
ANALYSIS OF THE DETERMINANTS OF CREDIT CONSTRAINTS STATUS OF RURAL HOUSEHOLDS

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ABSTRACT: *This study was undertaken to identify credit constrained status of households and analyse the determinants of credit constraints in the Afigya-Kwabre District of Ghana. A multistage random sampling was used to select 166 households which comprised of 94 credit constrained households and 72 credit unconstrained households. A semi-structured questionnaire was used to elicit primary data from the respondents. The Direct Elicitation Method (DEM) was used to identify credit constrained household whilst binary logit was used to determine households that were likely to be credit constrained. Results revealed that 57% of the households were credit constrained. Also, the results of the logit showed that sex, age, farm experience, farm size, years of formal education, household size, extension contact and distance were the major factors which significantly determine the credit constraint status of the households. In order to address the credit constrained status of the households, it is recommended that educational programs be organized by government for the households since more years of education reduces credit constraint. Credit lenders should strategically site their institutions close to the rural communities (households) to increase household credit access and reduce transaction cost. Extension workers must educate households on how they could be creditworthy to lending institutions.*

KEYWORDS: credit constraint, rural households, Direct Elicitation Method (DEM)

INTRODUCTION

Credit is an effective tool to reducing poverty (Sharma, 2000). Access to rural credit enhances the capacity of households to afford skill training, improve productivity and consequently raise household incomes (Zeller, 2000). However, most of these rural households are credit constrained and therefore are unable to construct sustainable livelihoods outcomes. Empirical studies have shown that credit constrained conditions has the potential to diminish the level of agricultural output, investment and profit (Carter, 1989; Sial and Carter, 1996). In their study to evaluate the impact of access to credit on productivity and income, Dong et al. (2010) used the endogenous switching regression model to analyse responses from 511 households in Heilongjiang province of Northeast China. The results of their study indicated that productivity and income of credit unconstrained farmers were higher than credit constrained farmers. McKnelly and Christopher (1999) also studied the impact of credit with education on mothers and their young children's nutrition in Bolivia. Studying a comparison of treatment and control groups, they found out that the bulk of participants with access to credit had their incomes increased. Analyzing data collected from participants and non-participants during the 2007 cropping season to study the relationship between credit and productivity in three selected districts in Pakistan, Shah et al. (2008) found that agricultural credit has the potential to increase productivity.

According to Hoff and Stiglitz (1990), providers of credit providers, especially formal credit, tends to deny the poor rural household access to loans as a result of the associated high transaction cost, high risk of default and asymmetry information. Rural households are considered less creditworthy by credit providers due to lack of tangible assets used as a collateral security (Hossain, 2002).

Not much has been done by governments, Non-Governmental Organizations (NGO), financial institutions and other development agencies to improve rural households' access to credit. They tend to focus much on providing urban infrastructure to the neglect of the rural households who are economically poor (Akwa-Sakyi, 2013).

Zeller (1994) has identified two stages involved in loan processing. The first strand is the demand stage which involves the decision of households to apply for credit at a price (interest rate). The second strand is the supply stage which takes into account the decision of the lender to approve and advance the loan after scrutinizing borrower characteristics assess the risk. The creditor may then decide to fully advance the loan, reduce or ration the amount or out rightly reject the application. Households whose loan applications are rejected or receive less amounts than requested are said to be credit constrained.

It is against this background that this study seeks to identify credit constrained households and analyse the determinants of credit constraints in the Afigya-Kwabre District of Ghana.

LITERATURE REVIEW

Measuring the Credit Constraint Status of Rural Households

Several authors have defined various indicators for measuring rural household constraint status. Japelli (1990) classified households whose loan request have been turned down and those who are not driven by any motivation to borrow as credit constraint (Kadir, 2003). Zeller's (1994) approach slightly differed from Jappelli. He expounded two scenarios to define the credit constraint status of rural households. Therefore, to Zeller (1994) households whose applications for loans are out rightly rejected by creditors and those who received less than how much they applied for are credit constrained. Boucher et al. (2006) broadened the scope of measuring credit constraint status of rural households. They used the term "non-pricing rationing" to identify three dimensions of credit constraint; quantity rationing, transaction cost and risk rationing. Quantity rationed households are refused access to loans because they lack collateral. Transaction cost rationed households take decisions not to borrow as a result of the high cost of transaction whereas risk rationed households decides not borrow because they are reluctant to take the risk of high returns associated with credit. Whilst Boucher et al. (2006) further classify quantity rationing as a variant of supply-side constraint, both transaction cost and risk rationing were classified as elements of demand-side constraint. They attribute supply-side constraint to decisions creditors make and demand-side complaint to decisions borrowers make.

