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Research Paper

Determinants of loan repayment performance of smallholder farmers in Ethiopia

ABSTRACT

This study was conducted to examine determinants of smallholder farmer's loan repayment performance in Alge Sachi district, South Western Ethiopia. The study has used Purposive and proportionate sampling technique in order to select sampled kebeles and households, respectively. Hence, from five kebeles which has large number of credit users, 95 farmers were selected from 1763 household credit users in the district. Both primary and secondary data were collected for this study. Primary data was collected through questionnaire and interview whereas, secondary data was collected from records of OCSSCO Suphe Sodo branch. Descriptive statistics was used in order to summarize and describe the socio-economic characteristics of the respondents. Furthermore, chi-square test was used to test the association between the explanatory variables and the dependent variable. In addition, binary logistic econometric model was employed in order to identify the significant factors that influence loan repayment performance of the selected sampled household farmers. A total of eleven explanatory variables were included in the econometric model and they were: Gender, age, marital status, educational level, family size, income from farming, farmland size, group size, loan size, distance from the institution and training. Seven of these variables were found to be statistically significant determinants of loan repayment. Depending on his finding, the researcher has made some recommendations.

Key words: Loan repayment performance.

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INTRODUCTION

Background

The economic growth of developing countries depends to a great extent on the growth of their agricultural sector. Ethiopia is one example of a developing country, characterized by a predominantly subsistence agrarian economy. The nature of farming in Ethiopia is dominated by traditional micro holdings of the subsistence type, with less than two hectares of land being the average holding (CSA, 2015). The principal components of the sector's output are food crops, livestock and livestock products. Small farmers work on 96.3 percent of the total cultivated area and produce over 95 percent of the national crop production, whereas private investors and state farms work on the rest (CSA, 2015).

From the total population, 83.8 percent live in rural areas where agriculture provides employment for not less than 80 percent of the total population (CSA, 2007). In 2008/09, this sector generated about 42.6 percent of the Gross Domestic Product (GDP) (NBE, 2009). The service sector dominates the economy by contributing over 37% to the country's GDP followed by agriculture which takes about 34%, industry 23% and a tiny contributor at 5.6% being manufacturing. (https://addisstandard.com). The Agricultural sector, however, is under performing, and several factors have been identified as being responsible for the situation. The factors include: use of traditional agricultural practices and implements; low inputs and lack of effective extension services; over grazing; serious erosion and depletion of soil fertility; lack of adaptive

research; and the inadequacy of agricultural credit. Other factors such as deficient communication infrastructure; ecological imbalance; inappropriate agricultural policies; market integration problems and political instability (Belay, 2002). These factors affected Ethiopia's agricultural sector and led to production at subsistence level with incomes not adequate to cover the farmers' consumption and expenditures and were unable to invest back into their farms.

The low disposable incomes available at household levels have affected the ability of smallholder farmers to improve agricultural production through acquisition and use of modern technologies. (Belete, 2015). Due to high default rate and lack of required collateral, agriculture in Africa continues to receive only a small share of total credit, leaving farmers, particularly smallholder farmers, to rely on insufficient savings and informal sources of credit which only about 10 per cent of the total portfolio of commercial banks goes to agriculture, including agro-industries, loans are rarely extended to smallholders (World Bank, 2009). Giving credit to the rural poor has been a hotly pursued but problem-plagued activity for Micro Finance Institutions. Giving low-cost, efficient credit services and recovering full amount of loans granted is the basis objective of rural finance (Wenner, 1995), but the combination has often been an illusion. For these reason, this study aimed at identifying determinants of loan repayment performance of smallholder farmers of Alge Sachi district.

REVIEW OF RELATED LITERATURE

Credit is defined as an exchange of goods and services, for the promise of a future payment. Loan can be in form of money, property or other material goods given to another party in exchange for future payment of the loan value amount along with interest or other finance charges. It also indicates that credit is necessary in a dynamic economy because of the time that elapses between the production of a good and its ultimate sale and consumption; credit thus bridges this gap. Credit is broadly defined today as an agreement or promise of transaction between lender and borrowers, where borrowers receive something of assessment now and repays sometime in the future (Hodgman, cited by Obse, 2015). The risk in extending credit is the probability that future payment by the borrower will not be made (Million, 2011). Credit is considered as a lubricant that helps to provide a push to the development process (Bekele, Kassa and Mulat, 2018).

Credit is the key means to have access to inputs in many development programs. This is particularly true for rural development because, so long as sufficient credit is not provided to support the development programs of the weaker sections of the society, the goal of development may not be achieved. By consuming the credit made available by the lender, borrowers play an important role in the financial system. Borrowers enter the financial market intending to get a loan to cover a need. As with the lenders, the borrower can be a single person, group of people, companies or even governments.

