using a wellstructured questionnaire and oral interviews. Data were analyzed using descriptive statistics such as frequency, percentages, means, and inferential statistics such as the probit regression model.

Model Specification Probit model

To assess the determinants of participation in informal financial institutions probit model was employed. The decision to either participate in the credit market or not is assumed to be determined by household demographic factors, farm attributes, and institutional factors. For credit participation, households were simply treated as participants (borrowers) if they had at least one loan during the 24 months before the survey, and otherwise they were classified as nonparticipants (non-borrowers). Thus, the dependent variable is a simple dichotomous variable (Y), which is a dummy equal to 1 if the respondent participates in an informal financial institution in the last two years before data collection and zero, otherwise. This situation does not allow for the employment of classical regression like OLS without estimation and interpretation problems (Maddala, 1983). Therefore, а binary quantitative response model was constructed to handle this, leading to the choice of probit procedures that rely on normal distribution assumptions. This binary variable is assumed to be a proxy for a true underlying continuous normal distribution.

The probit model is written following (StataCorp, 2003): The probit procedure assumes there is an unobservable underlying response variable y, and that this variable can

be determined by the regression relationship:

 $Y^{*} = \beta X_{i} + \mu_{i}$ (1);

Where X_i is the vector of explanatory (independent variables), β is the vector of parameters, and μ_i is the error term subject to

the usual statistical assumptions. Thus, what is observable instead of the underlying response variable is the dummy variable defined by y=1 if y>0, y=0 otherwise, which leads to the probit equation: Prob(Y=1) =F (β X), where F is the cumulative distribution for μ_{i} .

Probit analysis is similar to logit and Tobit, but is preferred when data are normally distributed (Kim, 2000). The explicit form of the probit model is

 $Pr(Y=1/X_{1,} X_{2,...,} X_{n}) = \beta_{0} + \beta_{1}X_{1} + \beta_{2}X_{2} + + \beta_{n}X_{n} + e \dots (2)$

Where:

Y = dichotomous (discrete) dependent variable which can be explained as Y (Decision to Participate) = 1 if farmers participated in the informal financial institution in the last two years before data collection or not., Y=0 if farmers didn't participate.

 $\beta_{0=}$ intercept

 β_1 - $\beta_n =$ coefficient of the independent variables

 $X_{1-} X_{16}$ = the determinants of participation

e = stochastic error term.

Y = Decision to Participate = 1 (if the respondent participated in the informal financial institution in the last two years before data collection) or 0= Otherwise.

 X_1 = Gender of farmer (1 = male, 0 = female) X_2 = Age of the household head (years)

 X_2 – Age of the household head (years) X_3 = Education (Years of formal education)

 $X_4 = Marital Status (1 = Married, 0 = Otherwise)$

 X_5 = Household size (Number of household members)

 X_6 = Farm size (Total household farm size in hectares)

 X_7 =Total household income (receipts of the farm sales in the last one year, including non-farm income (\aleph))

 X_8 = Asset (Value of productive assets owned (\aleph)) X_9 = Distance to alternative financial institution (Bank) (Kg)

 X_{10} = Visit (number of times visited by loan agents/officers in a year)

 X_{11} = Main occupation (farming = 1, 0 = otherwise) X_{12} = Interest rate (total amount paid as interest charges on money borrowed (\aleph))

 X_{13} = Guarantor [a person who pledges that a debt will be paid (1 = guarantor was available, 0= otherwise)]

 X_{14} =Social capital [membership of farmers association, (1 = borrower is a member, 0 = otherwise)].

 X_{15} = Farming experience (number of years in farming)

X₁₆ = Repayment period [time taken to pay back borrowed money (months)]

u = Error term

Results and Discussion

Informal credit sources used by farm households in the study area

Table 1 shows the informal credit sources participated in by farm households in the study area. Majority (97%) of the respondents participated in ASCRA/thrift, followed by Isusu/ROSCA (81%), family and friends (79%), and money lenders; others were the least with 70% and 48% respectively. Informal credit markets mostly adopt a group solidarity approach, which involves mutual trust among the individuals who are pursuing common objectives, as this could provide a loan guarantee and boost confidence among them. This result agrees with Okezie and Agu-Aguyi (2022).

