

## RURAL HOUSEHOLDS' CREDIT ACCESS AND LAON AMOUNT IN GHANA: EMPIRICAL EVIDENCE FROM WA MUNICIPALITY

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### ABSTRACT

*The study focused on the determinants of rural households' access to credit and loan amount. Multistage sampling procedure was used to select a sample of 120 households from the Wa Municipality. Data were collected using structured questionnaire. In the absence of potential sample selection bias, a probit model and Ordinary Least Squares regression were estimated. Empirical results show that gender, age, farming and trading occupations, credit history, and household income are significant determinants of rural households' credit access. Also, gender, education, marital status, trading, formal sector workers, distance and credit source are significant predictors of loan amount. It is recommended that appropriate educational programmes be designed through promotion of self-financing adult literacy classes and local media to increase awareness and knowledge of households on credit. Additionally, procedure for getting loan should be simplified. Finally, to ease rural credit constraints informal financial institutions should increase their presence in the rural communities.*

**Key words:** Rural households, Heckman selection model, credit access, loan amount, Ghana.

**JEL classification:** C5, D1, D11, D12, G20.

### 1. INTRODUCTION

Provision of credit services to rural households has been considered as a powerful instrument to lift the poor rural households out of poverty. Increased access to financial services holds promise to help alleviate poverty and improve development outcomes by enabling the poor smoothing consumption, start or expand a business, cope with risk and increase and diversify household income. Access to credit can help rural economy in many ways. Credit access can significantly increase the ability of households to

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The author deeply appreciates Magdalene Otoo, Joseph Owusu Ansah and Charles Dakurah for their assistance with data collection.

meet their financial needs such as the purchase and use of improved agricultural inputs. Again, access to credit by rural households has the potential to accelerate the adoption of modern agricultural technologies that may increase the income of the small holder farmers and help break the poverty cycle they often find themselves (Tenaw & Islam, 2009; Anyiro & Oriaku, 2011).

Access to credit by rural households is a key ingredient in the promotion of agricultural production and transformation. According to Diagne, Zeller and Sharma (2000) access to credit affects the welfare of households in two ways. First, it alleviates capital constraints on agricultural households. This can significantly improve the ability of poor households to procure needed agricultural inputs, and will also reduce the opportunity costs of capital-intensive assets, encouraging labour-saving technology and raising labour productivity. Second, credit access increases the risk-bearing capacity of households, hence, altering risk-coping strategies. Households with access to credit may be more willing to pursue promising but risky technologies, and will be better able to avoid adopting risk-reducing but inefficient livelihood strategies.

Globally, delivery of financial services to the poor has increased in recent years. The numbers of formal public and private commercial banks, rural and development banks, cooperative banks and informal institutions such as self-help groups, and savings and credit associations that provide financial services to the poor have grown. This growth has led to introduction of innovative products that have improved the livelihood of poor people, by building their assets and increasing their earnings (World Bank, 2006).

Despite the growth in rural financial services and pockets of success stories worldwide, many people in rural areas still lack access to financial services. According to Consultative Group to Assist the Poor, nearly 3 billion poor people lack access to basic financial services. For instance, in India of 6,000 households surveyed, 87% of the marginal farmers had no access to formal credit and 71% had no access to a savings account in a formal financial institution (World Bank, 2007). In the case of Nepal access to credit is even weaker with only 16% of rural households having a bank account (World Bank, 2006).

Many poor families in the developing world have limited access to formal financial services (Bauchet *et al.*, 2011). The formal credit market lends disproportionately more to upper income groups with the poor obtaining a smaller share of their loans. In many developing countries including Ghana, the financial market is highly fragmented (Aryeetey & Udry, 1997). In these countries five to six percent of the population are reported to have access to the commercial banking sector (Basu, Rodolphe, & Murat, 2004), while 16%

have access to an account with a financial intermediary (Demirguc-Kunt, Beck, & Honohan, 2008).

Diagne, Zeller, and Sharma (2000) argue that most rural households in developing countries continue to rely on the informal credit market for their intertemporal transfer of resources. These households use complex strategies to increase their productive capacity, share risk, and smooth consumption over their life cycles. Often rural households rely on a variety of informal credit such as moneylenders, neighbours, relatives, friends, or merchants. The poor in Ghana rely on indigenous money collectors known as “Susu collectors” in their bid to save to raise working capital to invest in their businesses to improve household incomes. However, these credit source are not ideal as they tend to be unreliable and unaffordable. This is mainly due to the fact that formal financial services providers traditionally have considered the poor as unviable market and also penetration rates by these services providers are extremely low in developing countries.

