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Factors affecting credit use for rural farming at household level: Evidence from small holder farmers' of Toke-Kutaye district.

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Agricultural finance for smallholder farmers is critical for the growth and development of agricultural sector. The study is based on the survey of a total of 99 farmers which particularly covering three kebeles of Toke Kutaye district, Ethiopia with the objectives identifying factor affecting access to credit service. The data were collected from both primary and secondary sources in 2017/18. Binary logit model was used to analyze the factors affecting access to credit service. The results indicated that the significant variables included in the model such as education of the household head, frequency of extension contact and farmers' perception of group lending were positively and significantly affect households' participation credit service while family size and distance from MFIs were negatively and significantly affect households credit participation in the study area. This study recommends that in order to make agricultural development successful these factors and problems are taken into consideration by policy makers to participate in credit use. Our results have important implications for the management and future of farmers, as well as for the assessment of their development impacts.

Keywords: Access to credit, logit model, smallholder, study area.

INTRODUCTION

The formal microfinance in Ethiopia started in 1994. In particular, the Licensing and Supervision of Microfinance Institution Proclamation of the government encouraged the spread of Microfinance Institutions (MFI) in both rural and urban areas as it authorized them among other things, to legally accept deposits from the general public (hence diversity sources of funds), to draw and accept drafts, and to manage funds for the micro financing business (Gobezie, 2005). The number of microfinance institutions in Ethiopia currently reached 34 which jointly mobilized about Birr 22.7 billion in saving deposit, which showed a 28.7 % annual growth. Likewise, their outstanding credit increased by 15.3 % reflecting the growing role of the institutions in financing intermediation among low income groups both in rural and urban areas. Similarly, their total asset expanded by 24 %and stood at Birr 43 billion (NBE, 2017).

The origins of MFIs in Ethiopia is largely rooted in their NGO past with a clearly defined mission of rural poverty eradication. With a network of 500 sub-branches and branches, the MFIs have expanded their outreach to many of the regions where the incidence of poverty is highest. As of January 2001, MFIs has made loans to and mobilized savings from about 500,000 clients nationally. Some MFIs have also started to offer other services such as managing pension remittances and money transfer services At least 41% of the MFI clients nationally are women and in the majority from rural households. Most of the MFIs have two types of loan products, namely loans for on-farm activities, which are due in four to twelve months, and off-farm investments with more flexible repayments on weekly or monthly basis (IFAD, 2001). On average, 60% of the MFI portfolio represents loans for on-farm investments while income generating activities and petty trading accounted for about 40%. (Dejene, 1999).

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Access to credit is considered as one of the key elements in achieving the transformation plan and is an important factor in economic development to achieve higher growth in agricultural sector and it is being an engine of growth. It is also becoming increasingly important to the livelihood of smallholders by generating additional activity and creating new jobs. But, limited participation of smallholder farmers in formal credit market is taking as a challenge in Ethiopia in general, in the study district in particular.

Microfinance and MFI are among the tools used to address the problems of poverty and development finance at a grass root level; mainly for the poor that has no access to large financial institutions like banks. Yet, their net impact on the lives of the poor people is a debatable issue in the development arena. According to. Microfinance contributes to the development of human, social and physical capital to the poor

Lack of financial resources is one of the major problems facing poor households. Formal financial institutions are inefficient and inaccessible in providing credit facilities to the poor. That is, Social and Human capitals have an important role in improving the livelihood of the poor, but have gotten little attention as indicators of MF contributions. So this researcher will incorporate some human and social capital indicators in the assessment of the contribution to livelihoods. Likewise the clients of Toke Kutaye Woreda microfinance institution is influenced by many factors such as lack of facilitated infrastructure; limited funding alternatives, limited financial products (small amount of loan), short repayment period, weak inter control system, shortage of technological support and lack of strong regulatory frame works. So this researcher will incorporate some human and social capital indicators in the assessment of the contribution to livelihoods. Therefore, the objective of the study is to identify factor affecting access to credit service in the study areas.

