FACTORS INFLUENCING THE DECISION TO PARTICIPATE IN MICRO-CREDIT PROGRAMMES: AN ILLUSTRATION FOR NORTHERN GHANA[a]

Michael Ayamga

Department of Agricultural Economics and Extension,
University for Development Studies, Nyanpkala Campus, Ghana,
Email: yoomah2@yahoo.com.

D.B. Sarpong

Senior Lecturer, Department of Agricultural Economics and Agribusiness,
University of Ghana, Legon.

S. Asuming-Brempong

Senior Lecturer, Department of Agricultural Economics and Agribusiness,
University of Ghana, Legon.

ABSTRACT

In recent times, governments of several developing countries have been promoting micro-credit as a means for increasing investment in the livelihood activities of the poor and capital-constrained so as to raise their levels of income. This is premised on the assumption that poor people living mainly in rural areas will participate in micro-credit schemes once they are provided the opportunity. However, studies find that, in several instances, rural households refuse to borrow. This study uses the logit model to assess factors influencing the decision to participate in micro-credit schemes in Northern Ghana. The study revealed that age, value of farm output, non-farm income, number of micro-credit institutions, level of education and distance of micro-credit institutions from borrowing households influence individuals' decision to participate in micro-credit schemes. The study concludes that households will join credit programmes if there is the potential to increase gains from their farm enter-prises.

KEY WORDS: Micro-credit, Households, Northern Ghana, Logit Model, Risk Aversion

INTRODUCTION

The economic policy of many governments in recent times has been directed towards improving productivity and incomes of the poor particularly in developing countries.

The premise is that, rural households can improve upon their main sources of livelihood (mainly farming) if they had access to small loans. For example, Feder, Just and Zilberman (1985) argue that with the provision of credit, the cost of technology (capital intensive) and assets will be reduced relative to family labor. Thus, instead of growing low yielding local varieties with low level of fertilizer, access to credit may allow for use of improved varieties, fertilizers and high yield per unit labor and land.

The assumption, again, is that the poor in rural areas of developing countries will participate in micro-credit schemes once they are offered the opportunity. Studies however suggest that rural households may refuse to borrow for want of investment opportunities, inadequate liquidity within households and unwillingness to bear the risk of indebtedness. For example, Diagne and Zeller (1998) report that households in Malawi borrowed less than the maximum amount available for borrowing. The situation is no different in Northern Ghana[2] (Ayamga, 2004). This notwithstanding, farmers, researchers and development practitioners blame the low productivity of rural enterprises on inadequate or a total lack of credit. In the wake of massive local and international policy redirection towards providing micro-credit for the rural poor, policy makers and other supporters of microfinance need to understand what makes rural people interested in micro-credit. By examining factors influencing participation in micro-credit programmes in Northern Ghana, this study comes in handy in the quest for such understanding. Participation is said to have occurred when the individual enlists with a micro-credit institution and actually borrows.

Although micro-credit involves extending loans either in cash or kind, the rural poor will not regard micro-credit as an incentive until they understand the nature and/or implications of such loans. Just as is the case with any innovation, rural people who are mainly farmers will take several factors into consideration before opting to join credit programmes. It is important for policy makers and providers of micro-credit need to understand these factors and their effects on household decision to borrow before designing credit programmes.

The individual's decision to participate in micro-credit is dichotomous involving two mutually excluding alternatives. The individual either participates in micro-credit or does not. Models for estimating such phenomena in which the dependent variable is binary have been propounded. The framework for such analysis has its roots in the threshold theory of decision making, in which a reaction occurs only after the strength of the stimuli increases beyond the individual's reaction threshold (Hill and Kau, 1973). This implies that every individual, when faced with a choice has a reaction threshold influenced by several factors. The individual either participates in micro-credit or does not. This yields a binary dependent variable, y, which takes on values of zero (non-participation) and one (participation).

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[2] Northern Ghana is made up of three regions, the Northern, Upper East and Upper West and is located in the Guinea Savannah grassland belt. These three regions are considered the poorest in Ghana.

