

# Determinants of Access to Agricultural Credit among Smallholder Maize Farmers: The Case of Hababo Guduru District, Horro Guduru Wollega Zone, Ethiopia

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**Abstract**— Access to agricultural credit remains a major challenge for smallholder farmers in Ethiopia. One of the reasons for very low agricultural productivity in developing countries and particularly in Ethiopia is that lack of access to agricultural credit. Hence, we intend to identify determinants of access to agricultural credit among smallholder maize farmers in Hababo Guduru District, Horro Guduru Wollega Zone, Ethiopia. The data were obtained from a total of 260 sample households, 120 who have access to credit and 140 who do not have access to credit via two stage random sampling technique. Descriptive statistics and probit model were used to analyze the data. The results of the probit model show that age, sex, education, number of livestock owned, year of membership for the credit institution, frequency of extension contact and distance from credit source were significant factors affecting farmers' accessibility to agricultural credit in the study area. Therefore, government policy that intends to improve the smallholder farmer's access to agricultural credit facilities should formulate well-functioning system of providing credit.

**Keywords**— Agricultural credit, Smallholder, Maize Productivity, Ethiopia.

## I. INTRODUCTION

Agricultural credit is an essential input along with modern technology for increased farm productivity and for sustainable agricultural development. But access to finance remains a major challenge for smallholder farmers in most developing countries like Ethiopia. The problem often is seen in terms of limited access to production credit to buy and use farm inputs as well as pay for non-family farm labor and other farm maintenance costs (Gashayie, 2015). Farmers are particularly in need of agricultural credit, because of the seasonal pattern of their activities and the important uncertainty they are facing (Ololade and Olagunju, 2013). Availability and access to adequate, timely and low cost credit from institutional sources has great importance especially for smallholder farmers (Elias *et al.*, 2015). In addition, credit is an important instrument for improving the welfare of the poor directly through

consumption smoothening that reduces their vulnerability to short-term income.

The reasons for limited access to agricultural credit from formal sources are that, each credit source has its own constraints that limit either the ability of a farmer to obtain credit from the source or the amount of credit the farmer wishes to borrow. For instance, (Owusu-Antwi and Antwi, 2010) state that formal financial markets often require collateral in the form of land or houses as a pre-requisite for granting loans to borrowers which are often out of reach of majority of the farming population. As a result, there is a wide gap between owned and required capital to finance the agricultural activities of smallholder farmers since the income from subsistence agriculture does not yield much surplus beyond family consumption and other social obligations (Amentae *et al.*, 2017). Lack of access to capital



Computing marginal effect after estimating the coefficient in logit or probit model is important to facilitate interpretation. The marginal effect measures the changes in

the probability of the occurrence of the dependent variable, Y (access to credit), as a result of a unit change in an independent variable X.

**2.5. Measurement and definitions of variables for the model**

**2.5.2. The independent variables and their definitions used in probit model**

**2.5.1. The dependent variables of probit regression models**

From the literature review, several studies on factors influencing smallholder farmers’ access to formal credit are used to establish working hypotheses of this study. Among a number of factors, which have been related to smallholder farmers access to formal credit, the following demographic, socio-economic, communication, institutional and psychological factors are hypothesized to explain the dependent variable. The summary of the potential explanatory variables which are hypothesized to influence the probability of access to agricultural credit from formal source in the study area are given in Table 1.

The dependent variable for the probit analysis is of dichotomous nature representing smallholder farmer’s access to formal credit. This is to distinguish or discriminate between those who have access to credit and those who do not have access to credit from formal source in the study area. It takes value of “1” for those who have access “0” for those who do not have access to formal credit.

Table 1: Description of explanatory variables for credit access

Variables	Description	Measurement	A priori expectation	Reference
<b>Dependent variable</b>				
AACRED	Small holder farmer’s access to formal credit	Dummy:1 if access, 0 otherwise		
<b>Covariates</b>				
AGEHH	Age of farm household	Years	-	Awotide <i>et al.</i> (2015)
SEXHH	Sex of household head	Dummy:1 if male, 0 otherwise	+	Omonona <i>et al.</i> (2010)
FSIZEAD	Family size man equivalent	Number	-	Tang <i>et al.</i> (2010)
EDULEVEL	Number of years of formal education	Years	-	Kangogo <i>et al.</i> (2013)
TOTLHH	Total land holding in hectare	Hectare	+	Lensink <i>et al.</i> (2009)
TLU	Total livestock unit of farmers	Numbers	-	Yehuala, (2008)
DISTAINS	Distance institution from farmers home	Km	-	Tang <i>et al.</i> (2010)
COLLTER	Assets willing to offer to get credit	Dummy: 1 if yes, 0 otherwise	+	Olaoye <i>et al.</i> (2012)
FEXTSERV	Frequency of extension contact per a year	Numbers	+	Abdalla and Ebiadalla (2012)
RISK	Risk attitude of the farmers towards credit	Dummy: 1 if yes, 0 otherwise	-	Bigsten <i>et al.</i> (2003)
NUYRMEM	Years of membership for formal credit	Number of years	+	Abdul-Jalil, (2015)

Source: Authors’ calculation from survey data (2017)

**III. RESULTS AND DISCUSSION**

**3.1. Demographic and socio-economic characteristics of sample households**

Results of the descriptive statistics of continuous variables indicated that there was a significant difference between

who have access to credit and who do not have access to credit with regard educational level, land size, total livestock, years of membership for credit institution, extension contact and distance from credit source were significantly different for the two groups (Table 2).

