

CROSS - SECTIONAL FACTORS INFLUENCING LOAN REPAYMENT CAPACITY OF SMALLHOLDER FARMERS'

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ABSTRACT

The study identified factors influencing loan repayment capacity of smallholder farmers' borrowers. Purposive sampling techniques were used to select 93 respondents. Binary logit model result showed that 47.1 percent of respondent were defaulters and 52.6 percent were non-defaulters. model result indicates sex, marital status, follow-up & supervision, annual income and number of livestock were significant factors to loan repayment capacity of smallholder farmers'. Therefore, follow-up & supervision, consideration for marital status, annual income and number of livestock of borrowers are need government attention and greater consideration during borrowing money in the area.

Keywords: Binary Logit, Loan Repayment, Smallholder Farmers

INTRODUCTION

In subsistence agriculture and low income countries like Ethiopia, where the smallholder farming dominates the overall national economy, small peasant farmers often face scarcity of capital due to a low level of production to adopt new agricultural technologies. Hence, short and medium-term credits with favorable terms for seasonal inputs like fertilizer, improved seeds, pesticide, and herbicides would generally be favored because the better return would be achieved quickly within the cropping season. The performance of the agricultural sector depends to a large extent on the availability of credit which is considered not only as one of the critical inputs in agriculture but also is regarded as an effective means of economic transformation and poverty alleviation. Credit determinant factor of agriculture by providing resources for the purchases of inputs and adoption of new technology cited in Nwankwo (2008) & Nwafor (2018).

Agricultural is an intersecting input enjoined by the smaller tenant farmers to establish and distend their farms with intention of growing agricultural production, aggravate food adequacy, raised domestic and general income, and increase the single borrower's capacity to require borrowed fund. Agricultural lending involves giving out of credit (in cash and kind) to small scale farmers for farming. Credit plays a decisive part in enlarging the evolution of agriculture and rural saving. Likewise Oladebo (2008) argued that trust is Acts of the Apostles as a catalyst that activates the Jinny of growth, endow it to assemble its inherent potentials, and aggrandize in the project or anticipate over sight. Similarly Ojiako & Ogbukwa (2012) identify the economic loan repayment capacity of smallholder farmer that was a vital party credit transformation and rustic unraveling. Particularly agricultural credit is very important for enduring agricultural education to be achieved in any region of the Earth Ololade & Olagunju (2013). Rural belief has proved to be an energetic instrument against poverty reduction and revelation in rustic areas. Farmers are particularly in the necessity of

such an instrument, because of the seasonal example of their activities and the uncertainty they are facing.

Loan repayment performance in developing countries has become a major problem in agricultural credit administration, especially for smallholders who have limited collateral capabilities. As a result of the high default rate among farmers, lending institutions are reluctant in advancing loans to farmers. Farmers in the developing countries have been identified as the most defaulting group of credit beneficiaries indicated that credit is the second largest source of farm capital and few small-scale farmers benefit from a formal source of loans from financial institutions as a result of the difficulty in fulfilling their loan obligations (Duncan, 1994; Abankwah *et al.*, 2016). Agricultural lending involves giving out of credit (in cash and kind) to small scale farmers for farming. There is no doubt about the crucial roles of credit in economic development. But the increasing default rate is one of the major problems of the lending institutions Mohammad, (2009). The importance of agricultural credit in the development of the sector has been underlined strongly by various authors concluded that credit helps to bring about the required productivity and food self-sufficiency through the adoption of new technologies.

The sustainability of micro institutions depends largely on their ability to collect their loans as efficiently and effectively as possible. In other words, to be financially viable or sustainable, micro institutions must ensure high collection quality based on full repayment, or at worst low delinquency/default, cost recovery, and efficient lending. In agricultural loan conduct, the incremental default rate has been one of the major problems for all the financial institutions, and results discourage the financial institutions to refinance the defaulting members.

