Factors Affecting Loan Repayment Performance of Smallholder Farmers in Ethiopia

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Abstract: Farm credit has been described as one of the pre-requisites for farmers to increase the agricultural production. However, the majority of Ethiopian population comprises small farmers, who cannot implement a technology without credit. Even though, there are attempts to solve these rural financial difficulties by government being collateral and extending microfinance institution, associated to different factors, a number of farmers are becoming defaulters and the lending institution faces a problem. This study focused on the analysis of factors affecting loan repayment performance of farmers in Simada District, South Gondor Zone and Amhara Regional State. In this study primary data collected from 150 randomly selected borrowers using structured questionnaire. Descriptive statistics such as mean, standard deviation, maximum, minimum and percentages were used to describe socio-economic and institutional characteristics of the respondents. The t-test and Chi-square test statistics were employed to compare defaulter and non-defaulter groups with respect to some explanatory variables. Finally, a Tobit regression model was employed to identify factors affecting loan repayment and intensity of loan recovery among smallholder farmer. Variance inflation factor and coefficient of contingency were calculated to detect multicollinearity and association among the continuous and discrete variables, respectively. A total of 14 explanatory variables were included in the empirical model and out of these, 8 were found to be statistically significant. Education level, Land holding size, total livestock holding, non farm income, expenditure on social festivals, number of years of experience in agricultural extension services, saving habit and source of credits were highly important in influencing loan repayment performance as evidenced by the model statistic. Therefore, the study suggests that improving the livestock sector, educating households, giving attention in promoting non-farm activities and saving habit, minimize traditional ceremonies are some of the important priority areas for the success of future intervention strategies aimed at the promotion technological transformation, increasing production and to minimize loan defaults..

Keywords: Loan Repayment, Defaulter, Non Defaulter, Descriptive Statistics, Tobit Model

1. Introduction

Many financial institutions in Ethiopia provide financial services such as saving and credit to aid several smallholder farmers. This is an effort in line with the "Millennium development goals" which seeks to reduce poverty by 50% by the year 2015. However, the sustainability and continuity of the financial institutions to increase the volume of credit to stimulate the poverty reduction goal depends on threats allow the institutions to lower the interest rates and processing costs and consequently increase patronage of loans. High repayment rates reduce the subsidy- dependence of the credit institutions to help them reach a better sustainability level. Repayment performance thus serves as a positive signal for increasing the volume of credit availability to various sectors of the economy. However, the financial institutions continue to decline credit to the agricultural and fisheries sectors. This decline is partly due to poor loan repayment performance from these sectors [1].

Various empirical studies have concluded that without the development and adoption of new agricultural technologies and the use of credit facilities, it is impossible to expand rapid growth of agricultural productivity. However, with the

introduction of new production technologies, the financial needs of farmers increase manifold. Steady agricultural development depends up on the continuous increase in farm investment. Most of the time, large investment cannot be made by the farmers out of their own funds because of their low level of incomes. Thus, here comes the importance and significance of the availability of rural credits to bridge the gap between owned and required capital [1]. Agricultural lending involves giving out of credit (in cash and kind) to small scale farmers for the purpose of 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 [2].

Loan default problem has been a tragedy as it leads to a system failure to implement appropriate lending strategies and credible credit policies. In addition, it discourages the financial institutions from refinancing the defaulting members, which put the defaulters once again into vicious circle of low productivity. According to annual report of the Simada District Cooperative Promotion Office an amount of birr 15,250,146 was disbursed in the year 2011/12 up to 2013/14 from this 9,895,750 (64.88%) birr is the net amount which is not collected within the year [3]. So, ACSI-Simada branch, an amount of birr 5650750.3 was disbursed in the year 2011/12 up to 2013/14 from this 1956765 (34.7%) birr is the net amount which is not collected within the year [4]. Therefore, this study will be undertaken to analyze factors affecting loan repayment performance of stallholder farmers and default and non-default rates which are associated with different loan characteristics as well as personal and socio-economic characteristics of farm households. In addition to these, factors affecting loan repayment performance of smallholder farmers even in the good harvesting years are not yet studied in the study area. Therefore, this study initiated with the main objective of analyzing factors of loan repayment performance of smallholder farmers in Simada District. This would try to fill the knowledge and information gaps in expanding viable and sound credit facilities to transform smallholder farmers. The main objective of this study is to analyze the extent of loan repayment and factors that affecting credit repayment performance of smallholder farmers in Simada District, South Gondor Zone, Amhara Region.

Specifically the study intends to: describe the rate of repayment of farmers from different lending institutions, determine the extent of default in the repayment of loan offered to smallholder farmers and identify socio-economic and institutional factors affecting loan repayment performance of smallholder farmers.