As a result of high population pressure in the rural areas of developing countries, such as Ethiopia, getting additional productive land is difficult, implying the need to improve farm level productivity through intensification. This involves, as pointed out by Tomaya and Takashi (2010), the use of improved farm inputs such as fertilizers and improved seeds, besides improved tillage and husbandry practices. These inputs are not available on the farm and most farmers are not able to purchase them due to lack of finance. Moreover, most of the commercial inputs are expensive and hence, smallholder farmers cannot afford to buy them, from their own cash earnings. It is therefore, generally acknowledged that agricultural credit to smallholder farmers can help to improve their farm productivity through the use of improved farm inputs.

Agricultural credit granting formal financial institutions in Ethiopia

In the Ethiopian context, farm credit had been made available through public financial institutions of which the Commercial Bank of Ethiopia (CBE) and the Development Bank of Ethiopia (DBE) were the two major providers of credit for inputs such as fertilizer, improved seed, herbicides, and farm tools. However, the DBE sharply reduced its supply of fertilizer loans in the early 1990s when its existence was threatened by massive default. The Development Bank of Ethiopia (DBE) stopped extending input credit in 1997. The financial institutions, however, do not have contact with the farmers on an individual basis. Instead, the regional governments facilitate the loan provision, along with signed agreements with banks on the amount, duration and security of the loan. The amounts of the loans are estimated by each regional government, and in fact are estimated, based on information obtained from zonal- and district-level demand for the previous years. The loans are short-term credits, which should be paid back within one year; the banks uses the regional government's budget as collateral.

Due to the large number of defaulters, the Agricultural and Industrial Development Bank (AIDB) and the Development Bank of Ethiopia (DBE), since the early 1990's have not been interested in extending input credit to farmers.(Million, 2011). Micro finance institutions deal directly with borrowers, who fulfill the loan provision criteria set by their management. Though figures on the amount of credit they provide are not available, it is believed that these institutions play an important role in narrowing the gap between demand and supply of credit in rural areas.

Thirty five micro-finance institutions have been officially recognized by the National Bank of Ethiopia (NBE, 2018). The advantage of these financial institutions is that, farmers can get loans in cash and use them to purchase the most

scarce production resources. Micro-Finance Institutions (MFIs). The World Bank defines microfinance as "Small scale financial services primarily credit and savings provided to people who farm or fish and who operate small enterprises or microenterprises. In addition, where goods are produced, recycled, repaired, or sold; who provide services; who work for wages or commissions; who gain income from renting out small amounts of land, vehicles, draft animals, or machinery and tools; and to other individuals and groups at the local levels of developing countries, both rural and urban" (Robinson, cited in Belete, 2015).

Microfinance institutions (MFIs) were established to fill the gap in the financial services sector by providing funds to the poor and lower income group and thus alleviating poverty and enhance their business activities. The MFIs provide funds for start-up business or for working capital. In addition, some MFIs also provide funds for non-business activities such as for education and emergencies purpose. In the credit market, agency problem, moral hazard and adverse selection exist because of information asymmetries. Information asymmetries are the main obstacle for MFIs to provide loans to clients. Financial institutions usually requires business proposal, borrower past credit information and collateral before approving the loan. (Fitsum,2014). The number of micro-finance Institutions (MFIs) operating in the country reached 35 at the end of the fiscal year 2018 (NBE, 2018). Their total capital stood at Birr 1.7 billion, they mobilized deposits of Birr 2 billion, advanced loans of Birr 4.9 billion and total assets of Birr 6.6 billion, by the end of the fiscal year.

Empirical Studies on determinants of loan repayment

Determinants of loan repayment performance globally

Several studies have analyzed loan repayment performance from different perspectives, upon which upcoming initiatives need to draw reference. Zeller (1996) investigated the determinants of repayment performance in credit groups. The study focused on the effects of program design, community and group characteristics on the repayment performance of groups, using a data set on groups from six different lending programs in Madagascar. The study found that socially cohesive groups pool risks by diversifying the members' asset portfolio so that their repayment performance is improved, even in communities with high-risk exposure. Indeed, the evolution of microfinance services all over the world has tended to focus on group programs.

Loan repayment performance in Ethiopia

Ethiopia has also had its share of agricultural loans over the years, and equally, its share of loan defaulters. A number of studies have investigated the phenomena. Abebe (1998) hypothesized that 21 socio-economic variables influenced the loan repayment performance of smallholder farmers, in Alemgena district, Ethiopia. He used multiple linear regression analysis and revealed that factors such as experience in own farm, experience in credit use, proportion of area under teff and wheat production, annual farm revenue, number of draught oxen owned, ownership of livestock in the livestock unit, number of contacts with development agents and the location of the farmers from the development agents' center were the most critical variables contributing to loan repayment.