It is for these reasons that most governments and donors in developing countries' over the years have set up credit programmes aimed at improving rural households' access to credit. However, majority of these programmes especially the so-called “agricultural development banks” that provide credit at subsidized interest rates, have failed to achieve their objectives to serve the rural poor and be sustainable credit institutions (Adams, Graham, and von Pischke, 1984; Braverman and Guasch, 1986; Adams and Vogel, 1985).

Recognizing the critical role that credit can play in alleviating rural poverty in a sustainable way, innovative credit delivery systems are being promoted throughout the developing world as a more efficient way of improving rural households' credit access with no or minimal government involvement. It is the aim of governments to create conditions of stability and wellbeing to ensure a minimum standard of living consistent with human dignity through economic and social progress and development. Government of low income nations are trying to achieve this by first attending to the rural sectors of their economies.

Before the establishment of the first rural bank in Ghana in 1976, the availability of formal credit in rural areas was extremely limited. The main sources of credit to the rural folks were mainly moneylenders and traders who charge exorbitant interest rates. In an attempt to improve access to finance in rural areas the Government of Ghana took some policy measures. These measures included a requirement that commercial banks lend at least 20% of their portfolio for agricultural purposes and the establishment of the Agricultural Development Bank (ADB) in 1965 with an exclusive mandate of lending for agriculture and allied industries in rural Ghana (Nair & Fissaha, 2010). Despite these noble policy measures, lending to the rural sector continued to remain low. For instance, commercial banks used

their branches in the rural communities primarily to make payments to cocoa farmers and collect deposits for onward lending in urban areas. Provision of credits to rural farmers had not been achieved as commercial banks continued to demand stronger collateral requirements before giving out loans. Mensah (1993) and Ranade (1994) found that the ADB's credit provision and coverage were limited as only 27% of its branches were in rural areas, and lending to smallholder farmers made up only about 15% of its total portfolio.

In Ghana about 44.6% of the total number of households in the country is found in the rural areas usually with limited or no access to basic infrastructure such as schools, health facilities, sanitary facilities, institutions among many others (GSS, 2014). A common feature of the rural areas in Ghana is the dominance of agriculture. For instance, estimates from Ghana Living Standard Survey revealed that about 82% of the rural households own farms. In the rural savannah, about 93% of the household engaged in agriculture (GSS, 2014). Unfortunately, the agriculture sector especially in the savannah areas, provides seasonal employment and this has led to greater financial distress and poverty among the rural folks.

Even though the overall poverty rate in Ghana has declined, the three regions in the north have seen only marginal decreases. Poverty rates in the north are two to three times the national average. With such a relatively high levels of poverty in the north of which Upper West Region is included the role of credit access to the rural households cannot be underestimated. The importance of rural credit to the rural economy is well documented. For instance, Feder, Lawrence, Justin, and Xia-Openg (1990) observed that in China one additional Yuan of credit to rural farmers yielded 0.235 Yuan of additional gross value of output. Additionally, Diagne (1999) found a positive relationship between credit access and households' welfare in Malawi. Boucher, Cartel, and Guirkingner (2007) showed that 27% loss of agricultural output is associated with credit constraints in rural Peru.

Despite recent advances in providing financial services to the rural poor through microfinance initiatives, opportunities still exist to improve practice when we look at household survey evidence on credit access. Better understanding of the workings of the credit market (both formal and informal), source of credit and determinants of households' access to credit is an integral part of poverty reduction efforts in poor countries (Amin *et al.* 2003). Our understanding has been hindered by the absence of household-level data that enables one to identify the factors associated with credit access. Studies in Africa on credit access used firm level data mainly due to lack of data from household surveys (Bigsten *et al.*, 2003; Fafchamps, 2000). Globally, most household level studies often focus on urban and peri-urban credit markets (see Kedir, 2003; Pastrapa, 2009; Doan & Tuyen, 2015). The

existing literature particularly on credit access and the demand for loan amount focuses on developed countries (Crook, 2001; Jappelli, 1990). Studies on rural households' access to credit in Ghana particularly in the Wa Municipality of the Upper West Region remain largely rare. It is against this background that this study aims at exploring rural households' access to credit in the Wa Municipality.