Farm household decision to participate in the informal credit market

The results in Table 2 show the probit regression estimate and marginal effects of factors that determine the decision to participate in the informal credit market in the study area. The results showed a Pseudo R² of 67% (0.6782) with a statistically significant chisquare at the 1% level (42.97), showing

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explanatory power of the model. The variables that significantly influenced the decision to participate in the credit market, as shown in Table 2, include gender, age, income, distance to alternative financial institutions, household size, major occupation, interest, education, farm size, and social capital.

The marginal effect (dy/dx) coefficient from the probit model result, which measures the expected change in probability of participating in the credit market with respect to a unit change in the explanatory variable, was also used for interpretation of the result.

The coefficient of gender had a negative and significant effect (p<0.01) on farm household participation in the credit market, with a marginal effect of - 0.08. The result of the marginal effect indicated that the probability of females participating in the informal credit market is 8 times higher than men. This means that female farmers are more likely to participate in informal credit schemes than their male counterparts. This may be connected to the predominance of female participants in the study area. Oladele and Olawuyi (2012) showed that gender was important in micro-credit participation in Nigeria. The result is consistent with the findings of Akudugu et al. (2012), who reported that females are considered the most vulnerable, disadvantaged, and above all, creditworthy and are therefore likely to opt for credit from informal sources rather than their male counterparts. This finding also agrees with Ajegbe, Oyetere, and Ajetomobi (2012), who investigated the household and individual characteristics that act as determinants of small-scale credit demand and reported that gender influences credit demand from informal sources.

The coefficient of age was significant (p<0.01) and negatively influenced household

participation in the informal credit market with a marginal effect of -0.0121. This indicates that an increase in the age of the household head by one year reduces the probability of participating in the informal credit market by 1.21 percent. This means that other things remaining constant, as the household age increases, they accumulate collateral that enables them to seek for individual loan. Coupled with this is that the chances of older people being considered for credit are low, and are due to the low probability of success, with the high risk of default. This is consistent with the results from Nguyen (2007), who found that older households often have more assets, reputation and meet the requirements for getting formal credit, in contrast with younger households who often lack capital and other conditions forcing them to join micro-credit groups to access informal credit. Ayamaga et al. (2006) also found that as age increases, the probability of a farmer participating in microcredit programmes in Northern Ghana decreased.

The coefficient of the household head's years of formal education was negatively significant (p<0.01) in influencing the decision to participate in the informal credit market, with a marginal effect of -0.6390. This showed that an increase in one year of education decreases the probability of participating in the informal credit market in the study area by 63.9 percent. This result implies that more years of formal education could help households to find paid jobs, hence can access formal loans, which do not need one to join a micro credit group; thus increase in years of formal education does not determine micro credit participation. Nguyen (2007) confirmed that years of education of the head of household had a negative effect on access to credit, and that if years of education increase, there is a significant decrease in credit program

participation.

The coefficient of household size significantly and positively influenced the decision to participate in the informal credit market at p<0.01 with a marginal effect of 0.7953. This implied that a unit increase in household size increases the probability of participating by 79.53%. The positive sign of the result indicated that large household sizes were more likely to participate in the credit market since they have more family burden to contend with in terms of social and economic services, especially if a majority of them are not income earners, and therefore need support to meet their family's daily needs. Doan et al. (2010) support this finding that larger household size represents a bigger demand for consumption and a better ability for income generation and debt repayment. Also, Zeller (2006) agrees with this finding; he reported that ceteris paribus, having a bigger family increases the demand for loans, because per capita income is smaller for big households.