Bekele (2001) hypothesized 15 demographic, socio-economic, natural and institutional variables to explain the loan repayment performance of smallholder farmers in the Amhara and Oromiya regions of Ethiopia. His logit regression model results indicate that, timeliness of input supply, amount of formal loan per hectare, total grain production, participation in off-farm activities, total livestock owned in monetary terms, informal loan and yield loss due to bad weather, were significant, while the remaining eight variables, were less powerful in explaining the variations in the dependent variable.

Belay (2002) examined the socio-economic factors influencing loan repayment in Diredawa. Ethiopia. Data was collected from 92 randomly selected borrowers, drawn from 23 savings and credit groups. The study used a binary logit model to analyze the factors influencing loan repayment performance of rural smallholder farmers. The Study included 12 explanatory variables in the empirical model, out of these, six were found to be statistically significant. Location of borrowers from lending institution, loan diversion, annual farm revenue and celebration of social ceremonies were highly important in influencing loan repayment performance among smallholder farmers.

In addition, Gender and business experience of the respondents were found to be significant determinants of loan repayment rate. Million (2012) examined factors affecting loan repayment performance of smallholder farmers in eastern Hararghe, Ethiopia. The results of the descriptive analysis revealed a significant mean difference between the defaulter and non-defaulter households in terms of education, experience of credit use, distance from credit source, technical assistance, livestock units, total annual income and total land.

Conclusion and research gap

From the above empirical review of literature, we saw different studies on factors that affect loan repayment performance of farmers, women and others who receive loans from formal financial institutions either individually or in group in different parts of Ethiopia. Different conclusions are made regarding the determinants of loan

repayment and some of them contradict each other. In another way, there is no consensus regarding the effect of some variables on loan repayment. This may be due to topography, socio-economic or other factors.

Fikirte (2012) recommended that determinants of loan repayment differ from place to place, sector to sector and from time to time, hence the result found in one place may not work in another place. This calls for another research to be conducted in another area to identify determinant factors of loan repayment. From the reviewed literature above, no research is found to be done in the area that the researcher has done this research and this research fills literature gap by focusing on group lending specifically on farmers which were ignored by the researchers. For successful loan repayment and minimized default rate, factors which hinder loan repayment has to be identified and measures taken by the concerned body. When loan repayment is improved, both the lender and borrower will be benefit because the lender earns its interest and the borrower will get another round loan to meet his/her finance need. Therefore, the researcher is motivated to conduct a research to identify whether the factors affecting loan repayment performance in South Western part of Ethiopia, specifically in Alge Sachi district is the same or not with those mentioned in the literature. Different explanatory variables related to the institution, borrowers and economic related variables were used and presented as follows in Figure 1.

CONCEPTUAL FRAME WORK

Research hypotheses

H1: There is no significant association between Gender and loan repayment performance of farmers.

H2: Age of farmers has no significant association with loan repayment performance of farmers.

H3: There is no significant association between marital status and loan repayment performance of farmers.

H4: There is significant and positive association between education level and loan repayment performance of farmers.

H5: There is no significant association between family size and loan repayment performance of farmers.

H6: There is no significant association between group size and loan repayment performance of farmers.

H7: There is significant association between farmland size and loan repayment performance of farmers.

H8: There is no significant association between loan size and loan repayment performance of farmers.

H9: There is significant association between and positive association between training and farmers loan repayment performance.

H10: There is no significant association between distance of borrowers from the institution and loan repayment performance of farmers.

H11: There is positive and significant association between income from farming and loan repayment performance of farmers.

RESAERCH METHODOLOGY

Research design

The study used quantitative and qualitative methods in the explanatory research design. The quantitative aspect of the data focuses on description of socio economic variables, loan and related variables, and business related variables and analysis of relationship among the dependent and explanatory variables.

Data type and sources

The study was made with the use of both secondary and primary data using a structured questionnaire with the help of trained enumerators. The primary data were collected by face to face interviews using structured questionnaire. The questionnaire includes both closed and open-ended questions. The secondary data obtained through extensive review of documents from microfinance institutions, loan cycle and loan repayment records to help target population of the study. In order to assess the determinants of loan repayment performance, primary data collected by direct interview with the respondents.

Target population of the study

The target population of this study were farmers (borrowers) who take loan from Oromia Credit and Saving Share Company (OCSSCO) of Suphe Sodo branch which are found in Alge Sachi District specifically in Alge town.

