

# Evaluation of the Determinants of Smallholder Farmers' Access to Credit in East Wollega Zone: In Case of Guto Gidda District, Ethiopia

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## Abstract

Improving access to finance service helps smallholder farmers to improve production and productivity through investment in irrigation, production equipment and inputs and in postharvest handling, processing and marketing. However, the majority of the rural population does not have access to the agricultural financial system. This study is concerned with evaluating determinants of smallholder farmers' access to credit. A two stage sampling method was used to select sample respondent. A total of 200 small holder farmers were selected randomly using probability proportional to size. Descriptive statistics and logit model were used to analyze the data. The result of the study indicate that access to formal credit by smallholder farmers is determined by educational Level, farm size, non-farm income, interest rate, collateral security, rigid repayment period, and lending procedure. Out of those determining variables, level of education, Farm size and non-farm income were found increase the likelihood of farmers access to formal credit financial service. On other hand, variables like Interest rate, collateral security, rigid repayment period, and lending procedure decreases the likelihood of access to credit. Therefore, the government should have to consider these factors through its policy aimed to speed up agricultural development.

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## 1. Introduction

In world, agriculture provides the opportunity to stimulate growth in other sectors of the economy, boost food security, and ultimately reduce poverty. Agriculture plays a pivotal role in the development process in terms of growth as well as poverty reduction. In consistent with this, Agriculture has always played a pivotal role in the history of Ethiopian economic development by providing food security, employment, foreign exchange earnings and poverty reduction (CSA, 2009). The performance of the Ethiopian economy as a whole is highly interconnected with the agricultural sector. Having a share of approximately 44 percent of GDP, agriculture employs almost 80 percent of the workforce and accounts for 70 percent of export earnings. The biggest share of export value comes from cash crops such as coffee, sesame and as well as livestock, which contributes 47 percent to agricultural GDP and 85 percent of farm cash income (IGAD, 2013).

In spite of huge agricultural potential, the growth in agricultural production has not been able to keep pace with that of the demand. In fact, a high proportion of cultivated land is owned by subsistence farmers who produce about 97 % of the national agricultural output (Wolday, 2007). Furthermore, land degradation, deforestation and drought are among the most severe challenges for agriculture in Ethiopia. The majority of farmers are small holders, with 85 percent of households farming less than 2 hectares and 40 percent less than 0.5 hectares (FAO, 2015). In line with the above, World Bank report of 2013 reveal why agricultural productivities in Africa has been on declining trend. Accordingly, the factors are war, lack of knowledge on agricultural resource management, drought, limited land or farming space, financing, climate change, floods and global warming.

In Ethiopia, like in most developing countries, agriculture is considered key for economic development and growth and it requires a revolution in smallholder farming by improving their productivity, profitability and sustainability. Access to agricultural credit is considered as one of the key elements in addressing development issues in Ethiopia. Improving financial access helps smallholder farmers to improve production and productivity through investment in irrigation, production equipment and inputs and in postharvest handling, processing and marketing (Amha and Peck, 2010; Amha, 2011). However, the majority of the developing world's rural population does not have access to the agricultural financial system.

In spite of the fact that a bigger percentage of Ethiopians population live in rural areas and that more of them are involved in farming activities, there is little effort by commercial banks and other financial institutions to smooth the progress of credit to this industry which is important in rapid development of this dominant section of the population. The available piecemeal credit services are provided by small credit schemes, which are limited in scope and have specific target groups hence there is no bank which provide for the specific credit and saving needs. The inadequacy in financing and credit arrangements in rural Ethiopia encumber development of agriculture and rural sectors given that this sector is the mainstay of a large segment of the populace; their poor performance makes the fight against poverty even more challenging (Kimuyu and Omiti, 2000; Henning and Jordaan, 2015).

The thrust of this study draws from the premise that access to credit by farmers is keys to increasing

productivity. In this respect, one of the major reasons is that acquisition of seasonal inputs and essential modern farm equipment are rarely affordable by farmers on a cash basis. Majority of these farmers face liquidity constraints that compromise the crucial investments in agriculture and other sectors necessary in increasing productivity (Doward *et al.*, 1998; Kiplimo, 2015). Therefore, the study intended to investigate those factors that affect farmers' access to formal credit and establish how those factors hinder farmers' access to credit.