In studying formal credit constraints in Vietnam, Tran et al. (2014) defined three groups of credit constrained households. They were households who were totally refused access to loans, those who credit was rationed and households required loans but did not apply for fear of being rejected. Similarly, Kadir (2003) in his studies on analyzing determinants of credit constraints and loan size in urban Ethiopia identified three groups of credit constraints; those who were flatly refuse credit and households whose demand for credit was not fully met. He referred to the third group as "discouraged borrowers" as they are deterred from borrowing as a result of high interest rate.

This study however, adopted Zeller's (1994) measurement of credit constraints, as the researcher on the account of the available data focused on households whose application for loans were rejected and those who did not receive the full amount applied for.

We then have to look at the methodology in identifying the credit constraint status of rural households.

Identifying Credit Constrained Rural Households

Approaches to identifying household credit constraint status have become problematic, especially in Africa, due to unavailability of household level data (Kadir, 2003). Literature has identified both direct and indirect methodologies of identifying credit constraint status of households. Indirect inferences were drawn from analyzing the 'personal income hypotheses' of households. This approach analyzes the relationship between household transitory income and consumption to determine credit constraint (Kadir, 2003). The other approach has to do with identifying credit constraint directly by analyzing household level data (Japelli, 1990). However, using this approach create a problem, as households lack data on their transactions. Some researchers in Africa tend to address this problem by using firm data which struggles to accurately generate the information required (Kadir, 2003). Using the Direct Elicitation Method (DEM), a set of specific questions are asked to elicit responses from the subjects (Tran et al., 2014). Kadir (2003) in his credit constraint survey in Ethiopia identified his first constrained group by replying "yes" to the question "*During the last 12 months, did any member of your household apply for a loan and was the loan completely rejected?*"

Barham, Boucher and Carter (1996) used DEM to identify credit constraint status of households in a survey in Guatemala and later in Honduras and Nicaragua (Boucher, Barham and Carter 2005). Foltz (2004) also used DEM to identify credit constraint households in his study of credit market access and profitability in Tunisian agriculture. Algeria. Guirkinger and Boucher (2007) employed the same methodology in studying credit constraints and productivity in Peru whilst Tran et al. (2014) also adopted DEM in analyzing credit constraint and impact on farm household welfare in Vietnam.

The subsequent section deals with the factors that determine credit constraint status of rural households.

Determinants of Credit Constraint Status of Rural Households

A number of factors exist to determine the probability of households being credit constrained. They include household, farm and institutional characteristics.

Household Characteristics

The findings of Tran et al. (2014) showed a negative effect of sex on the probability of a household being credit constraint. The implication was that female headed households were more likely to be credit constraint. This supports the conclusions of Mohammed (2003). However, Kadir's (2003) study to analyze the determinants of access to credit and loan amount indicated that loans were targeted at female headed households. This contradicts the findings of Abankwa and Awunyo-Vitor (2012) who asserted that men have control and ownership of resources and hence are more credit worthy. Findings from empirical studies have shown conflicting results. Tran et al. (2014) concluded that probability of being credit constraint increased with age. This is consistent with the findings of Chanduri et al. (2011). Barlslund and Tarp (2008) and Baiyegunhi et al. (2010) thought otherwise as according to them age has a positive effect on the likelihood of a household being credit constrained. A study by Owuor (2009) in Kenya indicated that households with more years of schooling had access to credit. Similarly, Tran et al. (2014) concluded that households with low level of education were more likely to be credit constraint. An empirical study by Zeller (1994) on the other side, noted that credit constraint increased with more years of schooling. Household with a large size has a significant positive effect on the probability of being credit constrained. Large household sizes tend to be credit constraint (Tang et al., 2010). To them, such households tend to spend the loan on dependents rather than investment. Bizoza et al., (2007) think that the large

household sizes are more likely to have access to credit, because they tend to be endowed with labor, which is a factor of production.

Farm Characteristics

Foltz (2004) indicated that the farm land has a significant influence on access to credit. Land is a physical asset which could serve as collateral to secure loans (Binswinger et al, 1989). However, Studies by Boucher et al. (2009) revealed households who owned lands were credit constraint. This is consistent with the findings of Pham and Izumida (2002) who also found out in Vietnam that land owning households were denied access to credit. The distance from household farms to lending sources could also determine the credit constrained status of households. According to Winter-Nelson and Temu (2005), households that are located far from lenders are more likely to be credit constrained than households in close proximity with creditors. Barslund and Tarp (2008) studies in Vietnam indicated that households who found themselves around lending sources had more access to credit than those further away. Social capital also could determine the probability of a household being credit constraint. A study in Mali by Konare (2001) revealed that creditors were only providing loans to households who formed village associations. Yehuala (2008) also concluded that social capital significantly affects access to credit.