However, two groups was the same in terms of age of household head, family size in adult equivalent, collateral and risk attitude towards credit. The existence of significant

difference between the two groups for selected variables suggests that they may have an influence on smallholder farmer's access to formal credit.

Table 2: Descriptive statistics of sample households (for continuous variables)

Variable	Have access to credit (N=120)		Have no access to credit(N=140)		Total (N=260)		t-value
	Mean	SD	Mean	SD	Mean	SD	
Age	42.54	8.97	43.01	9.23	42.77	9.1	-0.417
Family size(ME)	1.51	0.21	1.07	0.19	1.29	0.2	-1.644
Education	3.6	2.79	4.45	3.2	4.03	2.9	-2.23**
Land size	2.63	1.26	1.9	2.11	2.26	1.68	3.15***
Total livestock	5.64	2.2	6.97	2.45	6.3	2.32	-4.56***
Years of membership for CINS	6.5	2.67	5.34	2.34	5.92	2.5	3.72***
Extension contact	2.43	1.41	1.86	0.9	2.15	1.15	3.92***
Distance-CINS	1.75	1.19	2.69	1.69	2.22	1.44	-5.09***

Source: Authors' calculation from survey data (2017)

Note: \*\*\*, \*\* means significant at 1% and 5% probability level respectively.

Moreover, the results of categorical variables showed that sex of the respondent farmers (SEX) is one of the discrete variables that significantly affect access to formal credit. From the total sample households, 7.5% of those who have

access to credit and 15.0% of those who do not have access to credit were female headed households. The difference between the two groups was significant at 10% probability level.

Table 3: Descriptive statistics of sample households (for dummy variables)

Variable		Have access to credit (N=120)		Have no access to credit(N=140)		Total (N=260)		χ <sup>2</sup> -value
		N	%	N	%	N	%	
Sex	Male	111	92.5	119	85	230	88.5	3.561*
	Female	9	7.5	21	15	30	11.5	
Collateral	Yes	58	48.3	64	45.7	122	46.9	0.178
	No	62	51.7	76	54.3	138	53.2	
Risk attitude	Yes	65	54.2	68	48.6	133	51.2	0.81
	No	5	45.8	72	51.4	127	48.82	

Source: Authors' calculation from survey data (2017)

Note: \*\*\* and \* means significant at 1% and 10% probability level respectively.

### 3.2. Determinants of access to agricultural credit from formal sources

Prior to running the probit model, both the continuous and dummy explanatory variables were checked for the existence of multi-collinearity problem. The problem arises when at least one of the independent variables is a linear combination of the others. The existence of multi-collinearity might cause the estimated regression

coefficients to have the wrong signs and smaller t-ratios that might lead to wrong conclusions.

From the results in Table 4, the probit regression gave aPseudo-R<sup>2</sup> of about 0.2504. The value of Pearson chi-square indicated the goodness of fit for the fitted model. Eleven variables were hypothesized to explain factors affecting smallholder farmer's access to formal credit. Out of these seven variables were found to be significant. These

are age, sex, years of formal education, number of livestock in tropical livestock unit (TLU) owned by the farmer, frequency of extension service from extension agent,

distance of credit institution from farmers house and number of year of membership for formal credit organization.

Table 4: Probit model results for factors influencing farmer access to agricultural credit

Variables	Coefficient	Robust Std. Err.	Z	P> z	Marginal effects
Age	-0.0174	0.0105	-1.66*	0.097	-0.0069
Sex	0.6845	0.2842	2.41**	0.016	0.2489
Family size (ME)	-0.7307	0.4720	-1.55	0.122	-0.2889
Education	-0.0749	0.0316	-2.38**	0.017	-0.0296
Land size	0.0889	0.0897	0.98	0.326	0.0348
Livestock holding	-0.1535	0.0416	-3.69***	0.000	-0.0607
Collateral	0.00034	0.1814	0.00	0.999	0.0114
Extension contact	0.3121	0.0952	3.29***	0.001	0.1235
Distance	-0.2237	0.0596	-3.75***	0.000	-0.0885
Year of membership	0.0936	0.0341	2.75***	0.006	0.0370
Risk	-0.1425	0.1795	-0.79	0.427	-0.0564
_cons	0.8194	0.7672	1.07	0.285	