## **2. RESEARCH METHODOLOGY**

### **2.1. Study Area**

The study was conducted in Guto Gida Woreda or District of East Wollega Zone, Oromia Regional State, Ethiopia. Guto Gida woreda is located at 328 Km West of Addis Ababa. It is situated at latitude and longitude of 9°5'N 36° 33'E/9.083°N 36.550°E and at an altitude of 1350-2450 meters above sea level. The climatic condition of the area is highland (dega) (23%), midland (woynadega) (33%) and lowland (bereha) (44%) with the mean annual rainfall range from 1800-2200 mm and average temperature 14-26°C. The area receives bimodal rainfalls that are long rainy season (June to September) and short rainy season (March, April and May). The people living in Guto Gida district practice mixed farming system that is crop production and livestock rearing and own large number of livestock. The livestock population in the area includes 86,724 cattle; 8,589 equine; 15,800 sheep; 12,200 goats and 57,695 poultry (CSA, 2009). The Guto Gida District covers an area of 109,150 hectares out of which 18,336 hectares held by investors from the total of 93,699.97 hectares utilized for farming of cash crop and has the population of about 116,045.

Peasant associations in Guto Gida district are the main study area from where the researcher collected information regarding smallholder farmers. On the other hand however, the researcher would interview bank and micro finance institutions' officers in selected district.

### **2.2. Research Design**

Research design is an assemblage of conditions for specifying relationships among variables in a study, using these variables and controlling effects of extraneous variables and plan for selecting the source and types of information to be used in answering the research questions (Ndunguru, 2007). According to Kothari (2004) the research design facilitates the collection of relevant evidence with minimal effort, time and money. The author further argues that the design presents the purpose of conducting researches hence research designs include; explanatory, descriptive, and comparative, survey and predictive research.

The researcher would make use of the survey research design as it is convenient and cost effective for the collection of large data that informed this study due to the use of the logit regression model. On the other hand, the survey research design enabled the researcher to obtain data about practices, situations or views at one point in time through questionnaires and interviews. Quantitative analytical techniques were used to draw inferences from data concerning existing relationships. The uses of the survey research design also permit the researcher to study more variables at a point in time.

Furthermore, a cross sectional study was carried out to evaluate the determinants of small holder farmers access for formal financial services and examine its impact on agricultural productivities in five peasant association (Negasa, Eba, Tolera, Gari, and Feyisa) of Guto Gida District of East Wollega Zone.

### **2.3. Research Approach**

With the mixed approach to research, the researcher incorporates methods of collecting or analyzing data from both quantitative and qualitative approaches in a single study (Creswell, 2003). This will enable the researcher to strengthen and overcome the weaknesses that either approaches may pose (Jonson and Owuegbnzie, 2004). Therefore from this point of view, the researcher involved the use of both quantitative and qualitative approaches in this study.

### **2.4. Sample and Sampling Method**

A two stage random sampling technique was used to obtain a sample of 200 small holder farmers for the study. The sample was selected from 20 peasant associations. In the first stage, five peasant Associations were selected using simple random sampling method. In the second stage, a total of 200 respondents, 96 who have access to credit and 104 who do not have access to credit were selected based on probability proportional to size from the respective peasant associations.

### **2.5. Variable and Model Specification**

The following table 1 presents the variables used and their measurement to achieve objectives of the study

**Table 1: Variables and their measurement**

Variables	Symbol	Measurement
Gender	<b>GNDR</b>	1 if Male, 0 if female
Age	<b>AGE</b>	Age of the household head
Literacy	<b>Ltrcy</b>	1= literate, 0 = illiterate
Religion	<b>RLGN</b>	1 = Christian, 0 = Muslim
Education	<b>EDU</b>	Grade level attained by household head
Family Size	<b>FSIZE</b>	Number of family member
Farm Size	<b>FARMS</b>	Total Farm size in Hectare
Non-Farm Income	<b>NFI</b>	1= have non-farm income 0 = not have non-farm income
Distance from credit institution	<b>DSCI</b>	Distance in kilometer from CI
Attitude towards risk	<b>Atr</b>	
Interest Rate	<b>INT</b>	1= High, 0 = acceptable
Collateral Security;	<b>SCTRY</b>	1= do not have collateral security 0= they have a collateral security
Experience in credit use	<b>Excru</b>	1= used formal credit 0= not used credit before
Rigid repayment period	<b>Rrprd</b>	1= Rigid repayment period 0 = Not rigid repayment period
Lending Procedures	<b>LP</b>	1 = Simple lending procedures 0 = Complex lending Procedure
Access to formal Credit	<b>AFC</b>	1 = Get credit from Informal sources 0= No credit from formal sources

Different studies employed different models in order to identify factors that determine access to agricultural credit. This study was intended to analyze which and how much the hypothesized repressors were related to the small holder farmer's access to agricultural credit. As already noted, the dependent variable is a dummy, which takes a value of one or zero depending on whether or not smallholder farmers use agricultural credit. However, the independent variables are both continuous and discrete.