## 2. LITERATURE REVIEW

The starting point in analysing credit demand and access is the "life cycle model" (Modigliani, 1966). The life-cycle hypothesis argues that consumers inter-temporally reallocate their incomes (resources) over their life time to maximize lifetime utility, given the budget constraint (Morduch, 1995). Therefore, consumers can smooth consumption and/or increase utility by accessing credit, as credit improves consumers' purchasing power. Credit helps individuals or households to make inter-temporal choice and serves as additional spending power in the present in exchange for future repayment in the form of the loan plus interest (Soman & Cheema, 2002). On the contrary, the "permanent income hypothesis" argues that consumers' current consumption depends on expected consumption in the future period. That is consumers first estimate their ability to consume in the long run and then set current consumption to the appropriate fraction of that estimate, but the later depends on individuals characteristics (Hall, 1978).

Determinants of households demand for credit has been explored extensively in the literature, however, each of these study differs in its underlying objective, model(s) and variables used. Most of these studies focused on borrowers' personal characteristics or attributes. Miller and Ladman (1983), applied discriminant analysis to identify a set of socio-economic, physical and psychological factors that influence credit use among peasant farmers in Bolivia with the view to differentiate between borrowers, potential borrowers, and non-borrowers. The results indicated that borrowers were characterized by higher resource base, farm size, higher level of education, large number of cattle, higher household incomes, higher level of market integration, greater use of improved technology, larger operating costs and investments, and higher risk ability among others. On the other hand, potential borrowers were characterized by further distance from markets, low level of market integration, higher transaction costs, less number of cattle, etc. Furthermore, non-potential borrowers were characterized by lack of interest to expand production, lower level of education, limited use of improved technology, shortage of labour and proximity to market.

According to Pitt and Khandker (1998) and Morduch (1998), participation in credit programme or loan size is determined by household characteristics such as gender of household head, age of household head, number of

household members, education level of household head, agricultural work, value of house and land holding size; and of commune characteristics including distance from the community to the nearest government banks and distance from community to the nearest bank.

Studies from Vietnam show that characteristics of the rural household head, household expenditure and asset significantly influence both the probability of borrowing and loan size. The probability of borrowing increases with education and social responsibility of the household heads. Age negatively influences the probability of borrowing, but it has a positive effect on loan size. Household size has a negative effect on the probability to borrow as well as on the amount borrowed (Ha, 1999; Ha, 2001).

Fanwell (2001) analysed factors that affect household demand for credit in Malawi. He observed that credit demand was positively and significantly influenced by household expenditure and family size. Plausible explanation for this finding was that larger family size exerts pressure on the household, which mostly reflected through an increased probability of borrowing.

Rweyemamu *et al.* (2003) also examined the determinants of credit demand in Tanzania. Demand for credit was hypothesized as being influenced by household size, years of schooling of household head, household income, expenditure, and borrowing transaction costs. Using regression analysis, they found out that credit demand was positively influenced by household size, years of schooling of household head, expenditure and household income, but negatively influenced by borrowing transaction costs. They argued that increase in credit demand as a result of more years of schooling is associated with more productive jobs and more income, while increase of credit demand as a result of higher level of expenditure is associated with households' desire for more income to meet their desired consumption.

Kedir (2003) analysed the determinants of access to credit and loan amount by households in urban Ethiopia. To control for potential selectivity bias in identifying factors affecting households' likelihood of being credit constrained and the volume of loan amount, a probit and a tobit models were used. The study found geographical location of households as a significant determinants. Households who lived in the urban areas of Addis Ababa were more likely to borrow relative to their counterparts in the rural areas of Mekele. Kedir argued that this was because most households in Addis Ababa were closer to financial intermediaries like banks and micro financial institutions relative to those in Mekele. Other factors that influenced the probability of credit constrained included current household resources, schooling of the household head, outstanding debt, and number of dependents. The study also found that value of assets, number of dependents, collateral, age, and outstanding debt was significant determinants of loan amount.