Institutional characteristics

Lenders are mostly concerned about lending at low risk. However, lending to rural households involves a high level of risk since creditors do not have enough information about borrowing households. This give rise to information asymmetry. In order to reduce the risk of lending and transaction cost, creditors therefore demand collateral (Hossain, 2002). Since rural households mostly lack physical asset, they tend to charge high interest rate. Studying access to credit in Malawi, Aliou and Zeller (2001) concluded that loans were advanced to households who could present collateral. Mpuga (2004) posited that a high interest deters rural households from borrowing.

METHODOLOGY

Population and sampling

Multistage sampling technique was used to select the respondents for the study. Four communities were randomly selected from the Afigya-Kwabre District. Using a simple random technique 166 households were selected by assigning random numbers to a list of household heads. Thirty-six (36) of the respondents were selected from Abroma, forty-eight (48) from Kyekyewere, forty (46) from Aboabogya and thirty-six (36) from Penteng. The number of households selected was based on the population of each community. Only household heads who applied for credit in 2016 were considered. A semi-structured questionnaire was used to collect primary data from the respondents.

Data analysis

Descriptive statistics such as means, frequency and percentage tables were used to analyse the data collected on the determinants of credit constraints among households in the Afigya Kwabre District. Direct Elicitation Method (DEM) was used to identify credit constraint households and credit unconstraint households whilst a binary logit model was used to analyse the determinants of credit constraints in the study area.

Specification of the model for Determining Credit Constraints Status of Households

The choice of logit model was informed by the dichotomous nature of the dependent variable being credit constraint (1) and credit unconstrained (0). The logit was preferable to probit owing to its mathematical flexibility and the use of odd ratio (Tran et al., 2014).

As adopted by Tran et al. (2014), the credit constraint status of a household is expressed as

$$CC = 1 \text{ if } CC = \alpha Zi + \varepsilon i > 0 \quad (1)$$

$CC = 0$ if otherwise

CC denotes the credit constraint status of households. Whilst “1” is used to represent credit constraint households, “0” is used for households that are credit unconstrained. Z is a vector representing household and socio-economic characteristics, ε as the error term α is the parameter to be estimated.

The probability of a household being credit constraint or $CC = 1$ is

$$Prob(CC = 1) = \frac{\exp(\alpha Zi)}{1 + \exp(\alpha Zi)} \quad (2)$$

The probability of a household being credit unconstrained or $CC = 0$ is

$$1 - Prob(CC = 1) = \frac{1}{1 + \exp(\alpha Zi)} \quad (3)$$

Table 1 Explanatory variables used in the logit model

variables	Measurements	<i>A priori expectations</i>
sex	Sex of the household head (1 male, if female 0)	+/-
Age	Age of the household head (years)	-
Years of formal edu.	Years of school attendance (years)	-
Household size	Number of dependents (number of people)	+
Farm experience	Number of years farming (years)	-
Farm size	Size of the farm (acres)	-
FBO	Membership of a group (1 yes, if no)	-
Extension service	Visit from extension workers (1 yes, if no)	-
Distance	Borrower-lender distance (km)	+

RESULTS AND DISCUSSION

Descriptive statistics of the respondents

As presented in the Table 2 below, majority (64%) of the respondents were male with only 36% being female. This is an indication that ownership, control and access to resources in the study area are dominated by male household heads (Minot et al., 2006). The average age of household heads was found to be 41 years with a mean household size of 7 people. Household heads in the study area have low educational background; given the average number of years of formal

education was 5. With an average farm experience of about 15 years, the average farm size of the respondents was only 2 acres. Only thirty-nine percent (39%) of the household heads were members of Farm Based Organisations (FBO) were about 5km away from a credit lender.

Table 2 Descriptive statistics of the respondents

variables	Mean	Std. Deviation
Sex	0.64	0.47
Age	41.10	7.55
Yrs of formal edu.	5.56	3.82
Household size	7.45	2.14
Farm experience	15.56	8.03
FBO	0.67	0.47
Extension contact	0.39	0.49
Farm size	2.45	1.24
Distance	4.84	3.08

Source: field survey (2017)

Identifying the credit constraint status of households

The Direct Elicitation Method (DEM) as adopted by Foltz (2004) and Boucher et al. (2009) was used in the study to identify credit constrained and credit unconstrained households. This means that respondents were asked whether or not they had applied for credit in 2016 and whether their applications were rejected or the amount they applied for was not fully given. Table 3 below presents the results of credit constraint analysis of the Households Heads (HH).