Sampling technique and sample size

There were 1,763 credit users in Alge Sachi District. Since it is impossible to study all population elements, taking sample is inevitable. For this reason, multi-stage probability
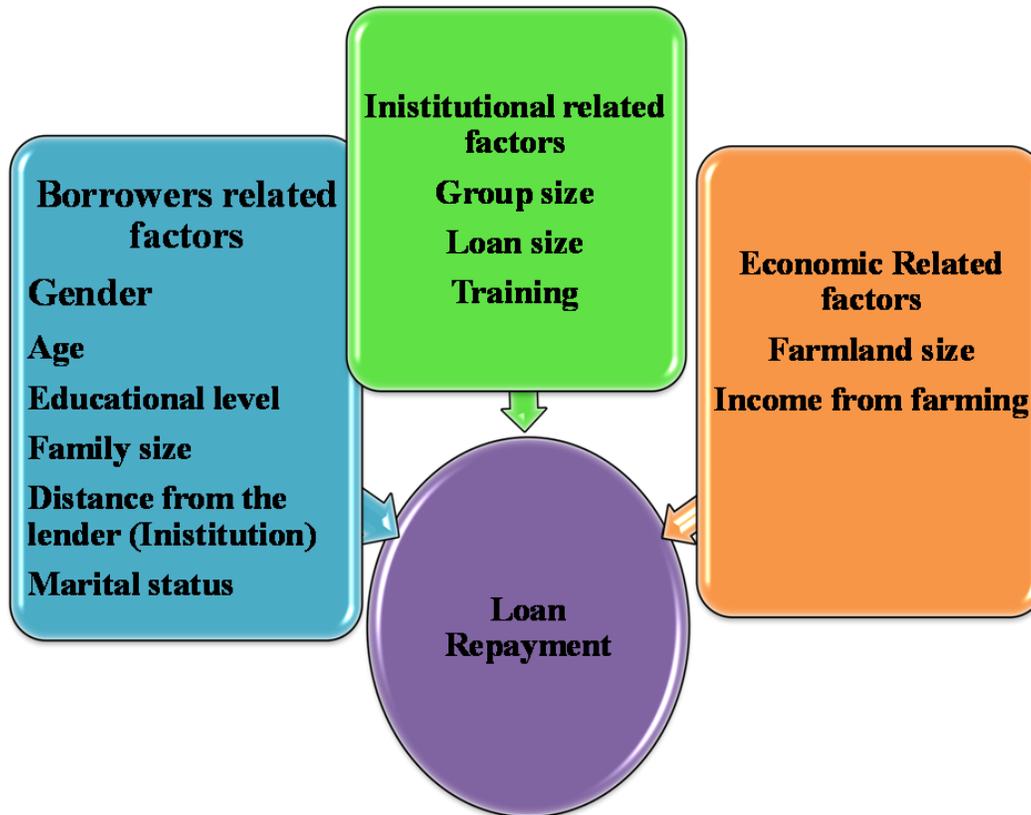
Figure 1: Conceptual framework.
Source: Developed by the researcher.

sampling techniques was used for this study. At first, five kebeles which have large number of borrowers were selected from twenty six kebeles. The selected kebeles are Sibo Ganji, Jarkuni, Mogu, Adare and Uso Sige Kebeles. Total number of credit users in these kebeles is 557 individuals. From total credit users in the woreda, sample was selected by using Yamane (1967) formula as follows:

n   = N/1+N(e²)

where,
n = Sample size
N = total population of the study
e = margin of error
n= 1763/1+1763(0.1²)
<u>n= 95</u>

From each stratum (Kebeles), respondents were selected proportionately from these five kebeles shown in Table 1.

Econometric model specification

Loan repayment is a dependent variable, while different demographic, institutional, loan, economic and cultural factors are considered as independent variables. In this study, the dependent variable assumes values 0 and 1, which is 0 if the borrower is a defaulter and 1 if the borrower is non-defaulter. Therefore, loan repayment is treated as dichotomous dependent variable and a non-continuous dependent variable that does not satisfy the key assumptions in the linear regression analysis. There are several methods to analyze the data involving binary outcomes. However, for this particular study, logit model was selected over discriminate and linear probability models. The linear probability model (LPM) which is expressed as a linear function of the explanatory variables is computationally simple.

However, despite its computational simplicity, as recommended by Amemiya (1981) and Gujarati (1995), it has a serious defect, in the sense that the estimated probability values can lie outside the normal 0-1 range. Hence logit model is advantageous over LPM because the probabilities are bound between 0 and 1. Moreover, Logit best fits the non-linear relationship between the dependent and the explanatory variables.

In the analysis of studies involving qualitative choices, usually a choice has to be made between Logit and probit models. According to Amemiya (1981), the statistical similarities between Logit and probit models makes the

Table 1: Selected respondents from each stratum (Kebeles).