METHODOLOGY

Description of the study area

The study was conducted in Toke Kutaye Woreda which is located 124 km from Addis Ababa as well as 11km west of Ambo zone capital. Livestock production is an integral part of production system in the study area. Production of cattle (milk, meat), goat (meat) and poultry is a common practice. More than ten percent of the rural population of Toke Kutaye Wodera is engaged in crop production while the rest depends on mixed farming (crop with livestock). Crop production is dependent on rainfall and the major crops produced in the area are Wheat, teff, fruits and barley. Livestock are also reared by most families. Oxen provide traction power for the cultivation of the agricultural lands. On the other hand, livestock are kept as a source of income through milk, butter, meat and egg production.

Sampling Procedure

A three stage sampling techniques was used to select representative households from the study area. At the first stage, Toke Kutaye District was selected purposively due to there is financial institution (ACSI) which gives loan for smallholders and there are so many financial institutions compete with this institution. Secondly, three out of 35 kebeles in the Woreda were selected randomly. In the third stage, sample size was determined using a simplified formula provided by Yamane (1967). Out of the total 1020 households, 99 households were selected using simple random sampling methods proportionally.

Data Collection Method

Both quantitative and qualitative data types were collected for the study. In order to generate these data types, both secondary and primary data sources were used. Primary data sources were smallholder farmer's three purposely-selected kebeles. The data collection methods used includes survey using structured questionnaire. The structured questionnaires was pre-tested with similar households operating within the study area, but not included in the final survey. Using the questionnaire data were collected on household characteristics, socioeconomic and demographic characteristics, farm information, input utilization, and access to services such as extension, credit and market information. Experienced enumerators were recruited and well trained for actual field data collection. The data were collected in January 2017/18.

Methods of Data Analysis

Descriptive statistics such as mean, standard deviation and percentage, were used to describe characteristics that can influence participation in credit use which was presented by tabular form. In addition, mean comparison tools were applied between the characteristics of credit participants and non-participants using t-test for continuous variables and chi-square test for dummy variables. To identifying factor affecting access to credit service at the individual household level, Binary logit model was used. This method was chosen because it is a standard method of analysis when the outcome variable is dichotomous (Hosmer and Lemeshow, 2000), measured as having a value of 1 or 0, where 1 = participant and 0 = non participant. Generally, the Binary logit model can be written as:

Therefore, the cumulative logistic probability model is econometrically specified as follows:

$$P_i = F(z_i) = F(\alpha + \sum \beta_i x_i) = \frac{1}{1 + e^{-zi}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where, P_i is the probability that an individual will participate in formal credit or does not participate given X_i;

e denotes the base of natural logarithms, which is approximately equal to 2.718;

X_i represents the ith explanatory variables; and α and β_i are parameters to be estimated

Logit model could be written in terms of the odds and log of odds, which enables one to understand the interpretation of the coefficients. The coefficient of the logit model therefore represents the change in the log of the odds associated with a change in the explanatory variables. The odds ratio implies 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.

$$1-pi = \frac{1}{1+e^{zi}}\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots2$$

$$\frac{p_i}{1-pi}\frac{1+e^{zi}}{1+e^{-zi}}) = e^{zi}\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots3$$

Or

Therefore, to get linearity, we take the natural logarithms of odds ratio equation (4), which results in the logit.

$$\frac{p_i}{1-pi}=\frac{1+e^{zi}}{1+e^{-zi}}=e^{(\alpha+\sum \beta ixi)}\dots\dots\dots\dots\dots\dots\dots4$$

$$z_i=\ln(\frac{pi}{1-pi})=\alpha+\beta_1x_1+\beta_2x_2+\beta_3x_3+\dots\dots+\beta_mX_m\dots\dots\dots\dots5$$

If the disturbance term (u_i) is taken in to account, the logit model becomes

$$Z_i=\alpha+\sum_{i=1}^{m} Bixi + ui\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots6$$

The data covered information necessary to make household level indices of social, economic, demographic and institutional indicators comparable across different categories of identifying factor affecting access to credit service at the individual household level. In order to identify factors affecting access to credit service at the household level, both continuous and discrete variables were identified based on economic theories and empirical studies as follows.