From the empirical literature reviewed, a different author identified factors influence loan repayment. According to Ogah Alemu (2015), credit receptibility and use is an authority by farmers' socioeconomic characteristics, the censure of covering long variance to the bank, obstinacy on forage of security, inadequate faith given, and the disinclination of bank in transfer agricultural trust, high degree of interest command by private money lenders, delay and difficulty in intelligence with officials in acquiring credit. According to (Dadson 2012 cited in Idowu O *et al.*, 2016) the investigation of reimbursement of lends by farmers is one of the important upshots since it supremacy access to estimation by the farmers and given that one moving to seize the loan reimbursement challenges is to scrutinize the factors which move the loan in reimbursement.

Increasing defaults in the reimbursement of loans may proceed to very serious implications. For this case, it disfavors the financial institutions to refinance the fault members, which put the defaulters once again into a vicious circle of low productivity. Therefore, rough research of the various aspects of loan defaults, source of credit, the purpose of the loan, form of the loan, and condition of loan provision are of great consequence both for policymakers and the lending institutions Kelly (2005).

Farmers' question for credit is regulating by socio-economic and environmental factors. These factors, explain the existence nature of production, land tenure problems, technological stagnation, and lack of restructured market outlets, social organizations, attitude, and values Ukoha *et al.*, (2011). According to Kohansal *et al.*, (2009) studied factors that control repayment performance of farmers in Khorasan-Razavi tract of Iran during 2008. The logit model was used to explain the probability of loan on time reimbursement as a result of any of the identified that farmer's experience, income, received loan size and collateral value positive effect while loan interest rate, and total relevancy costs and the number of installment implies a negative effect on repayment performance of recipients.

According to Mukono (2015) reported that single characteristics include the age of borrower, gender, level of education, business experience, household size, credit use experience, household income, non-business income, type of business activity, and amount of business investment significantly determine loan repayment of borrowers. All economies of the world especially in developing countries of Africa resembling Ethiopia, micro and small enterprises are a key agent for sustained growth and development Gashu & Borji, (2015). A study by Ochieng & Bureti (2012), identified that factors affecting loan repayment include social responsibilities such as the feeding of children, paying of rent, hospital bills, and the number of household members.

According to Yelimani (2013), study on determinants of repayment performance of assembly and single lending in microfinance: a case study in the superior westward region of Ghana. The results of the study show that individual lending yields a better repayment performance than assembly lending. Similarly Nancy & Mohamed (2014) in their study on Determinants of Loan Repayment in Small Scale Enterprises in Developing Countries analyzed and identified the determinants that control the loan repayment in a developing country. They found out that personal characteristics such as education level, house size, amount of loan applied and business experience of the respondents have a positive relationship to loan repayment. Age, interest rate and gender change had an inverse relationship to loan repayment. Likewise Study by Tadele (2014) estimated an econometric model known as binary logistic model analysis on Determinants of Microfinance Loan Repayment Performance: Case of Omo Microfinance in Kaffa Zone. Similarly Ofgaha Alemu (2018) also used a binary logit model to identify determinants of Loan Repayment of Micro and Small Enterprises in Jimma Town. Low repayment performance disfavors the lender to enlarge credit to abundant and fragmented farm households. Therefore, a thorough inquiry of the different sources of loan default is a great consequence to farmers, policymakers, and lending institutions. Hence, this study was undertaken to identify factors that influence the loan repayment capacity of smallholder farmers' borrower at the Toke Kutaye district.

MATERIALS AND METHODS

Study Area

The study was conducted in Western Shoa Zone in Toke Kutaye district. Toke Kutaye district is one of the 33 districts found in Western Shoa Zone of Oromia Regional State. It is placed at a distance of 126 km from Addis Ababa and 11 km away from the administering town of Western Shoa Zone i.e., Ambo town. The district is surrounded by Midakegn in the Northern, Dire Hinchin in the southern and Ambo town in the Eastern and Liban Jawi in the Western. The total population is 119,999 from this 59,788 are male and 60,211 are female. From the total 5,755 population were urban dwellers and the rest are rural dwellers. The district has the mean yearly temperature ranging between 15 up to 29 °C and the mean annual rainfall 900-1000mm. The altitude of the district fall between the 500 and 3200 meters above sea level representing the lowest point of lowland and the highest point of highland agro-climatic zone. In Toke Kutaye Woreda the area of the land 51,313.19 hectares, from that area 35,209.09 hectares used for farmland, and 16,104.1 hectares used for other services. The land in this woreda shows that (89.1%) arable, cultivable (86.1%), annual crops (2.7%), pasture (2.8%), forest (1.5 %) and the remaining (5.4%) considered swampy, degraded or otherwise unusable. Teff and wheat are important cereal crops in this woreda over 5000 hectares are planted with these crops. The land position of the district is generally Plato and mountain form (CSA, 2007).