Now the issue is to choose between logit and probit, and one has to raise the question which model is preferable? In most applications the models are quite similar, the main difference being that, the conditional probability  $P_i$  approaches zero or one at a slower rate in logit than in probit (Gujarati, 2003). In the analysis of models with dummy variables, we assume the existence of a latent (unobserved) continuous variable, which is specified as in the usual regression model. However, the latent variable can be observed only as a dichotomous variable (Maddala, 2001).] According to Amemiya (1981), the statistical similarities between logit and probit models make the choice between them difficult. The justification for using logit is its simplicity of calculation and that its probability lies between 0 and 1 (Amemiya, 1981). Furthermore, its probability approaches zero at a slower rate as the value of explanatory variable gets smaller and smaller, and the probability approaches 1 at a slower and slower rate as the value of the explanatory variable gets larger and larger (Gujarati, 1995).

Hosmer and Lemeshew (1989), Gujarati (1999) considered that the logistic distribution (logit) has got advantage over the others in the analysis of dichotomous outcome variable in that, it is very flexible and easily used model from mathematical point of view and results in a meaningful interpretation. Therefore, the logistic model is selected for this study.

$$p_i(Y_i/X_i) = F(Z_i) = F(\alpha + \sum \beta_i X_i) = \frac{1}{1+e^{-Z_i}} \text{----- (1)}$$

Where:

$P_i$  - is the probability that an individual or household is credit user or non-credit user given  $X_i$

$e$  - Denotes the base natural legalisms, which is approximately equal to 2.718;

$X_i$  . represents the  $i^{\text{th}}$  explanatory variables/determinants of access to credit and

$\alpha_i$  and  $\beta_i$  are parameters to be estimated

The derivation of Binary Logit model is given as follows:

Hosmer and Lemeshew (1989) stated that the logistic model could be written in terms of the odds and log of odds which enables one to understand the interpretation of coefficients. The odds ratio entail the ratio of the probability ( $P_i$ ) that an individual would choose an alternative to the probability ( $1 - P_i$ ) that he/she would not choose it.

$$(1 - P_i) = \frac{1}{1+e^{Z_i}} \text{----- (2)}$$

Therefore, the odds ratio becomes,

$$\left(\frac{P_i}{1-P_i}\right) = \left(\frac{1+e^{Z_i}}{1+e^{-Z_i}}\right) = e^{Z_i} \text{----- (3)}$$

OR

$$\left(\frac{P_i}{1-P_i}\right) = \left(\frac{1+e^{Z_i}}{1+e^{-Z_i}}\right) = e^{(\alpha + \sum \beta_i X_i)} \text{----- (4)}$$

Therefore, to get linearity, we take the natural logarithm of odds ratio equation (5), which results in the logit model as indicated below.

As P goes from 0 to 1, the logit goes from  $-\infty$  to  $\infty$ . According to (Gujarati, 1995), although the probabilities lie between 0 and 1, the logits are not so bounded.

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_K X_K \text{----- (5)}$$

The variables of the model are:

$Y_i$  = “1” if respondent has access to credit and “0” if respondent has no access to credit);

$\alpha_0$  = Constant term

Gndr = Gender (1 if male, 0 if female)

Age = Age of the respondent (years)

Litracy = Ltrcy

Rlgn= Religion

Educ = Educational Level

Fmsz = Family Size

Flsz =Farm land size

NFI= Nonfarm Income

Dsci= Distance from credit institution

Atrs = Attitude towards Risk

Int= Interest Rate

Cltrl = collateral

Expccu = Experience in credit use

Rpp= Rigid Repayment period

Lp= Lending Procedures

$\beta_i$  = Logistic coefficients for the independent variables;

$\epsilon$  = Error term

### 3. RESULTS AND DISCUSSION

#### *Socio economics characteristics of the farmers*

Table 2 summarized the descriptive statistics of the respondents’ demographic and socio-economic characteristics.