Kebeles	Credit users	Proportional sample size
Sibo Ganji	126	95*126/557=21
Jarkuni	121	95*121/557=21
Mogu	115	95*115/557=20
Uso sige	101	95*101/557=17
Adere	94	95*94/557=16
Total	557	95

choice between them difficult. The justification for using Logit is its simplicity of calculation and that its probability lies between 0 and 1. Moreover, 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 Lemeshown (1998) pointed out that the logistic distribution (logit) has advantage over the others in the analysis of dichotomous outcome variable in that it is extremely flexible and easily used model from mathematical point of view and results in a meaningful interpretation. In statistics, logistic regression, or Logit regression, or Logit model is a regression model where the dependent variable is categorical/binary dependent variable (most commonly called dummy variables) - that is, where it can take only two values, "0" and "1", which represent outcomes defaulter and non-defaulter. Since the dependent variable of the study (loan payment) have binary/dichotomous outcomes (defaulter and non-defaulter), the binomial logistic regression model was selected for this study to find the determinant factors affecting loan repayment. The binomial logistic model is one of the sophisticated binary response models that overcome the limitations of the LPM. In a binary response model, interest lies primarily in the response probability:

$$P(y = 1 | x) = P(y = 1 | x_1, x_2, \ldots, x_k)$$

Where, $p(y = 1 \, x)$ is the probability that $y=1$(non-defaulting) given x (independent variable), y represents loan repayment and x denote the full set of explanatory variables such as education level, method of lending, nearness of borrower's residence to the institutions, family size, loan size, loan diversion rate, income from activities financed by loan, interest rate, celebrating and participating in social festivals, and training that affect loan repayment. To avoid the LPM limitations, let us consider a class of binary response models of the form:

$$P(y = 1 | x) = G(\beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k) = G(\beta_0 + x\beta)$$

Where G is a function taking on values strictly between zero and one: $0<G(z)<1$, for all real numbers z. This ensures that the estimated response probabilities are strictly between zero and one. We write $x\beta = \beta_1 x_1 + \ldots + \beta_k x_k$. Logistic function is a nonlinear function used for the function G in order to make sure the probabilities are between zero and one. In the logit model, G is the logistic function which is between zero and one for all real numbers z. This is the cumulative distribution function for a standard logistic random variable:

$$G(z) = \exp(z)/[1 + \exp(z)]$$

Where, $Z = X\beta = \beta_1 x_1 + \ldots + \beta_k x_k$

The goal logistic regression is to find the best fitting (yet biologically reasonable) model to describe the relationship between the dichotomous characteristic of interest (dependent variable= response or outcome variable) and a set of independent (predictor or explanatory) variables. Logistic regression generates the coefficients (and its standard errors and significance levels) of a formula to predict a logit transformation of the probability of presence of the characteristic of interest:

$$logit(p) = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + \ldots + b_k X_k$$

Logit(P) can be back transformed to p by the following formula:

When one categorical variable and one independent variable is included:

$$P(Y) = \frac{1}{1 + e^{-(b_0 + b_1 x_1)}}$$

When one categorical variable and several independent variables is included in the study:

$$P(Y) = \frac{e^{b_0 + b_1 x_1 + b_2 x_2 + \ldots + b_n x_n}}{1 + e^{b_0 + b_1 x_1 + b_2 x_2 + \ldots + b_n x_n}}$$

Where, P(Y) is probability of Y occurring, e is natural logarithm base (e ≈ 2.71828...), b0 is interception at y-axis,

bn is regression slope coefficient of Xn, and Xn is predictor or independent variable that predicts the probability of Y.

P(Y)= $\frac{e^{\beta 0} + \beta 1GD + \beta 2 FAG + \beta 3MRTS + \beta 4EDC + \beta 5FMS + \beta 6FLS + \beta 7GM + \beta 8LS + \beta 9TR + \beta 10DT + \beta 11INC}{1 + e^{\beta 0} + \beta 1GD + \beta 2FAG + \beta 3MRTS + \beta 4EDC + \beta 5FMS + \beta 6FLS + \beta 7GM + \beta 8LS + \beta 9TR + \beta 10DT + \beta 11INC}$

RESULTS

Econometric regression analysis

The binary logistic regression method was used to arrive at the econometric results. For the test statistics 10% or 5% significant level was used to reject or not to reject the null hypothesis. The first test done by the researcher was Hosmer and Lemeshow model fitness test because they are the means to know whether the model is valid or not to continue with the regression. Accordingly, Omnibus Tests of Model Coefficients and collinearity test were tested and the results are presented at the appendixes of the study. As these tests proved the validity of the model, the study had continued into regression analysis and hypothesis testing.

Table 2 below shows that predicted influencing factors were statistically significant at (Chi-Square = 98.579, P-Value = 0.000, 11 degrees of freedom, Nagelkerke R Square (R) = 0.919 and Cox & Snell R Square (R2) = 0.666). The estimated coefficients were statistically different from zero variously at the 5% and 10% levels of significance. Overall, the logistic model successfully predicted the determinants of small holder farmer's loan repayment performance.