Sampling Technique and Sample Size Determination

The study used a purposive sample, selected from smallholder farmers who received loans in the 2019/20 revenue year. For this study, Toke Kutaye district was selected purposively. This is because the district has a low loan recovery rate as compared with other districts. From 31 rural kebeles of Toke Kutaye district, two kebeles were selected purposively (namely Imladawiajo and naga file) because of low loan reimbursement available in the area. The total number of households from two kebele is 1401, of which 750 from Imlada wiajo and 651 from Naga file. The respondents were categorized into two categories, i.e. defaulters and non-defaulters. Borrowers of the two kebele have repaid their loans on the due date were classified as non-defaulters while those who did not repay their loan on the due date were classified as defaulters. For this study, the total sample size for sample household farmers was determined based on the sampling formula provided by Yamane (1967). The formula used for sample size determination with a 95% confidence level with a degree of variability of 5% and a level of precision 10% are recommended to obtain a sample size required which represents a true population.

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{1401}{1 + 1401(0.1)^2}$$

The above formula yielded 93 loan borrowers were selected purposively for this study. Proportionate to sampling size was employed to select 50 borrowers from ImaladWiajo and 43 borrowers from Naga file kebele for questionnaires and interviews from two kebeles of the districts.

Data Sources and Collection Methods

The study used both primary and secondary data. Primary data, which was mainly cross-sectional, was collected from 93 Loan borrower farmers in the toke Kutaye District. The primary data was collected from a sample of loan borrower farmers using structured questionnaires and interviews. The questionnaire consist of a broad range of questions belonging to demographic, socio- economic characteristics of the sample respondents which include sex of borrower, marital status, Annual income, saving habit, follow-up and supervision, number of livestock owned, the experience of borrowing and training. Secondary data were obtained from publications, seasonal and annual reports of the district, zonal and Oromia credit, and saving share company (OCSSCO) and cooperative.

Methods of Data Analysis

Descriptive statistics and econometric analysis were employed to analyze the data collected from sample respondents to meet the objectives of this study.

Descriptive Statistics

Quantitative data was analyzed using descriptive statistics such as mean, standard

deviation, and percentage. In addition, t-test and Chi-square test statistics were employed to compare defaulter and non-defaulter groups with respect to some explanatory variables.

Econometric Model

The objectives of this study were to select the variables which most significantly distinguished between non-defaulters and defaulters of agricultural loans, from a set of personal and socio-economic variables which, it was hypothesized. Model specification is supported on the nature of the dependent variable. The nature of the dependent variable was dummy variable, which takes a value Zero (0) if those farmers who receive but did not repay the money that they had borrowed are considered as complete defaulters and One (1) if those farmers that repaid all the money that they had received within the stated time are considered non-defaulters. Under such requisite binary logit and probit model was used to explain a change in the borrower defaulters and non-defaulters at smallholder farmers. The reason why the binary logit model was selected for this study over the probit model is that it has some advantage when the sample size is small. Logistic regression is used in a wide range of applications leading to categorical dependent data analysis Agresti (2002). In this study, the odds ratio is the ratio of the probability that the borrower will be non-defaulters (Pi) to the probability that he/she will be defaulters (1-Pi).