Contrast to previous research, Bendig *et al.* (2009) argued that households' choices for financial services are strongly interconnected. In furtherance of this, they used a multivariate probit model to simultaneously determine household demand for savings, loans, and insurance in rural Ghana by using household survey data. Their findings confirm the common finding that poorer households are less likely to participate in the formal financial sector than better-off households. Additionally, they observed that the use of savings products, loans, and insurance depends not only on the socioeconomic status of households, but also on other factors such as households' risk assessment and past exposure to shocks.

The two-stage model has been used to study the use of financial services. Zeller (1994) used univariate probit models to estimate the probability of an individual asking for credit and being granted such credit. To observe the difference between formal and informal sources of credit, separate models were used. Added to this, Pastrapa (2009) used the well-known two-stage Heckman model to estimate the determinants of loan demand by urban households in Greece. Major findings of this study was that the probability of getting a loan is higher for young married persons, employed workers, homeowners and credit card holders. Besides, households with high income, with own house and higher number of members working hold higher loan amounts.

A study by Pal (2002) revealed that more land holdings and less labour income significantly increase the probability of using formal loan, but the opposite relationship does not hold in the case of informal loans. Research by Barslund and Tarp (2008), found countervailing impacts of education, number of dependents, assets, credit history and secure land rights on the demand for formal and informal credit. However, most of the variables mentioned above with the exception of assets had a significant effect only on either formal or informal credit source. Connections to credit institutions had a positive significant impact on the demand for both formal and informal loans. Their analysis suggests that demand for formal loans is largely influenced by factors such as land holdings, and hence geared towards production purposes and asset management, whereas informal credit demand is negatively influenced by age and education, and positively associated with a bad credit history and number of dependents. This indicates household's tendency to use informal loans for consumption smoothing rather than investment.

### **3. METHODOLOGY**

#### **3.1. Study Design**

Data used in this study were obtained from a household survey conducted in some selected rural communities in the Wa Municipality in June 2015. Multistage sampling procedure was used to select 120 households. Stage

first involves clustering of communities in the study. The clusters were constructed based on administrative boundaries. It must be mention here that for easy administration, the Wa Municipality has been divided into six sub municipals namely Wa Central, Bamahu Sub-Municipal, Kambali Sub-Municipal, Charia Sub-Municipal, Busa Sub-Municipal, and Charingu Sub-Municipal. Communities were clustered based on these sub municipals. At the second stage, a community each was selected from the sub municipals with the exception of Wa Central mainly because of its urbanised nature and these constituted the target population. The total sample size was distributed over the selected communities proportional to their populations based on the 2010 Population and Housing Census figures. Finally, a simple random sampling technique was used to select households after households listing. A structured questionnaire was designed to capture major socio-economic characteristics of the rural households. Data were analysed using Stata/MP13.0.

### 3.2. Econometric Framework

Empirical analysis is based on Heckman two-stage procedure, which takes into consideration sample selection bias. Sample selection biases may arise because it is often difficult if not impossible to identify a perfectly random sample of the population of interest particularly when observations are selected in a process that is not perfectly independent of the outcome of interest. Hence, selection effects may lead to biased coefficients in regressions of the different outcomes and this may result in inconsistent estimates (Heckman, Ichimura, & Todd., 1998). One most commonly used approach to rectify these problems in the field of econometric is the Heckman selection model (Schafgens and Zinde-Walsh, 2002; Przeworski and Vreeland, 2000). This two-step statistical approach, offers a means of correcting for non-randomly selected samples. The first stage step is the estimation of a probit model for selection. The second stage corrects for self-selection by incorporating a transformation known as inverse Mills ratio obtained from the probit model. The inverse Mills ratio enters as an additional explanatory variable into an ordinary least square model of interest (Gujarati and Porter, 2009).

Following the Heckman selection model, the decision of a household to take a loan is assumed to be influenced by a number of factors, as shown in the equation below (Greene, 2000):

$$Z_i^* = \gamma'L_i + u_i \quad (1)$$

Equation (1) is the sample selection equation.  $Z_i^*$  is a dichotomous variable which is not observable but instead we observe the decision of the rural household on whether to access credit or not. Therefore,  $Z_i = 1$  if  $Z_i^* > 0$  and  $Z_i = 0$  if  $Z_i^* \leq 0$ .  $L_i$  is a vector of exogenous variables that affect  $Z_i^*$ .