Age (FAGE): It was hypothesized that age is significantly associated with loan repayment of farmers. The result from binomial logistic regression model in the above table shows positive sign for variable age (β of .452), which implies positive association between age and loan repayment of farmers. This shows that as age increases, borrowers enhance their ability to work and accumulate wealth.

Since the Sig. statistic or p-value is (0.021) which is smaller than the chosen significance level (0.05 or 5 percent), the positive association between age and loan repayment is statistically significant. Wald statistic of age (1.497) is outside of 95 percent confidence interval (0.066-1.269), the developed research hypothesis that there is significant association between age and loan repayment was not rejected. Hence, there is significant association between age and loan repayment of MFIs. The result can be interpreted as, other variables being constant, an increase in age could lead loan repayment rate to be improved by 1.571. This can be interpreted as; an increase in one year increases the odds ratio in favor of non-defaulting by a factor of 1.571, ceteris paribus. Its implication is, as the number of year's increase, their honesties also increase to

keep their reputation in the society and hence they repay the loan. This result is consistent with the findings of Amare (2005), Fikirite (2011) and Gebregzabier (2017) who suggested the elder borrowers feel more responsible to repay their loan than youngsters. But this result is inconsistent with the findings of Oladeebe (2008) who argued that as age increases, the probability of paying the loan decreases.

Educational level (EDUL): It was hypothesized that education was associated with loan repayment performance of farmers. The result from binary logistic regression model in Table 2 indicate positive sign for the variable education level (β of 0.894), which implies positive association between education level and loan repayment performance of farmers. This shows that as level of education increases, borrowers enhance their ability to access, evaluate, and understand new production techniques and technologies. Since the Sig. statistic or p-value is (.034) which is smaller than the chosen significance level (0.05 or 5 percent), the positive association between education level and loan repayment is statistically significant that is, the level of education contributes to the variance in probability of borrower's loan repayment performance. Wald statistic of education level (5.646) is outside of 95 percent confidence interval (1.162 – 2.441), the developed research hypothesis that there is significant association between education level and loan repayment performance of farmers was accepted.

Hence, there is significant association between education level and loan repayment of MFIs. The result from binomial logistic model can be interpreted as, other variables being constant, increase in education level could lead loan repayment rate to be improved by 2.441. In other ways, increase in one year schooling increases the odds ratio in favor of non-defaulting by a factor of 2.441, other variables kept constant. This implies that education plays a great role in raising the level of awareness, exposure to technologies, access to business information and manage resources properly which boost production and then improves loan repayment. Education level of the borrowers is one of the variables that were thought to affect loan repayment performance of the borrowers by different authors. This result is consistent with the findings of Abraham (2002), Girma (2017), but inconsistent with that of Demuma (2015).

Family size (FSZ): It was hypothesized that there is no significant association between family size and loan repayment of farmers. The result from binary logistic regression model in Table 2 indicates negative sign for family size variable (β of -.675), that shows negative relationship between family size and loan repayment performance of farmers. This shows that as borrower's family size increases, the probability of borrowers to repay their loan also decreases. Having higher number of family

Table 2: Logit estimate of determinants of loan repayment performance.

	B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
SX(1)	0.157	0.489	0.103	1	0.748	1.170	0.449	3.051
FAGE	0.452	0.371	1.497	1	0.021**	1.571	0.066	1.269
MARTUS	-0.612	0.288	4.511	1	0.198	1.325	0.690	5.545
EDUC	0.894	0.376	5.646	1	0.034*	2.441	0.388	1.162
FMSZE	-0.675	0.387	3.034	1	0.082**	0.508	0.561	2.497
GME	-0.975	0.467	4.362	1	0.037*	1.198	0.623	2.303
FLANSZ	0.208	0.122	2.903	1	0.089**	1.232	0.824	1.564
LSIZE	0.236	0.142	2.760	1	0.862	1.000	1.000	1.000
TRAI	0.909	0.548	2.751	1	0.043*	2.483	0.484	1.446
DIT	0.267	0.475	0.316	1	0.574	1.306	0.515	3.310
FINC	0.637	0.260	3.291	1	0.041*	0.682	1.045	2.298
Constant	-2.647	2.716	0.950	1	0.330	0.071		

a. Variable(s) entered on step 1: SX= Gender. FAGE=Farmers age, MARTUS=marital status, EDUC=education level, FMSZE=family size, GME=group size, FLANSZ=farmland size, LSIZE=loan size, TRAI= training, DIT=distance from the institution, FINC=income from farming.
b. Number of observation= 90, Chi-Square = 98.579, P-Value = 0.000, 11 degrees of freedom, Nagelkerke R Square (R) = 0.919 and Cox& Snell R Square (R2) = 0.666, -2loglikelihood 117.330
c. * and **means 5% and 10% significance level respectively
Source : binary logistic regression model output 2018.