$$\begin{aligned}
 p_i &= f(Z_i) = \frac{e^{\alpha + \beta_i \chi_i}}{1 + e^{\alpha + \beta_i \chi_i}} \\
 (1 - p_i) &= \frac{1}{1 + e^{\alpha + \beta_i \chi_i}} \\
 \frac{p_i}{1 - p_i} &= e^{\alpha + \beta_i \chi_i}
 \end{aligned}$$

Taking the natural logarithm from the above equation

$$\ln\left(\frac{p_i}{1 - p_i}\right) = \alpha + \sum_{i=1}^K \beta_i \chi_i + \varepsilon_i$$

Where K = Number of the independent variable included in the model

χ_i = Vector of the independent variable

ε_i = Error term (disturbance term)

α = value of log oddratio $\frac{p_i}{1 - p_i}$ When χ_i or independent variable is zero

=Measures the change in L (logit) for a unit change in explanatory variables (X)

Z_i =Dependent variable that takes value $Z_i= [0]$ if farmers who borrowed did not repay borrowed money in the stated time and $Z_i=[1]$ if farmers repaid all the money that they had borrowed in stated time.

Hypothesis, Definition and Formulation of Variables

In this section, one dependent variable and eight explanatory variables were considered and explained below in Table (1).

Dependent Variable

Loan repayment (LOA_REPM): It is a dummy variable that takes a value 1= if farmers repaid money that borrowed in the stated time and 0 = Otherwise

Independent Variables

The explanatory variables which are hypothesized to affect the above dependent variables were shown in the following Table (1).

Table 1 OPERATIONAL DEFINITION OF VARIABLES		
Dependent variable	Measurement	Hypothesis
Loan repayment(LOA_REPM)	Dummy (1= if farmers’ repaid money that borrowed in stated time and 0 = Otherwise)	
Independent variables		
Sex (SEX)	1 if male, 0 otherwise	+
Experience of loan use(EPB)	Dummy (0= NO, 1= Yes)	+
Marital status (MRTS)	Dummy (0=single,1= Divorced,2= married)	-
Number of livestock (NLIVE)	Continuous(TLU)	+
Saving habit (SAH)	Dummy (0= NO, 1= Yes)	
Annual income (ANNI)	Continuous (birr)	+
Follow up & supervision (FS)	Dummy(0= No, 1= Yes)	+
Training on loan use (TRA)	Dummy(1= Yes, 0= otherwise)	+

RESULTS AND DISCUSSION

Results and Discussion from estimated Descriptive Survey findings,

Loan Repayment (LOA_REPM)

The field survey results in Table (2) show that 47.1 percent of respondents are defaulters whereas 52.6 percent of them are non-defaulters members of the credit institute. Sex of the borrower (SEX): The results show that 43.2% and 56.8% were female and male defaulters relatively, whereas 38.7% and 61.2% were female and male non-defaulters respectively. The result reveals that majority of defaulters were males. Chi-square tests

showed that there is a statistically significant distinction between non-defaulter and defaulter households with regard to sex ($\chi^2 = 0.043$; $P < 0.05$). This implies that the sex of the borrower had a distinct effect on loan repayment in the study area.

Marital Status Of Borrower (MRTS)

Concerning the marital status, 15.9 percent of the respondents were individual with defaulters. 10.2 percent of the respondents were single with non-defaulters. 81.8 percent of the respondents were married and defaulters whereas 71.4 percent of the respondents were married and non-defaulters. 2.3 percent divorced with defaulter and 18.4 percent is divorced with non-defaulters' respondents respectively. The result reveals that the majority of defaulters were married in the study area. The Chi-square test indicated that there is a statistically significant difference between non-defaulter and defaulter households with regard to marital status ($\chi^2 = 0.039$; $P < 0.05$) level of probability. This implies that the marital status of borrowers had a distinct effect on loan repayment in the study area.