2. Research Methodology

2.1. Description of the Study Area

The study would be conducted in Simada District. It is found in South Gondar Zone at Amhara National Regional State. It is situated 774 km north of Addis Ababa and 209 km southeast of Bahir Dar [5].
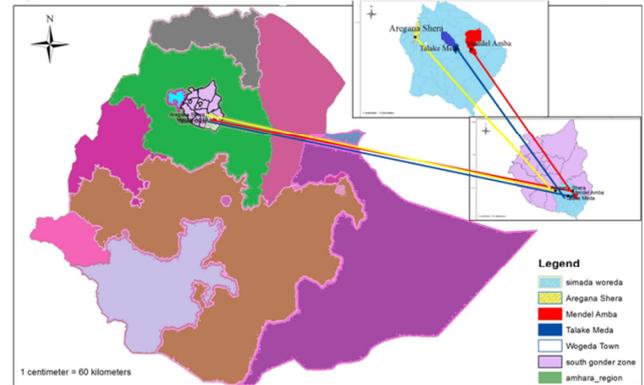

Figure 1. Map of Simada District.

2.2. Methods of Data Collection

The data for this study were collected from both primary and secondary sources. Primary data was collected from samples of the respondents. The data collected through a questionnaire survey includes the following. borrower's characteristics such as age, sex, level of education, family labor, land size, livestock ownership, extension contact and non-farm income, distance from credit source and market center, social festival during loan period, sources of credit, saving habit, loan utilization and implementation of the institution, marketability of products/services and technical capability, data on source of income for loan repayment and borrower's attitude towards default risk, borrower's opinion about the lending procedure of the cooperatives and ACSI, its supervision and actions being taken in case of default, measures taken on the side of borrowers and the institution to improve the repayment status and its outcome.

Secondary data were obtained from Cooperatives, ACSI and Kebele administrative office like: loan size, number of beneficiaries, proportion of female members, the degree of economic diversification as proxied by number of economic activities, number of members in a cooperative, repayment period, interest rate and purpose of borrowing.

2.3. Sampling Procedure and Sample Size Determination

A multi-stage random sampling method was used to select the sample respondents. In the first stage, Simada District would be purposively selected. Then, from 39 administrative kebele, 15 primary cooperatives and one ACSI Simada branch office found, three kebele administrations in the District were selected randomly. A sampling frame from the list of borrowers in the selected kebeles were obtained and stratified into borrowers from Cooperatives and ACSI. Appropriate sample size was determined from the total number of borrowers using the formula [6].

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

Where, $n =$ sample size, $N =$ Size of population (borrowers) $e =$ desired significance level

On average 191 borrowers from each kebele and 7% desired

significance level; the appropriate sample size was 150 households by using probability sampling size techniques.

2.4. Methods of Data Analysis

In this study, both descriptive and econometric methods were used to analyzing the data from farmers.

2.4.1. Descriptive Analysis

Descriptive statistics is one of the techniques, which were used to summarize data, collected from the respondents. By applying descriptive statistics such as, percentages, mean, standard deviation, maximum and minimum, one can compare and contrast different categories of sample households with respect to the desired characters to draw some important conclusions. In addition, t-test and Chi-square test statistics were employed to compare defaulter and non-defaulter groups with respect to some explanatory variables.

2.4.2. Econometric Analysis

In this study the value of the dependent variable is repayment ratio that has been computed as the ratio of amount of loan repaid to the total amount borrowed from formal sources of credit. Thus, the value of the dependent variable ranges between 0 and 1 and a Tobit model has been chosen as a more appropriate econometric model.

Mathematically, the Tobit model specification is given as follows:

$$Y^* = X_i \beta_i + U_i \quad i = 1, 2 \ldots n \quad Y_i = Y_i^* \text{ if } Y_i^* > 0$$

$Y_i = 0$ if $Y_i^* \le 0$ Where, Y_i is the observed dependent variable, in our case the percentage of loan paid by the borrowers from borrowed. Y_i^* represents the latent variable which is not observable X_i is explanatory variables, β_i is Vector of unknown parameters and U_i represents residuals that are independently and normally distributed with mean zero and a common variance and $i = 1, 2 \ldots n$ (n is the number of observations).

Note that the threshold value in the above model is zero. This is not a very restrictive assumption, because the threshold value can be set to zero or assumed to be other value [7]. The Tobit Model shown above is also called a Censored Regression Model because it is possible to view the problem one where observations of Y_i^* at or below zero are censored [8, 7].