The coefficient of size of farm land was also significant (p<0.05) and positively influenced household decision to participate in the informal credit market with a marginal effect of 0.1492. This implied that an increase in household farm size by one unit increases the probability of the household participating in the informal credit market by 14.92 percent. This could be because a large farm size can be used as collateral in the absence of a guarantor. Asante *et al.* (2010) reported similar results in their study on determinants of small-scale farmers' decisions to join farmer-based organizations in Ghana.

The coefficient of income was negative and statistically significant (p<0.01) with a marginal effect of 5.31×10^{-6} . This implies that an increase in income by one naira decreases the

probability of participating in the informal credit market by 5.31×10⁻⁶ percent. The plausible reason may be that income from both farm and off-farm activities enhances farmers' confidence not to borrow, and also high income reflects the capacity to finance their spending by themselves; hence, as household income increases, the probability of borrowing is expected to decrease. This result concurs with the work of Motsori, Cloete, and Van Schalkwyk (2013), who reported a significant negative relationship between income and participation in the credit market in Lesotho. The result is also substantiated by the findings of Nwaru, Essien, and Onuoha (2011), who reported a significant and negative relationship between income and informal credit demand in Nigeria. Also, the result reflects the pecking order theory that, in financing operations, businesses are more likely to use their internal resources first before external equity financing, as reported by Tsuji (2011) in his study.

The coefficient of distance to alternative financial institutions was highly significant (p<0.01) and positively related to participation in the informal credit market, with a marginal effect of 0.4827. This implies that an increase in the distance to the alternative financial institution by 1km increases the probability of a farm household participating in the informal credit market by 48 percent. Participation in informal credit increases as distance to the nearest bank increases, thus reflecting the opportunity costs of performing financial transactions in a formal institution. This result is consistent with Doan and Tran (2015) who reported, that farm household participate more in informal credit market, when alternative financial institution is located further away from their locality since they have a better community relationship, interpersonal trust and better social capital with credit providers which help ease access to

informal credit sources. Also, Hussien (2007) in his study affirmed that farm households are discouraged from borrowing when sources are located further away from their farming operations. A plausible explanation for this could be that farm households located further from credit institutions are discouraged from borrowing because both temporal and monetary costs of transaction, especially transportation cost, increase with lenderborrower distance, which raises the effective cost of borrowing.

occupation Major was negative and significantly related to determinants of participation in the informal credit market at p<0.05, with a marginal effect of -0.00002. This implies that household heads, whose main occupation is farming, are significantly less engaged in the informal credit market compared to their counterparts who are not. This result can be associated with the lower income level of farmers whose major occupation is farming, relative to part-time farmers. They noted that the major occupation of farmer influences participation in informal credit markets and that households whose minor occupation is farming, their demand for informal borrowings tend to be higher than households whose major occupation is farming. This might be that they have another/major source of income, thus can borrow and repay on time.

The coefficient of interest rate had a negative, significant effect (p<0.05) on informal credit participation by farm households in the study area, with a marginal effect of -0.00001. This means that a unit increase in the interest rate charged on informal credit will reduce the probability of participating in the credit market, all things being equal, by 0.001%. This is because a relatively lower interest rate reduces the total amount (principal plus interest) to be repaid and will not strain the

borrower, unlike when the interest rate is higher. This result is in line with the findings of Kausar (2013), who in his study on factors influencing micro-credit demand in Pakistan reported an inverse relationship between interest rate and demand for micro credit.

The coefficient of social capital had a positive and significant effect (p<0.05) on informal credit demand by the respondents, with a marginal effect of 0.02. The marginal effect result showed that a unit increase in organizational membership of the household head will increase the probability of participating in the informal credit market by two times. Informal financing is usually on trust, and being acquainted with the lender certainly tends to be a trust booster. This result agrees with the findings of Moobi and Oladele (2012), who investigated factors influencing small-scale farmers participating in informal financial markets in South Africa.