Closely related to access to credit is the amount of loan taken by the households which are assumed to be influenced by personal, household and institutional characteristics. Equation (2) is the outcome equation. Under the condition that  $Z_i = 1$ ,  $Y_i$  represents the log of the loan size expectedly received by each household, with the assumption that:

$$Y_i = b_i' X_i + v_i \tag{2}$$

where  $X_i$  is the vector of covariates determining the loan amount. From equations (1) and (2),  $u_i$  and  $v_i$  have bivariate normal distributions with zero means, standard deviation  $\delta_u$  and  $\delta_v$ , and with a correlation coefficient of  $\rho$ . It is presumed that  $Z_i$  and  $L_i$  are observed for a random sample of individual households, but  $Y_i$  is observed only when  $Z_i = 1$ , that is, when the  $i^{\text{th}}$  rural household have access to credit. Modified from the equation by Heckman (1979), the expected loan amount may be expressed as follows:

$$\begin{aligned} E(Y_i | Z_i = 1) &= E(Y_i | Z_i^* > 0) = E(Y_i | u_i > -\gamma' L_i) \\ &= b_i' X + E(v_i | u_i > -\gamma' L_i) = b_i' X_i + \rho \sigma_v u_i(\alpha_u) \dots \dots \dots \end{aligned} \tag{3}$$

Where:

$$u_i(\alpha_u) = \frac{\varphi(\alpha_u)}{1 - \Phi(\alpha_u)} = \frac{\varphi(-\alpha_u)}{\Phi(\alpha_u)} = \frac{\varphi(\gamma' L_i | \alpha_u)}{\Phi(\gamma' L_i | \alpha_u)}$$

and  $\varphi$  and  $\Phi$  are the normal density function and normal distribution function respectively. The function  $\mu_i(\alpha_u)$  is called the inverse Mill's ratio which is the ratio of the probability density function over the cumulative distribution function of a distribution. A least squares regression of  $Y_i$  on  $X_i$ , without the term  $\mu_i(\alpha_u)$  would yield inconsistent estimators of  $b_i$ . If the expected value of the error was known, it could be included in the regression model as an extra explanatory variable, removing that part of the error correlated with the explanatory variables and avoiding inconsistency. But the error term cannot be estimated, and the inverse Mills ratio needs to be estimated and added to the estimation of equation (3).

In the first step of the Heckman model, a probit model (equation 1) is estimated. Then, the inverse Mill's ratio is calculated from the linear prediction of this probit model. In the second step,  $Y$  is regressed on the covariates  $X$  and the inverse Mill's ratio for all cases where the selection equation equals one, i.e. household have access to credit. A Wald test of highly significant inverse Mill's ratio indicates that selection bias is present.

**3.3. Description and Measurement of the Variables**

In this study, access to credit is defined as the probability that the household head answered yes to the question, 'Have you taken a loan in the last 12

months (before the survey)”? A dummy variable was used to capture access; the value 1 was given for respondents who answered yes and 0 otherwise. Once response on access is obtained, further investigation was made on loan amount received. Loan amount is a continuous variable measured in Ghana Cedi (GHS). A dummy variable was used to capture gender; here for female headed households the value 1 is assigned and 0 otherwise. Age of the household head was taken in years. Marital status was a dummy variable, if the head of household is married the value 1 is assigned and 0 otherwise. Household size considered number of people living with the household head and whose responsibilities he/she bears. Education was measured by last educational level attained namely no education, primary, junior secondary/middle, secondary/vocational/technical, and tertiary. This variable was measured on a five-point scale from ‘0’ for no education at all to ‘4’ as the highest level of education that is tertiary. To look at the effects of occupational type on credit access and loan amount occupational dummies were created for farming, trading, formal sector workers with “others” as the reference category. Distance is a continuous variable measured in kilometres. It refers to the distance (in km) of the rural households from the nearness credit institution. Using factor analysis we constructed an asset index meant to measure household wealth. This index captures ownership of physical assets mainly: consumer durables assets including bicycle, refrigerator, electric iron, mobile phone, radio, TV, stove); property (another house), and dwelling characteristics such as the use of electricity, building materials, and toilet facilities. Also, dummy was used to capture credit history; the value 1 is assigned if the household had past history of demanding credit from a bank and 0 otherwise. Theoretically, selection equation in the Heckman selection model should contain at least one variable that is not in the outcome equation. Therefore, a variable known as credit source is included in the selection equation. A dummy variable was used to measure credit source; households’ who borrowed from informal financial institutions were assigned the value 1 and 0 for formal borrowers.