The model parameters are estimated by maximizing the Tobit Likelihood Function of the following form [9].

$$L = \prod_{Y^*_i > 0} \frac{1}{\sigma} f\left(\frac{Y_i - \beta_i \chi_i}{\sigma}\right) \prod_{Y^*_i \le 0} F\left(\frac{-\beta_i \chi_i}{\sigma}\right)$$

Where, f and F are the density probability function and cumulative distribution function of Y_i^*, respectively. $\prod_{Y^*_i > 0}$ Means that the product over those i for which $Y_i^* > 0$, $\prod_{Y^*_i > 0}$ means the product over those i for which $Y_i^* \le 0$

The Tobit coefficients do not directly give the marginal effects of the associated independent variables on the dependent variable. But their signs show the direction of change in probability of being non-defaulter and marginal intensity of loan recovery as the respective explanatory variable change [10, 11, 9].

The Tobit model has an advantage in that its coefficients can be farther disaggregated to determine the effect of a change in the ith variable on changes in the probability of being non defaulter [12] as follows:

1. The change in the probability of repaying the loan as an independent variable X_i changes is:

$$\frac{\partial f(z)}{\partial \chi_i} = f(z)\frac{\beta_i}{\sigma}$$

Where: $\frac{\beta_i \chi_i}{\sigma}$ is donated by the Z-score for the area under normal curve.

2. The marginal effect of an explanatory variable on the expected value of the dependent variable is:

$$\frac{\partial E(Y_i)}{\partial X_i} = F(Z)\beta_i$$

3. The change in the intensity of loan repaid with respect to a change in an explanatory variable among non defaulter is:

$$\frac{\partial E(Y_i / Y^* > 0)}{\partial X_i} = \beta_i \left[1 - Z\frac{f(z)}{F(Z)} - \left(\frac{f(z)}{F(Z)}\right)^2\right]$$

where, F (z) is the cumulative normal distribution of z, f (z) is the value of the derivative of the normal curve at a given point (i.e., unit normal density), z is the z-score for the area under normal curve, βi is a vector of Tobit maximum likelihood estimates and σ is the standard deviation of the error term.

2.5. Definition of Variables and Working Hypothesis

Table 1. Description of Dependent and Independent variable used in Tobit Model.

Variable	Description	Types	Measurement Values	Expected Sine
CREDITREP	Credit repayment (Dependent)	Continuous	Ratio of total amount credit repaid to total amount due	
AGE	Age of HHs head	Continuous	Number of years	Positive /Negative/
EDUC	Education of household head	Continuous	Number of year of schooling	Positive
LNAMNT	Loan amount	Continuous	Amount of borrowed (Birr)	Negative
LAND	Size of cultivated land	Continuous	Cultivated land in hectares	Positive
FAMLYSIZE	Family size	Continuous	Man equivalent	Positive
LIVSTOCKO	No of livestock unit	Continuous	TLU	Positive
NONFARM	Income from non-farm activities	Continuous	Income in Birr	Positive

Variable	Description	Types	Measurement Values	Expected Sine
EXPSC	Expenditure in social ceremony	Continuous	Expenditure in Birr	Negative
EXTSER	Extension service	Continuous	Number of years	Positive
RAODDIST	Road distance	Continuous	Kilometer	Nearness /positive/
SEX	Sex of the household head	Dummy	1=male, 0=female	Positive
SAVING	Saving habit of house holds	Dummy	1=Yes, 0=No	Positive
BORWPURP	Borrowing purpose	Dummy	1=productive, 0=non productive	Positive
CRDTSRCE	Source of credit	Dummy	1=cooperatives, 0=ACSI	Positive /Negative/

3. Results and Discussion

3.1. Demographic Characteristics & Loan Repayment Performance of the Sample Households

Age of the respondents: The average age of household heads was 44.06 years with the minimum and maximum ages of 28 and 62 years, respectively (Table 2). The average age of non-defaulter household heads was 48.98 years, while that of defaulters was 41.13 years with mean difference significant at 1% level. This implies that the more age that the non-defaulters have, the better accumulation of wealth which enable them to repay their debt in time than defaulters.

***Table 2.** Descriptive statistics of age of the head by repayment status of sample households.*

Age	Non defaulter (56)	Defaulter (94)	Total (150)	t-value
Mean	48.98	41.13	44.06	5.72***
SD	8.08	8.15	8.95	
Minimum	30	28	28	
Maximum	62	60	62	

*** Significant at 1% probability level.
Source: Own survey result (2015).

Sex of household head: The sample was composed of both male and female-headed households. Of the total sample household heads, 64.7 percent were male household heads and 35.3 percent were female household heads. About 37.2 percent and 62.8 percent of the defaulters were female and male-headed households, respectively, while 32 percent and 68 percent of the non-defaulters were female and male-headed households, respectively. The mean differences in terms of sex between the two groups were not statistically significant