**Table 2: Survey respondents Demographic and socio-economic characteristics**

Qualitative Variables	Frequency	Percentage
<b>Primary Occupation</b>		
Agricultural Activities	199	99.5
Nonagricultural activities	1	0.5
<b>Secondary Occupation</b>		
Secondary activities occupant	72	36
Not Secondary activities occupant	128	64
<b>Gender</b>		
Male	178	89
Female	22	11
<b>Literacy</b>		
Literate	105	52.5
Illiterate	95	47.5
<b>Religion</b>		
Christian	168	84
Muslim	27	13.5
Other	5	2.5
<b>Quantitative Variable</b>	<b>Mean</b>	<b>Standard Deviation</b>
Age	39.7	0.96
Educational Level	5	0.62
Family size	5	0.45

As depicted in above table, majority the respondents had agricultural activities as their primary work (99.5%). This indicates that farming is the main economic activity of the farmers and the largest employer of labor in the study area. However, thirty six percent (36%) of the farmers had a secondary occupation. Secondary activities are important for the farmers as it empower them to have additional income during non-farming periods.

In addition, the table revealed that eighty nine percent (89%) of the respondents were male headed household while the remaining eleven percent (11%) of the respondents were female headed households. This is similar with the findings of Yegbemey et al., 2014 and Kokoye et al., 2017 that depicts agriculture in most developing countries are dominated by male farmers and those male farmers have more access for agricultural resource. In addition, its id also depicted that 52.5% and eighty four percent 84% of the respondents were literate and Christian by religion respectively.

The average ages, Educational level and family size of the respondents were 39.7 years, 5.2 and 5 respectively. According to Ololade and Olagunju (2013), there is positive relationship between farmers' family size and poverty status. Even though, a higher household size (large family) could upsurge farmers' poverty status, in the study area on the contrary, it is a main source of labor that helps the respondents in their activities.

Concerning educational level of respondents', 52.5% of them are literate (attended formal education) and their average years of schooling is 5 years. This low educational level among small holder farmers witnessed in the study area is common in rural areas of developing countries and confirms the findings of researchers (Olorunsanya et al., 2009; Dzadze et al., 2012).

#### Determinants of household credit access: Logistic regression result

**Table 3: Logit estimate of the factors affecting access to credit**

Variables	Coefficient	Standard Error	Z	P> z
Gender	0.39	0.14	0.52	0.994
Age	-1.34	0.59	-0.01	0.348
Literacy	0.087	0.42	0.84	0.786
Religion	0.26	0.68	0.07	0.942
Education	0.42**	0.15	2.64	0.027
Family size	0.02	0.09	0.32	0.798
Farm land size	1.98***	0.86	2.14	0.000
Non-farm income	1.81***	0.80	2.27	0.000
Distance from credit institution	-0.03	0.09	-0.53	0.682
Attitude towards risk	-1.12	0.57	-0.86	0.584
Interest rate	-1.28**	0.72	-1.62	0.024
Collateral	-2.14*	0.87	1.79	0.087
Experience in credit use	1.20	1.41	1.68	0.693
Rigid repayment period	-1.27**	0.54	-2.41	0.037
Lending procedure	-1.19*	0.58	-1.94	0.054
Number of observations			200	
Pseudo R <sup>2</sup>			0.51	
LR Chi squared			79.75	

\*10% level of significance; \*\* 5% level of significance; \*\*\*1% level of significance.

As revealed in table 3, the likelihood ratio Chi-square is 79.95 with a p-value of 0.0000 indicates that the model is statistically significant. Table 3 shows that out of the fifteen variables, seven were significant for access of credit among farmers. These factors are formal education, Farm size, non farm income, Interest rate, collateral security, rigid repayment period, and lending procedure.

While educational level, farm size and nonfarm income have positive significant impact on probability of smallholders' farmers having access to formal credit, interest rate, collateral security, rigid repayment period and credit institutions lending procedure have negative impact on probability of smallholders farmers access to formal credit. Increase in level of education increases farmers' ability to understand credit scheme and related terms and condition. Those farmers able to consider the cost of taking credit with its benefit and favored to get credit from credit institutions. This finding agrees with the results of Hananu et al. (2015) who observed that being educated favors farmers' access to credit. Similarly, farm size is supposed to increase credit needs causing from the demand for agricultural inputs. This confirms the finding of Moahid, and Maharjan (2020) hence; farm size should positively affect probability of farmers' participation of receiving credit. Nonfarm income is also identified us one of determinant factor for access to credit. This positive relationship between nonfarm income and small holder farmers access to credit is supports findings of Benjamin and Richard (2019).