#### **4. EMPIRICAL RESULTS AND DISCUSSION**

Table 1 provides summary statistics of variables used in the empirical analysis. These descriptive statistics allow for exploration of data and explanation to major attributes of the respondents.

Of the 120 rural households surveyed, 53 which represent 44% had access to credit. Furthermore, with regard to those who had access to credit the minimum amount of loan obtained was GHS 50.00<sup>1</sup> and the maximum amount was GHS 1, 200.00 with GHS 104.32 as average amount. Besides, 34% of households in the sample are headed by females and the ages of the household heads ranges from 25 to 75 years. The average household size in the survey areas is almost 9 persons showing how rural households attached

**Table 1**  
**Descriptive statistics of variables used in the models**

<i>Variable</i>	<i>Observations</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Minimum</i>	<i>Maximum</i>
Dependent variables					
Access to credit*	120	0.4416667	0.4986677	0	1
Loan amount	53	104.3182	227.4376	50	1200
Independent variables					
Gender (female=1)*	120	0.3416667	0.476257	0	1
Age	120	43.03333	11.48396	25	75
Education	120	0.875	1.04971	0	4
Household size	120	8.516667	4.352114	1	30
Married *	120	0.825	0.3815603	0	1
Religion (Christian=1)*	120	0.5833333	0.4950738	0	1
Farming*	120	0.6083333	0.4901695	0	1
Trading*	120	0.1833333	0.388562	0	1
Formal sector workers*	120	0.0916667	0.2897647	0	1
Credit history*	120	0.225	0.4193332	0	1
Asset	120	61.26667	13.76619	10	95
Household income	120	424.2638	464.7126	60	2,713.65
Distance (in km)	120	3.625	2.942195	1	18
Credit source (informal=1)*	53	0.8113208	0.3949977	0	1

\* are binary variables

*Source:* Field Work, June 2015

great importance to large families. Also, about 83% of the household heads are married, 58% are Christian, 88% engaged in some form of employment with majority (61%) of them being farmers. The mean monthly household income is GHS 424.26. Of the 53 who had access to credit about 81% of them sourced credit from informal market.

The Heckman model could not proof sample selection bias as the inverse mills ratio as indicated by Lambda value of 0.0152126 (with a p-value of 0.868)<sup>2</sup> was not statically significant, hence the null hypothesis of independent equations was not rejected. This means that household's decision to access credit does not affect loan amount received. This implies that separate estimation procedure for credit access and loan amount is as good as using the Heckman model. Therefore, a separate probit model and OLS regression were employ on credit access and loan amount respectively as these estimates are unbiased and consistent. Table 2 displays results of probit estimation reporting both coefficients and marginal effects of the determinants of credit access by rural households.

**Table 2**  
**Probit result on determinants of credit access by rural households**

<i>Variables</i>	<i>Coefficient</i>		<i>Marginal Effect</i>	
Gender (female=1)	0.7444798**	(0.3206837)	0.2900003**	(0.11993)
Age	0.029286**	(0.0127147)	0.0115287**	(0.00501)
Education	0.0453887	(0.1425045)	0.0178677	(0.05612)
Household size	-0.0073731	(0.0364303)	-0.0029025	(0.01434)
Married	0.0964525	(0.3832947)	0.0428353	(0.17374)
Religion (Christian=1)	0.4203372	(0.3036582)	0.1632698	(0.11535)
Farming	1.16868**	(0.554289)	0.4247972**	(0.17338)
Trading	1.52935**	(0.6195674)	0.5325473***	(0.15638)
Formal sector workers	0.9318733	(0.686179)	0.3509547	(0.22258)
Credit history	0.7797847**	(0.339091)	0.3030067**	(0.1238)
Asset	-0.0003742	(0.0100683)	-0.0001473	(0.00396)
Household income	0.0011551***	(0.0003966)	0.0004547***	(0.00016)
Distance (in km)	0.0167376	(0.0497986)	0.0065889	(0.01961)
Constant	-3.759633***	(1.146186)		
Number of observations = 120		Log likelihood = -60.322806		
LR chi2(14) = 44.07		Prob > chi2 = 0.0000		
Pseudo R2 = 0.2676		Model classification = 75.83%		