***Table 3.** Distribution of household head sex by repayment status.*

Sex	Non-defaulter (56)		Defaulter (94)		Total (150)		x^2
	№	%	№	%	№	%	
Female	18	32	35	37.2	53	35.3	0.398***
Male	38	68	59	62.8	97	64.7	
Total	56	100	94	100	150	100	

***Significant at 1% probability level.
Source: Own survey result (2015).

Family size of respondent's: Family size of the sample respondents ranged from 2 up to 11 persons, with an average family size of 5.1. The average family size in the sample was higher than the average family size of the region's average family size 4.3 persons [13]. The average family size of the non-defaulters and defaulters was 6.08 and 4.52, respectively. Therefore, family size between the two groups was statistically significant at 1 percent (Table 4). The average number of active labor force (man-equivalent) for the whole sample, non-defaulters and defaulters was 3.23, 4.62 and 2.39, respectively. This also shows that the difference between non-defaulters and defaulters regarding active labor was statistically significant at 5 percent. If this result is compared with the average family size (5.1), on average 73% of the family members are actively engaged in an economic activity. The larger the family members, the more the labor force available for production purpose. Therefore, there is a possibility to have more alternative sources of income to overcome credit risks.

***Table 4.** Characteristics of the sample households by family size.*

Characteristics	Non-defaulter (56)		Defaulter (94)		Total (150)		t-value
	Mean	SD	Mean	SD	Mean	SD	
Family size (Number)	6.08	2.2	4.52	1.63	5.1	2.01	4.97***
Active labor (Number)	4.62	1.46	2.39	1.14	3.23	1.65	10.14**
Dependent labor (Number)	3.21	1.26	3.71	1.51	3.39	1.37	2.18**

***, **, Significant at 1% and 5% probability level respectively.
Source: Own survey result (2015).

Household head educational status: The survey results showed that the average educational status of household heads was 2.24 grades with the minimum and maximum grade of 0 and 10 respectively (Table 5). The average level of grade of non-defaulter household heads was 3, while that of defaulters was 1.79 grades with mean difference significant at 1% level of probability. This result indicates that the non-defaulter have more education level than defaulters, which enable them to be exposure to external environment, to acquainted with agricultural technologies, too frequently meet DA's, get written agricultural materials and more aware of the importance of loan and hence these reduced default.

Table 5. *Distribution of educational status of the head by repayment status.*

Education status (grades)	Non-defaulter (56)	Defaulter (96)	Total (150)	t-value
Mean	3	1.79	2.24	3.03***
SD	2.95	1.97	2.44	
Minimum	0	0	0	
Maximum	10	6	10	

*** Significant at 1% probability level.
Source: Own survey result (2015).

3.2. Socio- Economic Characteristics & Loan Repayment Performance

Land ownership: Land is the basic asset of farmers. The average size of own cultivated land was nearly 1.14 ha, the minimum and the maximum being 0.25 and 2 ha, respectively (Table 6). Non defaulters cultivated on average larger area of land (1.33 ha) than defaulters (1.03 ha). The mean difference between the land holding by non-defaulters and defaulters was statistically significant at 1% level of probability level. This indicates that non- defaulters have large farm size as compared to defaulter, and that enable to get more out put which helped them repaid their loan, being other factors, *ceteris paribus*.

Table 6. *Descriptive statistics of farm size (in hectar) by repayment status.*

Farm size (hectare)	Non-defaulter (56)	Defaulter (94)	Total (150)	t-value
Mean	1.33	1.03	1.14	5.35***
SD	0.278	0.352	0.356	
Minimum	0.5	0.25	0.25	
Maximum	2	2	2	

***Significant at 1% probability level.
Source: Own survey result (2015).

Livestock holding: The sample households in the study area on average owned 1.79 TLU, with a minimum of 0 and a maximum of 5.3 TLU. The mean TLU of the non-defaulter and defaulter households was 2.93 and 1.11, respectively. The survey result demonstrated that the mean difference between the livestock holding by non-defaulters and defaulters was statistically significant at 1% level of probability (Table 7). The implication is that livestock is an important asset for farmers not only to perform farm activities such as draught power, to generate income, to secure food and to cover different social, economic and legal expense, but also contribute to secure cash to pay debts.

Table 7. *Descriptive statistics of livestock holding (in TLU) by repayment status.*

Livestock (TLU)	Non-defaulter (56)	Defaulter (94)	Total (150)	t-value
Mean	2.93	1.11	1.79	12.3***
SD	1.09	0.72	1.24	
Minimum	1	0	0	
Maximum	5.3	2.8	5.3	

***Significant at 1% probability level.
Source: Own survey result (2015).

Off-farm income: The income generated from off-farm activity ranges from Birr 100 to a maximum of Birr 2500. The mean annual off-farm income of sample households was found to be Birr 521.97. All sample household heads reported that at least one of their family members was engaged in off-farm activities, which helped them to earn additional income. On average, the defaulters earned 293.1 Birr/year from off-farm income sources while the non-defaulter earned 906.16 Birr/year. There was much difference in mean annual off-farm income between the defaulter and non-defaulter households. It was found that there is a statistically significant mean difference at 1% probability level (Table 8). The implication is that non-defaulters have better opportunities to generated income from off-farm activities and which resulted reducing default.