members will increase consumption expenses and other living expenses which led loan repayment difficult. Since the Sig. statistic or p-value (0.082) is less than the chosen significance level (0.1 or 1 percent), the positive association between family size and loan repayment is statistically significant. In another way, as Wald statistic of family size (3.034) is outside of confidence interval (0.561 – 2.497), the developed research hypothesis that there is no significant association between family size and loan repayment cannot be accepted. Hence, there is significant association between family size and loan repayment of borrowers in MFIs. The result from binary logistic model can be interpreted as, other factors being equal, as the family size increase by one person (child), the odd ratio in favor of loan repayment performance decrease by odds of 0.508 and significant at 10%. This result is consistent with the findings of Berhanu (2008), Mesfin (2017) and Gudeta (2017) who argued that family size had significant negative effect on loan repayment performance of smallholder farmers. But this finding is in line with the finding of Roslan and Abdkarim (2009), who analyzed the determinants of repayment decision among small holder farmers in Southwestern Shewa Zone and obtained the result those borrowers with higher number of household members would meet their repayment obligation better than those with lower number of household members. In addition it is consistent with the finding of Firafis (2015).

Group size (GSIZE): This variable was hypothesized to have no significant association with loan repayment performance of farmers. The result from binary logistic regression model in Table 2 indicates negative sign for

group size (β of. -0.975), which implies negative association between group size and loan repayment of farmers. This shows that as group size increases, borrowers fail to supervise each other resulting in low probability of repaying the loan. Since the Sig. statistic or p-value is (0.037) which is smaller than the chosen significance level (0.05 or 5 percent), the negative association between group size and loan repayment is statistically significant that is, the increase in group size reduce probability of loan repayment of farmers. In another way, Wald statistic of group size (.4.362) is outside of 95%t confidence interval (0.623– 2.303), the developed research hypothesis that there is no significant association between group size and loan repayment is rejected. Hence, there is significant association between group size and loan repayment of farmers. The result from binary logistic model can be interpreted as, other variables being constant, increase in group size could lead loan repayment rate to be decreased by 1.198. In another way, addition of one person to a group increases the odds ratio in favor of defaulting by a factor of 1.198, ceteris paribus.

Farmland size (FLANSZ): This variable was hypothesized to have significant association with loan repayment performance of farmers. The result from binomial logistic regression model in the Table 2 indicates positive sign for farmland size variable (β of .208), that shows positive association between farmland size and loan repayment performance of farmers in MFIs. This shows that as borrower's farmland size increases, the probability of borrowers to repay their loan increases. Having higher hectare of farmland will increase income from farming of

farmers which led loan repayment difficult. The positive association between farmland size and loan repayment is statistically significant.

P-value (0.089) is less than the chosen significance level (0.10 or 10 percent). In another way, as Wald statistic of farmland size (2.903) is outside of confidence interval (0.824 – 1.446), the developed research hypothesis that there is significant association between farmers farmland size and loan repayment was accepted. Hence, there is significant association between farmland size and loan repayment of borrowers in MFIs. This result can be interpreted as, other variables being constant; an increase in farmland size increases the probability of borrowers' loan repayment by 2.483. In other way, increase in farmland size increases the odds ratio in favor of non-defaulting by a factor of 2.483, ceteris paribus. This result is consistent with the findings of Zelalem and Jemal (2013), who have studied the determinants of repayment decision among small holder farmers in Assosa and obtained the result those borrowers with greater hectare of land would meet their repayment obligation better than those with lower hectare of land borrowers. In addition, the result of this study conforms to findings of Awunyo-Vitor (2012). However, the result of the model is inconsistent with the finding of Amare (2005) who argued that farmland size affects loan repayment performance of smallholder farmers negatively.

Training (TRAI): The researcher hypothesized that there is significant association between training and loan repayment performance of farmers in MFIs, and it was found to influence positively and significantly (β =0.909) the borrower's loan repayment performance at 5% significance level. If other variables hold constant, the delivering of well-organized and sufficient training properly for borrowers increases the probability of borrower's loan repayment by 2.483. By other way, other variables kept constant, the odds ratio favoring loan repayment performance increases by a factor of 2.483 for borrowers who were trained. If lender provides various training, the clients will be able to understand the rules and regulations easily and they can also develop skill on how to use and utilize money. Training is needed not only for client but also for loan officers. In both cases, it has a positive contribution to the repayment rate.