Saving Habit Of The Borrower (SAH)

The results of the survey show that 45.4 percent of respondent were defaulters with no saving habit but 54.5 percent of respondents were defaulter with saving habit whereas 40.8 percent of respondents were non-defaulter with no saving habit and 59.2 percent were non-defaulter with good saving habit respectively. More of the respondents were non-defaulter with having good saving habit in the study area. The Chi-square test showed that saving habit of borrower had the same result on defaulter and non-defaulter categories at 68 percent. Training on loan use (TRA):The survey result indicated that the majority of the defaulters (63.6 percent) and non-defaulters (85.7 percent) borrower were trained on loan use whereas 36.3% were not trained before the loan disbursement in the study area. Chi-square test indicated that there is a statistically significant difference between non-defaulter and defaulter households with regard to having training on loan use ($\chi^2 = 0.017$; $P < 0.05$).

Borrowers characteristics by Dummy variable							
Borrowers Characteristic	Category	Defaulter (N=44)		Non defaulter		X2-value	Total
		No	Percent	No	Percent		
Sex	Female	19	43.2	19	38.7	0.043	55
	Male	25	56.8	30	61.2		
Marital status	Single	7	15.9	5	10.2	0.039	12
	Divorced	1	2.3	9	18.4		
	Married	36	81.8	35	71.4		
Saving habit	No	20	45.4	20	40.8	0.68	40
	Yes	24	54.5	29	59.2		
Training on loan use	No	16	36.3	7	14.3	0.017	23
	Yes	28	63.6	42	85.7		
Follow up & Supervision	No	2	4.5	2	4.1	1	4
	Yes	42	95.4	47	95.9		
Experience in loan use	No	29	65.9	21	42.8		50

	Yes	15	34	28	57.1	0.037	43
	OCSSCO	26	59	23	46.9		49
Source of loan	Cooperative	18	40.9	26	53.1	0.269	44
Borrowers characteristics by Continuous variable							
Borrowers Characteristic		Mean	St.dev	Mean	St.dev.	t-value	Total
Number of livestock household have in TLU		2.53	1.34	4.35	3.25	0.0043	
Annual income of household in Birr		1240.9	987.34	2415.6	1564.4	0.976	

Experience of loan use (EPB): The survey result showed that about 65.9 percent of respondents had no experience of loan use whereas 57.1 percent of respondents had experience of loan use in the study area. The experience of loan use among defaulters was significantly higher than that of non-defaulters. Chi-square test indicated that there is a statistically significant difference between non-defaulter and defaulter households with regard to having experience in loan use ($\chi^2 = 0.037$; $P < 0.05$).

The number of livestock holding and Annual Income of borrower: The survey result indicated that non-defaulters had relatively large units of livestock. The average livestock units were found to be 4.35 and 2.53 TLU for non-defaulters and defaulters respectively. The t-test indicated that there is a significant difference between these two means at 1 percent level of significance. The average annual income of the defaulters and non-defaulters was 1240.9 birr, and 2415.6 birr respectively.

Results and Discussion from the Estimated Logit Model

A binary logit model was employed to estimate the effects of the hypothesized explanatory variables on the loan repayment of smallholder farmer's credit beneficiaries' from Oromia Credit and Saving share company (OCSSCO) and Cooperatives. Before running the logistic regression analysis both the continuous and discrete explanatory variables were checked for the existence of multicollinearity or a high degree of association using variance inflation factor (VIF) and contingency coefficients respectively.

The VIF values for continuous variables were found to be very small (much less than 10) indicating the absence of multicollinearity between them. Likewise, the results of the computation of contingency coefficients reveal that there was no serious problem of association among discrete variables. For this reason, all of the explanatory variables were included in the final analysis. More specifically, two continuous and six discrete explanatory variables were used to estimate the logit model. Table (3) shows the logit model results for analyzing the factors influencing the loan repayment by smallholder farmers in the toke Kutaye district. The overall goodness-of-fit measured by the significance of the Chi-Square statistic in the Omnibus test of model coefficients is high ($\chi^2=54.2$, significant at 1% level). Out of the eight variables hypothesized to influence loan repayment of rural borrowers, The result of the logistic regression model shows that sex, marital status, follow-up & supervision, annual income, and the number of livestock were important factors influencing the loan repayment of smallholder farmers in the study area. The results of the model estimated were interpreted in relation to each of the statistically significant variables:

Sex of borrower (SEX): The study revealed that the coefficient of the sex of respondents is positive hence an indication that the sex of respondents weakly and positively affects loan repayment of smallholder farmers in the study area. Thus, the study concludes that the sex of respondents positively influences loan repayment hence a major determinant of loan

repayment by Oromia credit and saving institute. The odd ratio favoring that probability of being male respondents was increased loan non-defaulter by 66.87.