Number of obs=260; Wald chi2 (11) =68.21; Prob>ch2=0.0000; Pseudo R2=0.2504; Log likelihood=134.5169

Source: Authors' calculation from survey data (2017)

Note; \*\*\*, \*\* and \* is significant at 1%, 5% and 10% level of significance respectively

The result displayed in Table 4 shows that age of farmers is negatively and significantly associated with probability of accessing credit at 10% significance level. The marginal effect shows that an increase in household age by one year leads to a 0.69% decrease in the probability of farmer's access to credit. It might be due to the fact that older farmers have larger capital basis not to see for credit. The result is consistent with the findings of Mpuga (2004) who found that younger farmers more likely borrow, since they are very active and energetic and more aggressive to investment.

Sex of household head has positively and statistically significant (at 5%) relationship with the probability that households access to credit. Being male headed increases the probability of accessing credit from formal sources by 24.89% than being female headed. The implication is that women have few assets and have small landholding with low productivity thereby affecting their access to credit. The result is consistent with the findings of Awunyo-Vitor and Abankwah, (2012) who documented that males are more likely to access credit as compared to their female counterparts.

Educational level has negatively and statistically significant (at 5%) relationship with the probability that households access to credit. This demonstrates that an increase in one year of education status would decrease the probability of the farmer being credit access by 2.96%. The reason for this finding is that a large proportion of agricultural credit intervention like MFIs are targeted at poor farmers and an educated individual can joined to run their own business and earn income. This result in line with results from studies by Muhammed, (2013) who found that education have a negative relationship with agricultural credit and state that the likelihood of the larger amount of credit decreases as the level of farmer's education increases.

It was also apparent from the results that the number of livestock in tropical livestock unit (TLU) owned by the farmer is found to have a negative and statistically significant (at 1%) relationship with the probability that household credit access. A unit increases in total livestock decreases the probability of farmer's access to agricultural credit by 6.074%. One of the reason is that livestock is an asset farmers can liquidate during the cropping season to purchase inputs thereby reducing their need for credit. The results supported by the findings of Girma and Abebaw,

(2015), found that the higher number of livestock the household owns the less likely the household demand and borrow credit from the formal sources.

Frequency of extension contact is another factor, which is positively and significantly related to the dependent variable and that it is significant at 1% probability level. A unit increase in extension contact increases the probability of accessing agricultural credit by 12.35%. The result shows the important role played by extension agents as sources of information and enforce the farmers to use credit for productive purpose rather than for consumption purpose. Abdalla and Ebaidalla, (2012) found that access of farmer to the formal credit institution is positively influenced by participation of the household head in extension activities. Farmers' perception of the distance between credit institutions and his or her house had negative and significant (at 1%) effect on the probability that households get access to credit. For one kilometer increase in distance, the probability of accessing agricultural credit from formal source decreases by 8.85%. The result indicates that farmers who perceive the distance between their house and the credit institution to be far are less likely to access credit. This result is consistent with those reported by (Tang *et al.*, 2010) who found that an extra kilo meters between the nearest bank and village reduces the borrowing probability from the formal lenders by 1%.

In addition, the probability of accessing formal credit was also positively and significantly influenced by the number of years of membership in formal sources of credit. A one year increase in membership into formal credit institution increases the probability of the farmers' access to credit by 3.70%. Mpuga, (2004) found that access of farmer to formal credit institution is positively influenced by experience of the household head in credit use.

#### IV. CONCLUSION AND POLICY IMPLICATIONS

The aim of this study was to determine the factors influencing smallholder households' access to agricultural credit in Hababo Guduru district, Horro Guduru Wollega Zone, Ethiopia. The result of the probit regression model indicates that the probability of accessing formal credit was positively and significantly affected by sex of household head, frequency of extension contact, year of membership into credit institution. In contrary, age of household head, years of formal education of household head, number of livestock in TLU and farmers' perception of distance of residence from credit source negatively and significantly

affect access to credit from formal source. Therefore, in line with the major findings, the study recommends that: Livestock production is very important source of livelihood and a source of cash in rural areas which reduces farmers' demand for credit through generating additional income. Therefore, attention should be given for scientific livestock management system, which is salient for the welfare of rural households. Provision of training to credit beneficiaries concerning credit should be enhanced by credit institutions; this will ensure that credit users are well informed on loan requirements and repayment. Distance of the residence from credit institution was significantly and negatively affected the outcome variables of the study. Therefore, agricultural credit institutions like Micro Finance Institutions and Oromia Credit Saving and Sharing Company should be widely spread, so that farmers will only travel for a short distance to access financial services. The probability of accessing formal credit was also positively and significantly influenced by number of years of membership for formal sources of credit. Therefore, farmers should be members of credit institution, as this will help to reduce the problem of collateral and guarantor requirement which are prerequisite for accessing institutionalized credit.

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