Table 8. *Descriptive statistics of off-farm income by repayment status.*

Off-farm income (Birr)	Non-defaulter (56)	Defaulter (94)	Total (150)	t-value
Mean	906.16	293.10	521.97	
SD	517.68	203.23	461.76	10.25***
Minimum	125	100	100	
Maximum	2500	1500	2500	

*** Significant at 1% probability level.
Source: Own survey result (2015).

Expenditure on social festivals: Expenditure on social festivals includes expenditure for social ceremonies such as wedding, circumcision, funeral of a family member or close relative and engagement. All of the respondents were celebrated one or more of the above occasional ceremonies during the study period. The minimum and maximum expenditures for such ceremonies were Birr 200 and Birr 10000, respectively. Average amount of money spent for social ceremonies, was Birr 1719.89 for the defaulters' group which was higher than the non-defaulters' group of Birr 434.8, with mean difference significant at 1% probability level (Table 9). This indicates that defaulter had relatively spent more of the above occasional ceremonies than non–defaulter and that expenditure on social festivals is negatively related to loan repayment performance.

Table 9. *Descriptive statistics of expenditure on social festivals by repayment status.*

Expenditure on social festivals (Birr)	Non-defaulter (56)	Defaulter (94)	Total (150)	t-value
Mean	434.8	1719.89	1240.13	8.5***
SD	244.42	895.6	529.3	
Minimum	200	250	200	
Maximum	1500	10000	10000	

*** Significant at 1% probability level.
Source: Own survey result (2015).

Purpose of borrowing and loan performance: The rural households usually borrow money for a wide range of purposes. About 79.1 percent and 20.9 percent of non-defaulters and defaulters respectively used the borrowed money for purchase of agricultural variable inputs (Table 10). The survey result demonstrated that the mean difference between the purpose of borrowing by non-defaulters and defaulters was statistically significant at 1% level of probability. The implication is that non-defaulter households used the loan for productive purpose instead of consuming it and generated more income which lead loan repaid.

Table 10. *Distribution of purpose of borrowing by repayment status.*

Purpose	Non-defaulter (56)		Defaulter (94)		Total (150)		x^2
	№	%	№	%	№	%	
Productive	53	79.1	14	20.9	67	44.7	90.3***
Non–productive	3	3.6	80	96.4	83	55.3	

*** Significant at 1% probability level.
Source: Own survey result (2015).

Saving habit of the household: Ability to save refers to the saving behavior of households for future use.

Accordingly, 67.85% of non-defaulters and 18.08% of the defaulters have saving their money. There is significant difference in saving behavior between defaulters and non-defaulters at 1% significance level (Table 11). The result implies that the more the amount of savings, the greater the capacity to repay credit.

Table 11. *Distribution of sample respondents by saving habit.*

Saving habit	Non-defaulter (56)		Defaulter (94)		Total (150)		x^2
	№	%	№	%	№	%	
Yes	38	67.85	17	18.08	55	36.7	37.43***
No	18	32.15	77	81.92	95	63.3	

***Significant at 1% probability level.
Source: Own survey result (2015).

3.3. Institutional Factors and Loan Performance of the Sample Households

Source of Credit: Farmers in the study area used credit mainly from two institutions (Amahara Credit and Saving Institution and Farmers' Multi Service Cooperatives). Out of the total 150 interviewed households 56 (37.3%) were non-defaulters, and the remaining 94 (62.7%) were defaulters. Among the non-defaulters, 21 (37.3%) were repaid only 50 percent of the total borrowed money. With regard to sources of credit (CRDTSRCE), out of the total respondents 56 percent, borrowed from Co-operatives and the rest 44 percent borrowed from ACSI. The performance of credit repayment varied with respect to sources of credit. Larger proportion of defaulter households (67.1 percent) borrowed from Cooperatives as compared to ACSI (32.9 percent). As the chi-square analysis showed that the difference between defaulter and non- defaulter in terms of source of credit was significant at 1% probability level (Table 12). This indicates that those households borrowed from ACSI were relatively non-defaulters than who had borrowed from Cooperatives. Since the formation of borrowers group, the use of group responsibility and peer monitoring in ACSI helped to reduced asymmetric information and increased group pressure to repay the loan.