The negative effect of interest rate indicates that credit scheme with high interest rate reduce the probability of having access to formal credit. This result is consistent with studies by Ololade and Olagunju, 2013 and Ibrahim and Aliero, 2012 which found that farmers are reluctant to credit scheme with higher interest rate (Ololade and Olagunju, 2013; Ibrahim and Aliero, 2012).

The negative effect of collateral suggests that the requirement of having collateral decreases the likely hood of farmers demand for credit from credit institution. Collateral requirement and kind and other feature of the collateral accepted by credit institution hinders small holder farmers to get access to formal credit. Similarly, rigid

repayment period and lending procedures were identified as significant a factor that reduces probability of smallholder farmers access to credit. Agricultural loan that provided by microfinances are term loan which repaid at a fixed date decided based on grain or agricultural product collection period. The negative effects of rigid repayment period on access to credit shows that farmers demand for credit decreases due to the fact that more of agricultural product price is low at the time of farm product harvesting. This low consideration of the relationship between farm product price and credit repayment period decreases probability of having access to credit. Lending procedure is also another institutional factor that negatively affects probability of farmers' access to credit.

**Table 4: Estimated marginal effects of the explanatory variables**

Variables	dy/dx	Delta-method Std. Err.	Z	P> z
Gender	0.039	14.15	0.52	0.994
Age	-0.174	-0.59	-0.01	0.348
Religion	0.016	12.62	0.07	0.942
Education	0.032	0.15	2.64	0.026
Family size	0.004	0.09	0.32	0.797
Farm land size	0.162	0.86	2.14	0.000
Non-farm income	0.191	0.80	2.27	0.000
Distance from credit institution	-0.074	0.09	-0.53	0.679
Attitude towards risk	-0.315	0.57	-0.86	0.584
Interest rate	-0.184	0.72	-1.62	0.025
Collateral	-0.210	0.87	-1.79	0.079
Experience in credit use	0.281	1.41	1.68	0.787
Rigid repayment period	-0.148	0.54	-2.41	0.045
Lending procedure	-0.117	0.58	-1.94	0.054

Table 5 shows the estimated marginal effects of the explanatory variables on the likelihood of farmers having access to credit. This table demonstrates that for every hectares of farm land, the probability of farmer's having access to credit rises by 16.2%. Being engaged in nonfarm activities and earning non-farm income increases the probability of having access to credit by 19.1%. On other hand, failure to have needed acceptable collateral security by farmers decreases the probability of having access to credit by 21%. Similarly rigid payment periods and lending procedure decreases probability of access to credit by small holder farmer by 14.8% and 11.7% respectively. In addition, credit with high interest rates decreases it by 18.4%. This could be described by the fact that, in the study area, farmers tend to avoid loans due to concerns over repaying the loan with interest. This

In addition, having a guarantor was found to increase the probability of access to credit by 18.9%. However, having collateral decreases the likelihood of credit access by 12.4% and credit with high interest rates decreases it by 11.7%. This could be explained by the fact that, in the study area, farmers tend to avoid loans due to concerns over repaying the loan with interest.

#### 4. CONCLUSIONS AND RECOMMENDATIONS

In this paper, the authors have evaluate the determinants of access to formal credit among smallholder farmers in western Oromia regional, in case of Guto Gida district using a Logit model. The finding shows that access to formal credit by smallholder farmers is determined by educational Level, Farm size, non-farm income, Interest rate, collateral security, rigid repayment period, and lending procedure. Being educated, having large farm land size, and earning non-farm income increases the probability of farmers' access to formal credit while lack of resources by farmers that can be used as a collateral security for having credit, high interest on loan, rigid repayment period, and lending procedure related problems decreases probability of farmers access to credit. Thus, to enable the rural farmers to have access to credit, governments and non-governmental organizations should promote education and financial literacy and way of having nonfarm income. In addition to this, the leading procedure and credit terms of financial institution those operate in the Ethiopia in general and Guto Gida district in particular need to be reconsidered and modified in a way it allow farmers have a credit from credit institutions. Moreover, to ensure that any credit obtained is manageable for the farmers, financial institutions should provide loans with low interest rates hence, allowing farmers to get access to credit at optimum cost is supporting the credit institutions itself us those become loan customer at increased borrowing capacity for investment on agricultural activities or nonfarm business in one way and it is accelerating countries economic growth as most of the credit is used to finance farm inputs and farm machineries and equipment's that improve farmers performance.

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