Decision to use credit: This refers smallholder farmers participation in credit that takes value '1' if farmers participate in credit; otherwise '0'. It indicated as dependent variable that farmers' participation in credit for agricultural activities can be affected by socio-economic factors, demographic factors, institutional and other factors.

Age of the household head: It is defined as the period from the respondent's birth to the time of the interview measured in years. It is a continuous variable. Those farmers having a higher age due to life experience will have much better association with cooperatives and other formal credit institutions, and it will be hypothesized that older farmers with higher age may have more access to use credit from the formal sources and increase its income (Samuel,2010).

Sex of the household head (Sex): This is a dummy variable, which takes a value of "1" if the head of the household is Male and "0" otherwise. This independent variable will be expected to affect access to credit finance that male headed households have more access to credit use than female headed households. While female headed households are more preoccupied with childcare and home management than interaction with the external environment. According to Samuel (2010) men are more likely to go for credit than women. Therefore, it is hypothesized that sex and credit program participation are positively related.

Education of the household head (HEduc): This variable is measured using formal schooling of the household head and hypothesized to affect access to credit positively. It has taken dummy values 1 if the household attended any formal education of any level and 0 otherwise. Education increases farmers' ability to get and use information. Educated farmers may have the ability to analyze costs and benefits and thereby improve their livelihood. According to Samuel (2010) those farmers who have better level of schooling has high chance of being participant. It is hypothesized that educated farmers have more access to credit compared to others.

Family size: It is the number of people in the household. The larger the family members, the more labor force available for the production purpose. Based on this, families with sufficient labor force are expected to participate in credit program and increase household income. On the other hand, large family size may imply self-insufficiency in terms of food consumption because large households consume more than do small households. Households who have more number of family members are less likely to participate in the project than households with less family members (Samuel, 2010). Therefore, the effect of family size on credit access and increasing income may be indeterminate a prior.

Distance to nearest MFI (DMkt): It is a continuous variable and measured in hours which producers walk or

travel to reach the nearest district Micro finance institution. The closer the household is located to the micro finance institution, the lesser would be the transportation cost, loss due to spoilage, better access to market information , and less time spent. Therefore, distance is hypothesized to affect smallholder farmers' participation in credit finance positivly.

Frequency of Extension contact (FREEXECON): The variable extension service was measured as a continuous variable. This refers to the number of contacts with extension agents that the respondent made in the month. Farmers who have a frequent contact with extension agents are expected to have more information that will influence farm household's demand for credit access from the micro finance institution. Therefore, it will be hypothesized that this variable positively influences farmer's to use credit access.

Total livestock ownership (LIVESTOCK):-This refers to the total number of animals possessed by the household measured in TLU. As the total number of animals in the household increases, the household would be less likely to go for credit. This can be attributed to increase wealth and income base of farm households which makes more money available in the households that minimizes demand for credit (Petrick, 2004). Hence, this variable was expected to have negative influence on the dependent variable.

Total land size in hectare (LANDSIZ):-This is a continuous variable referring the total land owned by households in hectare. It consists of the sum of owned cultivated land, rented-in land and land secured through sharecropping arrangements) by the household. On the other hand, Petrick (2004) found that households owning large farms have a lower probability of attaining credit from formal financial institutions. This variable was hypothesized that, the farmer who has larger size of land can utilize more capital and access for credit and therefore he/she will be more participate in the formal sources.