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If the probability of observing a value of one is: $\Pr(y_i = 1 \mid x_i \beta_i) = 1 - F(-x_i'\beta_i)$ (1)
where F is a continuous, strictly increasing function that takes a real value and returns a value ranging from zero to one, then it follows that the probability of observing the value of zero is $P_r(y_i = 0 \mid x_i \beta_i) = F(-x_i'\beta_i)$ (2)

Given such a specification, we can estimate the parameters of this model using the method of maximum likelihood. The dependent variable is an unobserved latent variable that is linearly related to x: $y_i^* = x_i'\beta + u_i$ (3)

where is a random disturbance term. The observed dependent variable is determined by whether exceeds a threshold value:

$$y_i = \begin{cases} 1 \ if \ y_i^* > 0 \\ 0 \ if \ y_i^* \leq 0 \end{cases}$$ (4)

Common models include probit (standard normal), logit (logistic), and gompit (extreme value).

METHODOLOGY

The study adopted the logit model partly because the dependent variable denoting the decision to participate in micro-credit is binary and also because the logit model allows for a relatively straightforward computation of the relative mean of the dependent variable or elasticities given the estimated coefficients of the regressors.

THE MODEL

The logit model adopted for the study is specified as follows:

$$\Pr(y_i = 1 \mid x_i \beta_i) = 1 - e^{-x_i'\beta} / (1 + e^{-x_i'\beta})$$
$$= e^{x_i'\beta} / (1 + e^{x_i'\beta})$$ (5)

The binary model as a regression model is written as: $y_i = 1 - F(x_i'\beta) + \varepsilon_i$ (6)
Where; is the dependent variable denoting the individual's decision (participation in credit programmes) and , an attribute of the individual such as income. is a residual representing the deviation of the binary from its conditional mean. The estimated parameters in this case do not alone provide direct information about the effects of changes in the explanatory variable on the probability of dependent variable, participation in microcredit (Madala 1983). The prediction of the effect on the log-odds

is given by: $\dfrac{\partial\left(\log \dfrac{p_r}{1 - p_r}\right)}{\partial x_i} = \beta_i$ (8)

where: $p_r = \dfrac{e^{\sum \beta_i}}{1 + e^{\sum \beta_i}}$ (9)

the marginal effects are given by:

$$\frac{\partial P_r}{\partial x_i} = \beta_i \left[P_r (1 - P_r) \right] \qquad (10)$$

The elasticity of predicted probability at the means is then computed as:

$$\frac{\partial P_r}{\partial x_i} = \beta_i \left[P_r (1 - P_r) \right] \cdot \frac{X}{P_r} \qquad (11)$$

Guided by related studies in the past, (see for example, Khandker and Faruquee, 2003) socioeconomic attributes were identified and hypothesis constructed regarding their effect on the individual's decision to participate in micro-credit programmes. These socioeconomic factors either had a bearing on the individual (farmer) or on the micro-credit institutions and therefore policy. The variables include gender, age, level of education, household size, value of farm output, non-farm income, number of micro-credit institutions and distance of micro-credit institutions from borrowing households.

A dummy variable is used to specify gender (GENDER) of respondent. In Northern Ghana, males usually control household resources such as land, labor and even farm output. Thus, when it comes to production resources, females are usually constrained. In order to meet their resource requirements, females may have to depend on sources outside the household, including borrowing from micro-credit institutions. It is there-fore expected that females are more likely to participate in micro-credit programmes and borrow more as compared to males. A value of 1 is assigned to females and 0 to males. If this assertion is true, the coefficient of the gender variable will be signifi-cant.

The level of education of loan applicants is expected to positively influence the granting of credit by lending institutions. The literate are expected to keep records of their enterprises, which is a good basis for assessment of viability. Hence, due to a higher probability of success (being granted credit), it is expected that people with higher level of education are more likely to join micro-credit programmes. It is ex-pected that respondents with at least secondary level education (SEDUC) are more likely to participate in micro-credit as compared to those with no education (NOEDUCA).