*Source:* Field Work, June 2015

*Note:* Standard errors in parentheses; \*\*\*Significant at 1%, \*\*Significant at 5% and \*Significant at 10%

The model fit the data reasonably well mainly due to the fact that about 76% of the credit access outcomes are correctly predicted and the likelihood-ratio (LR) test of the hypothesis that all regression coefficients are jointly equal to zero is emphatically rejected. In all, significant relationships are observed between the probabilities of credit access and the set of explanatory variables included in the model. The result shows that probability of rural households accessing credit is influenced to a great extent by gender, age, farming and trading occupations, credit history, and household income. These variables showed signs that are in agreement with theoretical expectations, with the exception of gender.

The gender variable had unexpected positive sign. This means that female headed households are more likely to access credit than their male counterparts. This findings goes contrary to what is widely believed in empirical literature that the female headed households have a negative demand for credit (Pitt and Khandker, 1998; Morduch, 1998; Nwaru, 2011). This finding can probably be attributed to the fact that in the study area acquisition of credit is not restricted by social identities and that gender segregation is minimal. As a result, women can step-up outside their traditional roles by taking a more independent and entrepreneurial approach in their economic lives.

Age of household head is found to have a significant effect on credit access. The marginal effect suggests that the probability of accessing credit

goes up by 1.2% points for an additional year of the age of household head. This result is consistent with Swain (2001) who stated that increase in age is often associated with experience, practical and professional wisdom of the household head which increase his/her income generating capabilities and hence increase his/her demand for credit. But this finding differs from the work of Lehnert (2004) and Nugyen (2007).

Of the four occupational dummies that have been included in the model to investigate their empirical significance in terms of credit access two were statistically significant. These are farming and trading. Rural households are more likely to access from the credit market if the head of household works as a farmer. This finding is consistent with the finding of Nguyen (2007). In the same way household head engaged in trading activities are more likely to access credit than household head in "other" occupation. For instance, if the head of households who work in the "other" occupation were to engage in farming activities their probability of accessing credit will increase by 42.5 percentage points.

Credit history has a positive effect on the probability of accessing credit. This result suggests that households who had past history of demanding credit from a bank are more likely to access credit from the credit market.

Household income has a strong positive impact on the probability of households accessing credit and this is achieved at 1% level. This implies that rural households with higher incomes are much more likely to access credit than households with lower incomes. This result reinforces the findings of Rweyemamu et al. (2003). On the contrary, some previous studies indicate that the probability of getting a loan decreases with household income (Swain, 2007; Del-Rio and Young, 2005).

The final part of the analysis examined the determinants of loan amount by rural households. Here households who received a loan are analysed. Table 3 shows regression results for loan amount received by rural households conditioned on positive credit access.

The explanatory power of the model is quite good as indicated by the R-squared value (0.6938). This means that about 70% of the total variation in the loan amount is explained by the covariates. Additionally, F-test of the hypothesis that all regression coefficients are jointly equal to zero is emphatically rejected at 1% significant level. Among the fourteen explanatory variables considered in the loan amount models seven were statistically significant namely gender, education, marital status, trading, formal sector workers, distance and credit source. With the exception of the sign on gender the other variables are consistent with the a priori theoretical expectation.

Gender (female =1) is positively related to loan amount. Female headed households receive larger volume of loans than their male counterparts.

**Table 3**  
**Regression results on loan amount received by rural households**

<i>Variables</i>	<i>OLS Log (loan) if access=1</i>		<i>Marginal Effect</i>	
Gender (female =1)	0.3167635*	(0.1820433)	128.3379 **	(54.88877)
Age	0.0010532	(0.0071263)	-0.0149563	(2.148683)
Education	0.3219624 ***	(0.0900344)	112.0252 ***	(27.14672)
Household size	-0.0103536	(0.0290854)	0.6812215	(8.769689)
Married	0.5768542**	(0.2638502)	207.328**	(79.55474)
Religion (Christian=1)	-0.4126789	(0.2128939)	-101.5125	(64.19068)
Farming	0.2550983	(0.4953623)	238.1942	(149.3591)
Trading	0.6007678	(0.4973274)	345.7679**	(149.9516)
Formal sector workers	0.6863571	(0.517795)	366.6908**	(156.1229)
Credit history	-0.0771885	(0.1872772)	-30.13749	(56.46687)
Asset	-0.0042878	(0.0064986)	-1.641855	(1.95943)
Household income	-0.0000512	(0.0001839)	-0.02442	(0.0554581)
Distance	0.0061913	(0.0239666)	13.71535*	(7.226284)
Credit source (informal=1)	-0.4622543	(0.3740031)	-260.6138**	(112.7675)
Constant	5.53507***	(0.8063362)	174.4586	(243.1224)
Number of observations	53		53	
Goodness of fit	R <sup>2</sup> = 0.5543		R <sup>2</sup> = 0.6938	
Test: all coefficients are zero	F( 14, 38) = 3.38		F(14, 38) = 6.15	
	Prob > F = 0.0014		Prob > F=0.0000	