Membership to any cooperative (mcoop): It is binary variable taking a value of "1" if the household is member of a cooperative engaged in any business and "0" otherwise. Some of the households those members of the cooperatives and they get different services including credit (according to the credit arrangements of the Oromia regional government, agricultural input credit is channeled through cooperatives and therefore cooperatives have to lend to both members and non-members). However, for other agricultural activities credit is provided for members only. Therefore, it is hypothesized that farmers who are members of cooperatives have more access to credit from cooperative

Experience in credit use from formal sources (EXCRIFS): it is a continuous variable which refers to a number of years that the household head use credit from formal financial institutions. A farmer having more experience in formal credit use will have higher tendency towards using the formal credit sources and vice versa. Atieno (2001) indicated that past credit participation was a significant variable to explain the participation in formal credit markets positively. Hence, this variable was hypothesized to have positive influence on the dependent variable.

Farmers perception of group lending ((P-GLENDING): It is a dummy variable which takes a value "1" for those who perceived group formation is a constraint and "0" otherwise. Smallholder farmers are expected to form a group (that can serve as collateral) to take credit from the formal credit sources. Armedáriz and Morduch (2010) define group lending as "arrangements by individuals without collateral who get together and form groups with the aim of obtaining loans from a lender. Therefore, this variable was hypothesized as farmers who are unable to form a group or deprived of membership by the group are not able to use formal credit.

RESULTS AND DISCUSSIONS

In this study, rural households' participation in credit services is influenced by demographic, economic, social characteristics of households and other factors. Participation in credit by smallholder farmers to the context of this study is measured in terms of participants and non-participants. From the total sample households 72.25% were married and the remaining 11.3% and 16.45%were separated and unmarried respectively. Out of the total sample respondents 69.5percent of non-participants and 75 percent of credit participants were married. The estimated chi-square value in the following table indicated there was statistically significant difference between participant and non-participant households in terms of this variable at 5% significance level.

Table 1 indicated that, from the total sample households 15.9% of respondents were a member of any cooperatives in the study area. Whereas 84.1% of respondents were not a member of any cooperatives in the study area. Moreover, the calculated chi-square value showed that there was statistically significant difference between participant and non-participant households with respect to membership of any cooperatives. With regard to sex the sample was composed of 64.35% male headed households and 35.65% female headed households. The number of credit participant female

Table 1. Summary of descriptive statistical results for dummy (categorical) variables

Variable	Categories	Non User		User		x^2-value	Total	
		N	%	N	%		N	%
Sex	Male	42	71.2	23	57.5	1.980	65	64.35
	Female	17	28.8	17	42.5		34	35.65
	Total	59	100	40	100		99	100
Marital status	Single	15	25.4	3	7.5	7.9506**	18	16.45
	Married	41	69.5	30	75		71	72.25
	Separated	3	5.1	7	17.5		10	11.3
	Total	59	100	40	100		99	100
Education	Literate	38	64.4	26	65		64	64.7
	Illiterate	21	35.6	14	35	0.0037	35	35.3
	Total	59	100	40	100		99	100
Membership of any cooperative	Member	4	6.8	10	25		14	15.9
	Not member	55	93.2	30	75	6.5180***	85	84.1
	Total	59	100	40	100		99	100

Source: Computed from the field survey data, 2018

Table 2. Summary of descriptive statistical result for continuous variables and t-test

Variable	Non-Users		Users		Total		T-test
	Mean	St.dev	Mean	St.dev	Mean	St.dev	
Family size in number	5.32	2.344	4.925	1.654	5.161	2.093	0.925
Total livestock in TLU	3.745	0.122	3.2	0.235	3.525	0.122	2.237**
Experience in credit use	0.711	0.744	1.275	0.933	0.939	0.867	-3.331***
Frequency of extension contact	1.779	0.418	1.325	0.474	1.595	0.493	5.027***

***, and ** represent level of significant at 1% and 5% probability level respectively.
Source: Computed from the field survey data, 2018

headed households is lower as compared to male. The implication is that male headed households had more participate in formal financial sources.