Large households tend to spend more on food and other basic household require-ments. The high expenditure associated with larger households will make them re-source constrained hence the need for credit. It is thus expected that as household size (HHSIZE) increases, the tendency of the household to join micro-credit pro-gramme also increases. Older people are thought to be more risk averse and thus are less likely to join credit programmes. Secondly, chances of older people being granted loans by credit institutions are low. The low probability of success coupled with a higher aversion to the risk of indebtedness is expected to discourage the aged from participating in credit programmes. Younger applicants on the other hand are

expected to be more successful in receipt of credit. The high rate of success in receipt of loans by young applicants is therefore expected to influence them to join credit programmes. The coefficient of age is expected to be positive for age and negative for age square. Age is expected to follow a quadratic distribution.

Households with higher farm income, that is value of farm output (VOUTPUT) and non-farm income (NONFARM) are expected to join credit programmes since the potential for higher profits exist. Also, higher non-farm income in the case of farming increases risk bearing capacity hence the tendency to join credit programmes. Lenders will also prefer applicants with high farm and non-farm income thus increasing their probability of being granted credit. Positive coefficients are expected for farm and non-farm income.

Penchansky and Thomas (1981) define access to represent a general concept that summarizes a set of more specific dimensions describing the fit between client and the system. The specific dimensions are availability, accommodation, affordability and acceptability. Dimensions of availability and accessibility are captured in the number of institutions (NUMIST) from which inhabitants of a particular geographical area can obtain loans as well as the distance (DIST) they travel to reach those institutions. The number of micro-credit institutions is expected to exert a positive effect on households' participation in micro-credit while distance is expected to exert a negative influence on households' decision to join micro-credit programmes.

The empirical model is specified as:

$$\log\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 AGE + \beta_2 (AGE)^2 + \beta_3 DIST + \beta_4 NUMISTS + \beta_5 SEDUC + \beta_6 NOEDUCA +$$

$$\beta_7 HHSIZE + \beta_8 NONFARM + \beta_9 GENDER + \beta_{10} VOUTPUT + \varepsilon_i$$

where p_i is the probability of participation in micro-credit and $\log\left(\frac{p_i}{1-p_i}\right)$ is the

odds ratio in favor of participation in micro-credit. The dependent variable is participation in micro-credit programme and takes the value 1 if respondent participates in a micro-credit programme and 0 if he/she does not participate in a micro-credit programme.

DATA COLLECTION AND STUDY VARIABLES

The study involved the use of primary data collected from a sample of 1000 respondents in Northern Ghana in 2004. Four hundred households were surveyed in the Northern region while three hundred households each were covered in the Upper East and Upper West respectively. Cluster sampling techniques were employed for data collection. Advice from micro-credit institutions was the basis for selection of districts. Communities or Villages in which the institutions operated were considered as clusters. Random sampling of participants and non-participants in micro-credit programmes was then carried out within the clusters. Data collection in communities

began with community fora/focus group discussions. A checklist was drawn for the purpose. The community fora aimed at gathering information from communities on general knowledge and experiences in relation to micro-credit. The variables collected included respondents' age, their level of education, number of micro-credit institutions that operate in the locality, the distance between the credit institutions and respondents, value of respondents' farm output, their non-farm income and respondents household size. The data was analyzed using Econometric Views software (Version 3.1 © 1994 –1998).

RESULTS

The Logit model employed to estimate the effect of factors influencing the decision to participate in microcredit programmes had ten explanatory variables. Table 1 presents a description of independent variables used in model.

Table 1: Description of independent variables used in model

Parameter	Unit of Measurement	Frequency/ (Mean)
Gender	Binary	0 = 478 1 = 463
Secondary Education	Binary	0 = 927 1 = 14
No formal Education	Binary	0 =290 1 = 651
Farm Income (value of farm output)	Cedis	(1,806,194)
Non-farm Income	Cedis	(682,468)
Household Size	Number of persons	(12.1)
Age of Respondents	Years	(46.0)
Distance of Microcredit Institution from Borrowing households	Kilometres	(2.780618)
Number of Credit Institutions	Count	(2.300425)

Source: Computations from Households Survey, 2004

The likelihood ratio test (LRT) indicates that the logit model specified to examine factors influencing households' participation in micro-credit is significant at the 1% significance level, implying that the explanatory variables included in the model jointly influence individuals' decision to participate in micro-credit programmes (See table 2). The coefficients of six of the explanatory variables were found to be in conformity with a priori expectations. Age of respondent did show the expected but was not significant. Age square was however significant at the 1 percent level of significance and also had the expected sign. Age, as expected, followed a quadratic distri-

bution where older people above a certain age threshold would not participate in mi-
cro-credit programmes.