Table 12. Distribution of source of credit by repayment status.

Source	Non-defaulter (56)		Defaulter (94)		Total (150)		x^2
	№	%	№	%	№	%	
ACSI	35	62.5	31	32.9	66	44	12.41***
Co-operative	21	37.5	63	67.1	84	56	

*** Significant at 1% probability level.
Source: Own survey result (2015).

Distance from main road: The distance in km that the beneficiaries traveled to get main road for accessing different services was assessed. In line with this, the average distance traveled by the respondents to the main road was about 2.68 km. On average, non-defaulters traveled about 2.57 km while the defaulters traveled on average about 2.76 km to reach the main road. The mean difference between the distances covered by non-defaulters and defaulters was not statistically significant (Table 13).

Table 13. Descriptive statistics of distance from main road (in km) by repayment status.

Distance from main road (km)	Non-defaulter (56)	Defaulter (94)	Total (150)	t-value
Mean	2.57	2.76	2.68	-0.88***
SD	1.21	1.26	1.23	
Minimum	1	1	1	
Maximum	5	7.2	7.2	

***Significant at 1% probability level.
Source: Own survey result (2015).

Amount of loan: The sample households on average borrowed Birr 3667.66. However, the loan size varied in accordance with the type of financial institution. The survey result also revealed that on average Birr 2161.39 was borrowed by non-defaulters and defaulter's borrowed Birr 4564.41. The mean difference between the two groups was significant at 1% level of significance. The loan is too small it is easy to repay such loans thus enhancing loan repayment performance (Table 14).

Table 14. Descriptive statistics of amount of loan by repayment status.

Amount of loan (Birr)	Non-defaulter (56)	Defaulter (94)	Total (150)	t-value
Mean	2161.39	4564.41	3667.66	10.28***
SD	1068	1540	1805.92	
Minimum	1000	1200	1000	
Maximum	7000	8000	8000	

*** Significant at 1% probability level.
Source: Own survey result (2015).

Experience in agricultural extension package: Experience in agricultural extension package varied among the sample borrowers from minimum of 0 year experience to a maximum of 14 years' experience. Non-defaulters participated on average for higher number of years 7.93 as compared to the defaulters who participated on average for 4.6 years (Table 15). The mean difference between the two groups was significant at 1% level of significance. That is, farmers experience in agricultural extension services has significant role in loan repayment performance.

Table 15. *Descriptive statistics of experience in agricultural extension package by repayment Status.*

Experience on extension package	Non-defaulter (56)	Defaulter (94)	Total (150)	t-value
Mean	7.93	4.6	5.84	9.97***
SD	2.72	1.36	2.55	
Minimum	3	0	0	
Maximum	14	8	14	

*** Significant at 1% probability level.
Source: Own survey result (2015).

3.4. Results of the Econometric Model

Factors of probability of being non-defaulter and intensity of loan recovery.

The estimated results of the Tobit model of the Maximum Likelihood and the marginal effects are shown in Table 16. A total of 14 explanatory variables were considered in the econometric model out of which 8 variables were found to significantly influence the probability of being non-defaulter and loan repayment performance among the smallholder farmers. These were education level of farmers, total land holding size of the family (hectare), total livestock holding (TLU), expenditure on social festivals, and number of years of experience in agricultural extension services, non-farm income, saving habit and source of credit. The remaining variables were found to have no significant effect on the loan recovery of smallholder farmers.

Education level (EDUC) is positively and (significantly at 5%) associated with loan repayment rate. This is in line with the expectation that educated borrowers are more efficient in resource allocation and are easily adaptable to changing situations. an increase in one year of schooling increases the probably of being non default by 3.2 percent (Table 16). On average an increase year of schooling in small scale farmers, increases the rate of loan repayment by 0.0307 for the entire sample and by 0.0459 among non-defaulters, *ceteris paribus* (Table 16).

The size of land holding in hectare (LANDH): was one of economic factors, which positively affected loan recovery of smallholder farmers (significant at 1% level). Each additional hectare of land holding increases the probability of being non-defaulter by 0.2 percent (Table 16). On average, each additional hectare of land holding of smallholder farmers increases the rate of loan repayment by 0.0561 for the entire sample and by 0.0802 among non-defaulters, *ceteris paribus* (Table 16). As more and more land is brought under cultivation, farm-income is expected to increase due to the increased output. Therefore, having larger size of land enhances a borrower's capacity to repay his/her loan timely.