Table 2 indicated that, the average livestock population owned by the sample household was 3.53 in TLU. The mean number of livestock owned by participant and non-participant households was 3.2in TLU and 3.75in TLU, respectively. The mean difference between the participant and non-participant households in terms of size of livestock holding was statistically significant at 5% level of significance. This indicates that household those who had many livestock were more participate in microfinance services than those who had a few livestock. As stated in below table, the mean frequency of extension contact for participant and non-participant households was 1.325 and 1.779 per year, respectively. The total mean of frequency of extension contact accessed by the two groups was 1.595 per year. The t-test value revealed that there was significant mean difference between the two groups with respect to this variable and statistically significant at 1% significance level. The total mean of experience of credit use of household was 0.939 per year. The result of t-test value shows that there was significant mean difference

between participant and non-participants regarding to households' experience in credit use at 1% significance level.

Econometric Results

The result of logistic regression (Table3) presented that education level of household head was positively affect the probability of households' credit use from microfinance institutions at 5% significance level. This implies that as education level of household heads increase the probability of their credit use will also increases. Family size of household head had negatively influence households credit participation and statistically significant at 5% significance level. That means, as a number of dependent family member increases their participation in credit use will decreases. This due to the fact that, as existence of dependent family members in the households increase the active labor that generate income for the family member decreases.

On the other hand, the result of logit model indicated that distance travelled by households from their home to microfinance institutions of was negatively affect households' participation to credit use at 1% significance.

Table 3. Logistic regression model of factors affecting households credit use

Dependent variable (Participation in credit)	Coefficient	Robust standard error	Z	p>z
AGE	0.0334	0.0492	0.68	0.497
SEX	-1.228	1.363	-0.90	0.368
EDTN	5.167	2.099	2.46	0.014
FAMLYSIZE	-0.795	0.313	-2.54	0.011**
DISTCEMFI	-0.176	0.0538	-3.28	0.001**
FREQEXNTNCON	4.158	1.026	4.05	0.002**
MEMCOOPTVE	0.636	1.128	0.56	0.206
MARITALSTATUS	1.284	0.668	1.92	0.974
LANDSIZE	-0.310	0.486	-0.64	0.283
LIVESTOK	-0.809	(0.766)	-2.21	0.217
FARMPERCTN	3.162	(1.272)	2.49	0.013**
EXPRIANCE	0.861	(0.506)	1.70	0.876
Constant	2.246	(3.166)	0.71	0.019

Note: Dependent variables are Credit Participation. N=99, prob> chi2 = 000 , PseudoR2 =0.4910, Log likelihood = -33.99, *** and ** means, statistically significant at 1% and 5% respectively. Std.Err is robust.
Source: Own computation from survey result, 2018

The negative relationship between cultivated distance from microfinance institutions and access to credit is that households who travelled a long distance to reach microfinance institutions is less participate in credit. Frequency of extension contact had a positive effect on rural households' participation in credit service and was significant at 1% significance level. This means that those households getting more extension service have high probability to participate in credit service. The average perception of group lending was negatively affect households' participation in credit use from microfinance institutions at 5% significance level. Smallholder farmers were expected to form a group (that can serve as collateral) to take credit from the microfinance institutions.

CONCLUSION AND RECOMMENDATIONS

This study was aimed at analyzing the role of microfinance institution in improving livelihood in Toke Kutaye *District* of Oromia National regional State. The specific objectives of the study include *identifying factor affecting access to credit service* of farm households. The data were generated from both primary and secondary sources. Among 12 explanatory variables, which were hypothesized to affect households' participation in credit service, the significant variables included in the model such as education of the household head, frequency of extension contact and farmers' perception of group lending were positively and significantly affect households' participation credit service while family size and distance from MFIs were negatively and significantly affect households credit participation in the study area. Therefore, to enhance participation of poor farmers in formal credit institutions, policies related to credit guarantees should be continuously revised to enable poor households to participate in formal credit. Alternative collateral options should be considered. For example, land-right certificates can be used. This is because most smallholder farmers live in poverty and lack adequate collateral.

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