Marital status (MRTS): These variables influence the loan repayment positively and weakly. Other things being constant, the odd ratio in favor of non-defaulting increases by a factor of 13.05 as the borrowers were married. It is assumed that married households can handle and manage their overall livelihood better than households that are single (unmarried) and Divorced, which enabled them to produce more and generate more income. Therefore, married households repay their loan more actively than unmarried and Divorced households.

Follow up and supervision (FS): It is positively and strongly affected loan repayment of smallholder farmers. As the result indicated follow-up and supervision given by Oromia credit and saving institute and cooperative borrowers increases, the odd ratio favoring that probability of loan non-defaulter increased by 277.2.

Annual Income (ANNI): The researcher hypothesized that there is a significant association between income and loan repayment of borrowers and it is found to influence positively and significantly the borrower's loan repayment at 1 percent significance level. If other variables held constant as the annual income of borrowers increased, the probability of borrower's loan non-defaulting increased by 1.001.

The number of livestock holding (NLIVE): This variable influenced the loan repayment performance of the respondent households positively and significantly at 1 percent significant level. Other things being kept constant, the odd ratio in favor of non-defaulting increases by a factor of 2.058 as the number of livestock increases by one in the Tropical livestock unit (TLU). Farmers who owned more livestock can repay their loans even when their crops fail due to natural disasters. In addition, as a proxy to oxen ownership, the result suggests that farmers who have a larger number of livestock have a sufficient number of oxen to plough their field timely and as a result obtain high yield and income to repay loans. This result is consistent with the study result of (Belay, 1998: Jemal, 2003: Worku, 2008), (Mohammad, 2009 cited in Kebede, 2010), which states that having a larger number of livestock is positively related to loan repayment performance shown in Table (3).

Variable	Coefficient	Std. dev	P - value	Odd ratio
Constant	-17.76	6.834	0.009	1.933
SEX	4.202*	2.52	0.095	66.87
MRTS	2.569*	1.466	0.08	13.05
SAV	-2.707	2.452	0.27	0.066
TRA	-1.383	2.131	0.516	0.25
FS	5.625*	3.071	0.067	277.2
ANNI	0.0011**	0.005	0.04	1.0011
NLIVE	0.722**	0.263	0.006	2.058
EPB	2.489	2.703	0.357	12.054
Log likelihood = -12.12				
Prob > chi2 = 0.000				
No of Observation = 93, Pseudo R2 = 0.541				
LR ratio chi(8) = 104.42				

CONCLUSIONS

One of the main problems of the institution is the high rate of defaulting of loans. This study was intended to identify the factors influence loan repayment of smallholder farmers. A purposive sampling technique was employed to select a total of 93 sample borrowers were borrowed from OCSSCO (49) and Cooperatives (44). The survey results show that 49(52.7%) of the borrowers were non-defaulters, whereas the rest 44 (47.3 %) were defaulters. The result of the logit model shows that among eight explanatory variables, which were hypothesized to influence smallholder farmer loan repayment performance, five were statistically significant while the remaining were less powerful in explaining the variation in the dependent variable. The significant variables include sex, marital status, follow up & supervision, annual income, and the number of livestock in the Toke Kutaye district. This research just concentrates on the borrowers' sex, marital status, follow up & supervision, annual income, the experience of loan use, training on loan use, saving habit, and number of livestock holding but many other factors can affect Toke Kutaye district, banks repayment performance on their loan. An extended research to other factors affecting loan repayment in Toke Kutaye district's banks must be conducted.

Acknowledgements

I wish to express my sincere thanks to all organizations and persons for your full cooperation in providing necessary data and information in the whole research process.

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