Total livestock ownership (LIVSTOCKO): It has positively related to the dependent variable and significant at 5% probability level. Each additional TLU increases the probability being non-defaulter by 4.2 percent (Table 16). Also, for each additional unit of TLU the rate of loan repayment increases by 0.0149 among the whole borrowers and by 0.0361 among non- defaulters (Table 16). The implication is that livestock are sources of cash in rural Ethiopia and serve as security against crop failure. Farmers who owned more livestock are able to repay their loans even when their crops fail due to natural disaster. In addition, as a proxy to oxen ownership the result suggests that farmers who have larger number of livestock have sufficient number of oxen to plough their field timely and as a result obtain high yield and income to repay loans. Larger number of livestock is positively rela ted to loan repayment performance

Non-farm activities (NONFARM): Is another economic factor that was positively and significantly affected loan repayment performance of smallholder farmers (significant at 1%). This might be because of non-farm activities were additional sources of income for smallholders and the cash generated from these activities could back up the farmers' income to settle their debt even during bad harvesting seasons and when repayment period coincides with low agricultural prices. One additional birr of Non-farm income increases probability of being non-defaulter by 0.8 percent (Table 16) and on average increases the rate of loan repayment by 0.0045 for the entire respondents and by 0.0305 among non defaulters (Table 16).

Expenditure on social festivals (EXPSC): is another important social factor, which was found to negatively affect the probability of being non-defaulter at 1% level of significance. Each additional birr of expenditure on social festivals decrease the probability of being non-defaulter by 0.1 percent (Table 16). Each additional birr of expenditure on social festivals decrease the rate of repayment (repayment ratio) by 0.0240 for the entire sample and by 0.0701 for non-defaulters, *ceteris paribus* (Table 16). This implies that farmers with more expenditure on social festivals were unable to repay their loan than those who had less or no expenses at all. The reason for this is that such expenses are more than the normal economic stand of the borrower. These are expenditure (in Birr) on celebration such as weddings, funerals, engagements, circumcisions etc. over one year period. Occasionally, such expenses are more than the normal economic stand of the borrower. As this variable can be alternative for use of income for non-productive purposes, it was a negative impact on loan repayment performance of the farmers.

Saving habit (SAVING): Saving behavior of the household influenced the loan repayment performance positively and significantly (significant at 5%). Household respondents who developed saving habit increases the probability of being non-defaulter by 2.9 percent (Table 14) and also increase loan repayment performance by 0.0177 and 0.1169 factors among the entire respondents and non-complete defaulters respectively (Table 16) and This implies that households who save their money gave more emphasis to credit repayment

and settle their debt timely than households who do not save and also the more the amount of savings, the greater the capacity to repay credit.

Experience in agricultural extension services (EXPSER): This variable representing institutional factor have strongly influenced smallholder farmer's loan recovery. This was positively related to the dependent variable at 5% level of significance. Each additional year of agriculture extension package experience increases the probability of being non-defaulter by 1.4 percent (Table 16). On average, one year additional experience in the extension package increases rate of loan repayment by 0.0027 among the whole respondents and by 0.0255 among non-complete defaulters, *ceteris paribus* (Table 16). This implies that experienced farmers in extension programs have developed their credit utilization and management skills that helped them to pay loans timely. In addition, as a result of their participation in extension for a number of years, these farmers are the beneficiary of the use of improved agricultural technologies that would increase their income generating capacity and these repay loans timely.

Source of credit (CRDTSRCE): The probability of being non-defaulter and the degree of loan recovery were also positively and significantly influenced by the source of credit. The formation of borrowers group, the use of group responsibility and peer monitoring are the core principles guiding financial transactions of Amhara Credit and Saving Institute. In-group lending programs, the functions of screening, monitoring, and enforcement of repayment are largely transferred from the lender to the borrowers group members. Therefore, group lending might be the reason for better repayment performance of borrowers from ACSI than that of Cooperatives. Being a borrower from ACSI increases the probability of being non-defaulter by 2.1 percent (Table 16). Similarly, it increases loan repayment rate by 0.0312 for the entire sample and by 0.0911 among non-complete defaulters (Table 16).

Table 16. *Maximum Likelihood Estimates of the Tobit Model and the Effects of explanatory variables on Probability of being Non-defaulter.*

Variable	Coefficient	Robust Std. Err	Z-ratio	P>|t|	Total Chang $\frac{\partial E(Y_i)}{\partial X_i}$
AGE	-0.0021	0.0078	-0.27	0.788	-0.0011
SEX	0.0481	0.0812	0.59	0.555	0.0101
EDUC	0.0425	0.0197	2.16**	0.032	0.0307
LNAMNT	0.0805	0.1553	0.52	0.605	0.0011
BORWPURP	-0.0911	0.1020	-0.89	0.373	-0.0181
LAND	0.0017	0.0005	3.40***	0.002	0.0561
FAMLYSIZE	0.0003	0.0002	1.51	0.117	0.0071
LIVSTOCKO	0.0361	0.0175	2.06**	0.042	0.0149
SAVING	0.0431	0.0189	2.28**	0.029	0.0177
NONFARM	0.0043	0.0016	2.68***	0.008	0.0045
EXPSC	-0.0058	0.0013	-4.46***	0.001	-0.0240
EXTSER	0.0375	0.0150	2.50**	0.014	0.0027
RAODDIST	-0.0701	0.0470	-1.49	0.138	-0.0002
CRDTSRCE	0.0300	0.0129	2.32**	0.021	0.0312
-constant	-0.1320	0.4890	-0.27	0.229	