The model results show that this variable has a positive (as the coefficient of training that is, β of 0.909 have positive sign) impact on the loan repayment. This result agrees with the findings of Firafis (2015), Girma (2017), Abreham (2017), Gobena (2018), and Amhara (2015). But, it disagrees with the result of Belete (2015) study, who argued that the association between training and loan repayment performance of borrowers is statistically insignificant.

Income from farming (INCM): Total income that farmers obtain from farming affects the capacity of a farmer to pay its loan on time. The result from logistic regression model in Table 2 indicate positive sign for the variable income from farming (β of 0.637), which implies positive association between income from farming and loan repayment of farmers. This shows that as income from farming increases, farmers financial capacity also increases and this result in paying their debt on time.

The positive association between total income from farming and loan repayment is statistically significant at P=0.041 which is less than the chosen significance level of 5%. Wald statistic of total income from farming (3.291) is outside of 95 percent confidence interval (.1.045 – 2.298). Therefore the developed research hypothesis that there is significant association between total income from farming and loan repayment is accepted. Hence, there is significant association between income from farming and loan repayment of MFIs. The result from binomial logistic model can be interpreted as, other variables being constant, one birr increase in income from farming could lead loan repayment rate in favor of non-defaulting by the odds of 0.682. This result is consistent with the findings of Gebre-Egziaber (2017), Mesfin (2017) and Girma (2017), but inconsistent with that of Demuma (2015).

CONCLUSIONS

Based on the analysis made previously, the researcher made the following conclusions on socio-economic and demographic characteristic of borrowers, loan related factors and institutional related factors as follows: The finding of this study shows that male farmer's usage of credit from OCSSCO was greater than that of female farmers. This means that female's participation in using credit is less than male farmers. The result from binary logistic regression shows that this variable is not statistically significant determinant of loan repayment for the study area. Borrower's age determines the probability of the borrowed money to be repaid in time. The regression analysis result reveals that age of the farmers was significant determinants of loan repayment performance. It shows positive sign for this variable which means that as age increases, the probability of paying the loan also increases. Elder borrowers (in our case, farmers) feel more responsible to repay their loan in time than younger farmers. Due to this, it can be concluded that age and loan repayment probability are positively related. Education is a key to development of every country. Educated citizens know how to use their resources and also know how to access and use what they do not have. Education level of farmers was one of the significant determinants of loan repayment. The finding of this study shows that, as educational level increases, riskiness of loan repayment decreases which means the probability of loan repayment increases. Especially farmers with higher

educational level are most likely to become non defaulters than uneducated farmers. It can be concluded from this that farmer's education level and loan repayment is positively related.   The finding of this study also shows that family size significantly determines probability of loan repayment. The result shows that as farmers family size increases the probability of paying the loan decreases. This is due to the fact that large families' consumption expense is greater than small families' expense and to meet these expenses, farmers with large family tend to divert the loan to consumption.

This reduces the capacity of the borrower to repay its debt on time. Therefore it can be concluded that larger family size tends to be more defaulter than small family size. Farmland size of farmers is also one of the significant determinants of loan repayment for the study area. farmland is the farmer's main asset. The result from econometric model shows that as a farmer's farmland increases, the probability of paying their loan in time also increases. This means that those who have land cultivates their land and pay their loan by the income from their cultivated land. For this reason it can be concluded that farmers with large farmland size tends to be non-defaulters than those who have no/small farmland. In group lending approach, borrowers organize themselves in group to take the loan. This group size of borrowers is also one of the significant determinants of loan repayment in the study area. The econometric model result shows that as group size (number of members in a group) increases, the probability of paying the loan decreases. As the number of borrowers in a group increases, it becomes very hard for members to control each other. Since the fault of one member of a group is borne by the group, large group creates good opportunity for free riders because there is joint liability. For this reason, it can be concluded that the larger the group size, the smaller the probability of paying the loan. Training was another significant determinant of loan repayment. The regression result from binary logistic regression shows that the presence of training while giving the loan affects the probability of loan repayment positively. The finding also shows that almost all of those who have attended training have repaid their loan on time. From this, it can be concluded that giving training for borrowers regarding utilization of the loan increases their probability of paying the loan in time. Income from farming activity was another determinant of loan repayment of farmers. The finding of this study shows that income from farming affects loan repayment positively. This means as income from farming increases, farmer's capacity to repay their loans also increases. In another way, as income from farming decreases, farmer's capacity to repay their loan also decreases. For this reason, it is possible to conclude that income from farming and loan repayment is positively related. In general, age of farmers (borrowers), education level of farmers, farmland size, training and income from farming are positively related with loan repayment

whereas, family size and group size are negatively related with loan repayment. But variables such as gender of borrowers, loan size, marital status and distance of farmers from the institution were statistically insignificant.

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