*Source:* Field Work, June 2015

*Note:* Standard errors in parentheses; \*\*\*Significant at 1%, \*\*Significant at 5% and \*Significant at 10%

The marginal effect suggests that females receive GHS 128.34 more loans than males. This result is interesting as it shows that the female gender is not discriminated against in terms of loan allocations. This is quite surprising in a society where traditionally males are often favoured over females. Plausible reason for this phenomenon could be that informal institutions such as microfinance institutions give more loans to females indicating how successful these institutions are in reaching the disadvantaged groups in the society.

Education is found to be statistically significant indicating that education is a good predictor of probability of rural households receiving credit. The positive coefficient indicates that highly educated households are more likely to receive larger loan amount than their least educated counterparts. The probability of rural households receiving loan amount increase by 32 percentage point as they move to higher educational level.

Households receive larger volume of loans if they are headed by a married person. Arguably, married couples are deemed credit worthy by financial institutions because they are less mobile and loans may be jointly written in their names. This result goes contrary to study by Del-Rio and Young (2005) who noted a negative impact of being married on loan amount. They observed that single and divorced have higher loan amount than married.

Of the four occupational dummies two were statistically significant namely trading and formal sector workers. This means that households working in the formal sector and traders will receive GHS 366.69 and GHS 345.77 respectively more than households in the “other” occupation.

Distance has a marginal positive impact on loan amount and this is achieved at 10% significance level. This result suggests that for every additional kilometre travelled by rural households to the nearness credit institution to access credit, loan amount increases by GHS13.72. This results contradicts the findings of Hussien (2007) who argues that households are discouraged to borrow from credit institutions if they are located farther away. This is mainly because both temporal and monetary costs of transaction, especially transportation cost increase with lender-borrower distance which increases the effective cost of borrowing.

Households receive smaller volume of loans if they source credit from the informal credit market. This result confirms what is widely believed in empirical literature that households have a positive demand for formal credit as it continues to be the cheaper source of credit for all households (Swain, 2002). Since most households took their loans from informal sources, perhaps this result is showing the fact that more risky and consumption purpose loans are not given by informal financial institution.

## **5. CONCLUSION AND RECOMMENDATIONS**

Generally, findings from this study are consistent with other results from researches in the field. The study revealed that most rural households primarily source credit from the informal financial institutions. The results drawn from the probit model concluded that rural households' access to credit is significantly influenced by gender, age, farming and trading occupations, credit history, and household income. The final part of the analysis examined the determinants of loan amount received by rural households conditioned on positive credit access. The results of the regression analysis concluded that gender, education, married, trading, formal sector work, distance and credit source are significant factors determining loan amount.

Recognising the importance of education of rural households in receiving larger loan amount, it is recommended for policy makers to make effort in designing appropriate educational programmes through the promotion of self-financing adult literacy classes, local media (village meetings or social gatherings) and mass media (local radio stations) to increase awareness and knowledge of households in accessing credit. Additionally, it is recommended that procedure for getting loan should be simplified so that less educated households could easily understand the terms and conditions of the loan agreement. Finally, efforts should be made by stakeholders to increase the presence of informal financial institutions in the rural

communities as they could be used to ease the credit constraints often faced by rural households.

### *Notes*

1. The exchange rate as quoted by [freecurrencyrate.com](http://freecurrencyrate.com) as at 30/06/2014 (the last day of data collection) was US\$1.00 = GHS 4.37.
2. Results of the Heckman model are not shown here, but could be accessed from the author.

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