Sample size 150.
F (14,135) 32.
Probability>F 0.0000.
Peusedo-R square 0.25.
Likelihood ratio -24.1235.
***, ** Represent level of significance at 1% and 5%, respectively.
Source: own economic model result (2015).

4. Conclusions and Recommendations

4.1. Conclusion

The result of the econometric model showed that, educated borrower were relatively non defaulter. which enable them to be exposure to external environment, to acquainted with agricultural technologies, too frequently meet DA's, get written agricultural materials and more aware of the importance of loan.

Farmers who had taken loan from Amhara Credit and Saving Institute (ACSI) were relatively non-defaulters than who had borrowed from Cooperatives. The formation of borrowers group, the use of group responsibility and peer monitoring are the principles guiding financial transaction of ACSI. Loan extended to groups rather than individuals have high repayment rates due to many reasons. First, loans extended to groups reduce the information asymmetry between the lender and the borrower. Thus, adverse selection and moral hazard problems are reduced in such cases. Secondly, the joint liability mechanism in-group lending means group pressure on members to repay loans timely would increase the repayment rate.

Land size affected loan repayment performance positively and significantly. This is due to the fact that those borrowers with larger land size earn more income from agricultural

activities, which in turn helps them in loan repayment.

Number of years of experience in agricultural extension services is a factor, which was positively related to the dependent variable. This might because of the fact that those farmers that have participated in the extension package have developed the skills of using new agricultural technologies that would increase their income. This ultimately improves the loan repayment performance of the farmers. In addition, those farmers that are regular participants in the extension package are aware of the consequences of loan default on the availability of credit for the next production season and are likely to make conscious decision to repay loan timely.

Celebration of social ceremonies had a significant negative impact on loan repayment performance. The reason is that celebration of one or more of social ceremonies need much material and financial resources, which are beyond what the borrowers could afford and aggravated them being defaulters.

The finding of this study also revealed that, livestock are important farm assets that improve the farmers' repayment performance; higher total household wealth in form of livestock would increase significantly the repayment performance of farmers since livestock can be easily liquidated into money. The higher the number of livestock owned, the more the probability of being non-defaulter and vice versa.

Non-farm activities are an economic factor that was positively and significantly affected loan repayment performance of smallholder farmers. The reason is that non-farm activities were additional sources of income for smallholders and the cash generated from these activities could back up the farmers' income to settle their debt even during bad harvesting seasons and when repayment period coincides with low agricultural prices.

4.2. Recommendations

The study revealed that education level of a household head positively and significantly influenced loan repayment rate. This clearly indicates that for effective utilization of resources, improved technologies, enhancing the educational status of farmers, training and the expansion of farmers training center should be given due attention.

Occasionally celebrated social ceremonies needed a great deal of investment which was beyond what farmers could afford and are found to be one of the major causes of being defaulters. Therefore, elders, community leaders, local associations (iddirs), religious organizations and concerned government bodies should strive to minimize these traditional ceremonies and alleviate the associated expenditure through time.

Livestock production is a very important source of livelihood and cash requirement in the rural areas. Therefore, due attention should be given for scientific livestock management system which is salient to improve the welfare of rural household. Hence, effort should be made to improve livestock's' genetics, provide appropriate nutrition, and monitor their health to boost their productivity.

The results also showed that, farmers engaged in non-farm activities earn more income and able to settled their debts timely and can also pay down payment to purchase inputs. This shows that, rural development strategies should not only emphasis on increasing agricultural production but concomitant attention should also be given to promoting non-farm activities in the rural areas.

The provision of formal credit schemes in the area should focus on group lending, as it would increase the likelihood of loan repayment by group members. Particularly, co-operatives should shared experience on the formation of borrowers group, the use of group responsibility and peer monitoring principles guiding financial transaction from ACSI.

Both saving habit and credit facilitation are an integral part of economic development, which engages people in economic activities that enhance self-reliance. Savings and credit scheme increases the productive potential of poor farmers particularly. Saving and Credit facilitation through cooperatives and ACSI (Amhara Credit and Saving Institution) plays a crucial role in agricultural production in countries like Ethiopia if managed in a proper way.

Acknowledgements

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