Conclusion

The study analyzed determinants of farm households' participation in informal credit markets in Anambra State, Nigeria. Multistage, simple random sampling techniques were employed to select 240 respondents. Primary data were collected with the use of a well-structured questionnaire through the aid of enumerators and oral interviews. Data were analyzed using descriptive statistics such as frequency, percentages, and inferential statistics such as the probit regression model. From the findings, the probit models analysis of factors that determined decision to participate by farm households shows variables that significantly influenced decision to participate in informal credit market with their coefficients were: gender (p<0.01); age (p<0.01); income (p<0.01); distance (p<0.01); household size (p<0.01); major occupation (p<0.05); interest rate (p<0.05); education (p<0.01); and social capital (p<0.05). as such,

the study recommends participation of farmers in informal credit market should be encouraged through farmers' association, this will help in involvement of borrowers in both operational and policy decisions which constitutes strong participatory elements in management of credit and also, help to unleash the inherent social capital and information advantages for improved informal financing. Farmers' association should also organize training about savings mobilization as a kind of credit scheme that can help in improving their access to credit. Finally, efforts should be made by stakeholders to increase the presence of informal financial institutions in the rural areas to ease the credit constraints often faced by rural farm households.

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Table 1: Percentage distribution of respondents according to the informal sources they participated in

Sources	Frequency*	Percentage	
Money Lenders	70	70.00	
Isusu/ ROSCA	81	81.00	
ASCRA/thrift	97	97.00	
Family & Friends	79	79.00	
Others	48	48.00	

Source: Field survey, 2020 *= multiple responses

Variable	Regression	Standard	Z-Value	Marginal Effect	Standard	Z- Value
	Coefficients	Error		Coefficients	Error	
Constant	3.4706	1.197494	2.90***			
Gender +(X1)	-0.0962	0.0312549	-3.08***	-0.0852	0.02705	-3.15***
Age(X ₂)	-0.0336	0.0124292	-2.70***	-0.0121	0.00443	-2.73***
Education(X ₃)	-1.777	0.6309731	-2.82***	-0.6390	0.22575	-2.83***
Marital Status+(X ₄)	0.0144	0.1155333	0.13	0.0052	0.04152	0.13
Household Size(X₅)	2.2424	0.846051	2.65***	0.7953	0.28906	2.75***
Farm Size(X ₆)	3.2474	1.6368	1.98**	0.0797	0.04011	1.99**
Income(X ₇)	-0.00001	4.59e-06	-3.22***	-5.31e-06	0.00000	-3.22***
Asset(X ₈)	0.0527	0.0365505	1.44	0.0170	0.01187	1.44
Distance(X ₉)	1.3047	0.5033825	2.59***	0.4827	0.1508	3.20***
Visit+(X ₁₀)	-0.05871	0.0312492	-1.88	-0.02111	0.01118	-1.89
Major Occupation(X_{11})	-0.00005	0.0000195	-2.56**	-0.00002	0.00001	-2.56**
Interest rate(X ₁₂)	-0.00005	0.0000197	-2.41**	-0.00001	0.00001	-2.41**
Guarantor+(X ₁₃)	-0.0867	0.1794793	-0.51	-0.0312	0.06131	-0.51
Social Capital+(X ₁₄)	0.0697	0.0316818	2.20**	0.0225	0.01016	2.22**
Farm Experience(X ₁₅)	0.00001	0.0000353	0.49	0.0015	0.00379	0.40
Repayment Period(X ₁₆)	0.5478	0.0361115	1.52	0.0197	0.01303	1.51
LR Chi ²	42.97					
Prob> Chi ²	0.0002					
Pseudo R ²	0.6782					

Table 2: Parameter estimates and marginal effect of factors influencing participation in the informal credit market

, *indicates significant at 5% and 1% respectively

+ is for a discrete change of the dummy variable from 0 to 1

Source: Field survey, 2020