Table 2: Logit Estimates of Factors Influencing Participation in micro-credit

Variable	Coefficient	Std. Error	Asymptotic T- Ratio	Elasticity of Predicted Probability
C	4.280948	2.737447	1.5638	0.0423814
AGE	0.0010810	0.000894	1.2091	0.0249749
AGESQ	-0.302047	0.101381	-2.9793***	-0.137574
DIST	-0.083459	0.045601	-1.8302*	-0.002297
NUMISTS	0.3640280	0.219312	1.6599*	0.0082904
SEDUC	3.324250	1.952912	1.7022*	0.0004896
NOEDUCA	2.059485	0.765294	2.6911***	0.0141054
HHSIZE	-0.028192	0.035071	-0.8038	-0.003373
NONFARM	0.0000153	1.95E-06	7.8461***	0.1033735
GENDER	0.3950030	0.480989	0.8212	0.0019221
VOUTPUT	0.0000019	2.88E-07	6.5972***	0.0343321

| LR statistic | 668.4996*** | | | |

Dependent Variable: Participation in microcredit programme

*** Significant at the 1 percent Level of Significance

* Significant at the 10 percent Level of Significance

The values of farm output and non-farm income were also consistent with a priori
expectations and significant at the 1 percent level of significance. This indicates that
respondents' income is an influential factor in the participation in micro-credit
schemes. High non-farm income increases risk-bearing capability of borrowers while
increasing value of output suggest the existence of 'viable' enterprise in which credit
could be invested. Educational status of respondents does significantly influence
households' decision to participate in micro-credit. This is in conformity with Khand-
ker and Faruqee (2003) where education significantly influenced borrowing and the
effect of credit on the outcome of interest. From the elasticity of predicted probabil-
ity, it was observed that the probability of participating in micro-credit decreases
with increasing level of education. The reason could be that as level of education im-

proves, the probability of gaining formal sector employment increases. Income from such sources could thus make borrowing relatively unnecessary.

The number of institutions in a particular area from which inhabitants can obtain credit also exerts a statistically positive effect on households' participation in micro-credit programmes and is significant at the 10 percent level. Distance between micro-credit institutions and borrowing households had the expected sign and was significant at the 10 percent level of significance. The effect of changes in household attributes on the log-odds of participation in micro-credit is explained by the elasticity of predicted probability. For example, any change (policy) that brings about a 10% increase in value of farm output, non-farm income and number of micro-credit institutions would lead to a 0.3%, 1.0% and a 0.08% increase in the log-odds of participating in micro-credit, respectively. A 10 percent decrease in the distance between micro-credit institutions and borrowing households in increase the log-odds of participating in micro-credit by 0.2%.

CONCLUSION

The results of this study indicate that a number of factors influence farmers' decision to participate in micro-credit schemes. The principal factors include age, value of farm output, non-farm income, number of micro-credit institutions, level of education and distance between micro-credit institutions. Households will join credit programmes if there is the potential to increase gains from their enterprises and when there are alternative sources non-farm income that acts to reduce their aversion to the risk of indebtedness, which arise mainly due to fears that the enterprises in which credit is invested could fail.

Households will also join credit programmes if there are several alternative sources (micro-credit instructions) from which they can obtain credit, thus increasing the probability of being granted the loan. It is also important for supporters of micro-credit and policy makers to keep in mind that anything that will take the rural farmer away from his enterprise especially during the farming season is regarded by them as very costly. The rural farmer evaluates the cost of credit not only in terms of interest on loans or transaction costs but also in terms of time lost in the process of acquiring loans. To the rural farmer, when the time lost in acquiring loans especially through travels is reduced by reduction of the distance between credit institutions and rural borrowers, then, the cost of credit is also reduced.

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