Table 3 Credit constrained households

Type of household	Frequency	Percentage (%)
HH with rejected applications	90	54
HH who received less credit than applied for	4	2.5
HH with successful applications	72	43.3
Total	166	100

Source: field survey (2017)

Based on the response from the respondents 166 household heads applied for loans and 54% (90 HH) were denied access to loans whilst 2.5% (4 HH) received less than what they had applied for. However, 43.3% of the households successfully received the full amount they applied for and hence are credit unconstrained. Therefore, 94 households representing about 57% are credit constrained.

Determinants of credit constrained households

The Table 4 below presents the results of the binary logit model. The chi square test shows a significant difference between Log likelihoods (-2LLs) of the baseline model and the new model, which explains the variance in the outcome is highly significant ($chi\ square=93.954$, $df=9$, $p<0.000$). This is an indication that the model is fit for the prediction.

Nine variables were included in the logit model and eight of them namely sex, age, years of formal education, household size, farm experience, farm size, FBO, distance and extension contact were the significant factors which determined the credit constraint status of households in the study area.

The sex of the household head positively affects household credit constrained status at 10% significant level. Male headed households are more likely to be credit constrained than female headed households. This implies that being male increases the odds of credit constraint status by 204.9%. The result is contrary to the findings of Ilahi (2001). There is a negative influence of age on household credit constrained status at 5% significant level. Young household heads are less credit constrained than their older counterparts. An addition to the age of a household head lowers the increases the odds of being credit constraint by 9.7%. This is in line with both the *a priori* expectation and the findings of Zeller (1994).

Table 4 Results of binary logit model on determinants of credit constrained status of households

Variable	coefficient	Z -values	Odd ratios	P>/Z/
Sex	1.115*	3.140	3.049	0.076
Age	0.092**	4.375	1.097	0.036
Yrs of formal edu	-0.280***	7.625	0.756	0.006
Household size	0.249*	2.992	1.283	0.084
Farm experience	-0.093*	3.064	0.911	0.080
Farm size	-2.183***	18.234	0.113	0.000
FBO	-0.947	1.958	0.388	0.162
Extension contact	1.378**	5.347	3.969	0.021
Distance	0.746***	31.627	2.109	0.000
constant	-1.382	0.346	0.251	

Source: Field survey (2017)

Note: *** significant at 1%, ** significant at 5%, * significant at 10% of significance levels.

As was expected, the number of years of formal education has a significant negative effect on household's credit constrained status at 1% significant level. An additional year spent in schooling lower the odds of being credit constraint by 24.4%. This confirms the conclusions of Chen and Chivakul (2008). Household size has a positive association with credit constrained status of households at 10% level of significance and this was expected. This implies that a unit increase in the household size increases the odds of being credit constrained by 28.3%. This is consistent with the findings of Tang et al. (2010). The farming experience of household heads is negatively related to their credit constrained status at 10% significant level, as was expected. The odds of being credit constrained is 8.9% less likely for an additional year of farming experience. This supports the assertion of Njoku (1997). As was expected, farm size of household heads showed a negative effect on their credit constrained status at 1% significant level. Any additional acre of farm size lowers the odds of being credit constrained by 88.7%. This is in line with the conclusions of Binswanger et al. (1989). Contact with extension officers also showed a positive association with the credit constrained status of households at 5% significant level. This is contrary to the *a priori* expectation.

The implication is that household heads who receive visit from extension officers on their farms are 270% more likely to be credit constrained. This result is inconsistent with the findings of Hussein (2007). Distance between the household head and creditors have a positive effect on their credit constraint status as was expected. Households who are farther from the lenders are more likely to be credit constrained. The odds show that households living farther from creditors are 111% more likely to be constrained than household who are close to lending sources. This result supports the findings of Hussein (2007).

CONCLUSION AND RECOMMENDATION

This study was undertaken to identify credit constrained status of households and analyse the determinants of credit constraints in the Afigya-Kwabre District of Ghana. A multistage random sampling was used to select 166 households which comprised of 94 credit constrained households and 72 credit unconstrained households. A semi-structured questionnaire was used to elicit primary data from the respondents. The average age of household heads was found to be 41 years with a mean household size of 7 people. Household heads in the study area have low educational background; given the average number of years of schooling was 5. The Direct Elicitation Method (DEM) was used to determine that over half of the respondents constituting 57% of the households were credit constrained. The results of the logit showed that sex, age, farm experience, farm size, years of formal education, household size, extension contact and distance were the major factors which significantly determine the credit constraint status of the households. In order to address the credit constrained status of the households, it is recommended that educational programs be organized by government for the households in order to improve their credit constrained status. Credit lenders should strategically site their institutions close to the rural communities (households) to cut down transaction cost of the household credit access. Extension workers must educate households on how they could be creditworthy to lending institutions.

Limitation

In identifying the credit constrained status of households, the study did not consider households who did not apply for credit because of fear of rejection, even though they needed credit.

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