

Research article

# **Determinants of Loan Repayment Performance of Smallholder Farmers: The Case of Kalu District, South Wollo Zone, Amhara National Regional State, Ethiopia**

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## **ABSTRACT**

In this study to compare defaulters and non-defaulters in terms of different explanatory variables and determine the extent of default in the repayment of loan offered to smallholder farmers in the study area were assessed. Smallholder farmers require improved agricultural technologies, knowledge and inputs such as fertilizer, improved seeds, pesticides and others that help to increase production and productivity thereby transforming their farm structure and capacity. Large investment cannot be made by the farmers out of their own funds because of their low level of incomes. Even though there are attempts to solve these rural financial difficulties by the government through extending rural financial institutions, because of social, economic and institutional factors, a number of farmers turned out to be defaulters. When such difficulty arises, the lending institution faces a problem. This study focused on the analysis of determinants of loan repayment performance of smallholder farmers in Kalu district, Amhara National Regional State. In this study, primary data were collect from 130 randomly selected borrowers using semi-structured questionnaire. In addition, secondary data were collected from different organizations and pertinent publications. A two-limit tobit regression model was employed to identify factors influencing loan repayment and intensity of loan recovery among smallholder farmers. A total of 14 explanatory

variables were included in the empirical model and out of these, six variables were found to be statistically significant. These are total land holding size of the family (hectare), total livestock holding (TLU), expenditure on social festivals, number of years of experience in agricultural extension services, purpose of borrowing and source of credit. Regarding the sign of the significant variables, expenditure on social festivals has a negative and significant effect on loan recovery rate while the remaining five variables have a significant and positive effect. Variance inflation factor were calculated to detect multicollinearity and association among all explanatory variables. Therefore, consideration of factors affecting loan repayment performance is vital because it provides information that would enable to undertake effective measures with the aim of improving loan repayment performance and hence helped lenders such as microfinance institution, nongovernmental organization and policy makers to have knowledge as to where and how to channel efforts to minimize loan defaults. **Copyright © IJEBF, all rights reserved.**

**Keywords:** Defaulters, Kalu, Loan repayment, Non-defaulters.

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## 1. INTRODUCTION

Agriculture is the main stay of the Ethiopian economy. The role that it plays in economic development is monumental. Agriculture meets the most essential needs of both human beings and small-scale industries. It accounts about 43 percent of the Gross domestic product, contributes over 80 percent of the country's export earnings and 85 percent of the population earns living from it (Seleshi, 2010). The country and its people have historically relied on rain-fed agriculture to meet their needs. This strategy has faced many challenges over the years, with the obvious short fall of food often arising from natural and economic disasters (MoFED, 2008). Poverty is pervasive and persistent in most developing countries. The root causes of economic suffrage are many but it is well understood that the most vulnerable population, those in a persistent poverty trap, are those who lack physical and financial resources. Physical resources imply the economic resources, land, buildings, and inputs, from which livelihoods are derived and financial capital implies the capital with which to acquire the physical resources. To many, the root cause of the poverty trap is not the constraint on physical resources but the financial constraints or credit constraints that prohibit the acquisition of those resources to poverty-escaping scale (Calum, 2007). The circular relationship between food insecurity, hunger, poverty and low productivity in food and crop production is increasingly understood that hunger leads to low productivity which in turn contributes to food insecurity. Reducing the incidence of hunger is essential to increase agricultural productivity and achieve higher rate of economic growth. People suffering from hunger are marginalized within the economy, contributing little to output and still less to demand. Investing in reducing hunger is a moral and economic imperative. So the goal of reducing food insecurity and rising agricultural productivity are interrelated (FAO, 2006).

History shows that no region in the world achieved food security and substantial productivity increases without significantly expanding agricultural input use. The goal of 6% annual agricultural growth by new partner shape for Africans development (NEPAD's) comprehensive African Agricultural Development Programme (CAADP) supports attainment of the millennium development goals. Yield gains through expanded use of fertilizer and

other complementary inputs can enhance household food security and increase rural incomes, which in turn will allow for investment in human capital and technologies to maintain the long-term quality of the soil (Camara and Heinemann, 2006). In Ethiopia, agricultural sector has been unable to produce sufficient quantities to feed the rapidly growing population. The reasons for low productivity of the agricultural sector and the growing gap between the demand and the supply of agricultural products are many in numbers and different in character. These include: poor and backward technology; limited use of modern inputs; lack of transportation and storage facilities; inadequate extension and credit facilities; natural calamities such as drought and ecological degradation (EEA, 2007).

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 expect 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 (Gebrehiwot, 2007). 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 (Mohammad, 2009).

Increasing defaults in the repayment of loans may lead to very serious implications. For instance, it discourages the financial institutions to refinance the defaulting members, which put the defaulters once again into vicious circle of low productivity. Therefore, a rough investigation of the various aspects of loan defaults, source of credit, purpose of the loan, form of the loan, and condition of loan provision are of utmost importance both for policy makers and the lending institutions (Kelly, 2005). In Ethiopia, the current agricultural loan repayment performance is not promising. Therefore, this study analyzed the extent to which agricultural credit functions and how non-default and default rates are associated with different demographic, institutional and socio-economic characteristics of farm households in South Wollo zone at Kalu district, Ethiopia. In Ethiopia, there is a wide gap between owned and required capital to finance the agricultural activities of small holder farmers since the income from subsistence agriculture does not provide much surplus beyond family consumption and other social obligations. The lack of access to capital in rural areas is one of the major factors which hinder the development of agriculture. The price of inputs is going up every year. Consequently, the dependence of the subsistence farmers on financial institutions for credit has become substantially higher now a day (Tefera, 2004). In Ethiopia, the importance of agricultural credit in the development of the sector has been underlined strongly by various authors (Sisay, 2008; Gebrehiwot, 2006; Tsegaye, 2006; Wolday, 2003). All these authors had concluded that credit helps to bring about the required productivity and food self sufficiency through the adoption of new technologies.

However, increasing default rate is one of the major problems of the lending institutions. In Kalu district, financial institutions extend credit facilities to farming households to narrow the gap between the required and the owned

capital to use new agricultural technologies that would increase production and productivity. The past empirical studies that were conducted on the factors contributing to loan default in different regions are not similar and the issues that were identified as problems in the previous studies may not issue today. This is because changes are in a continuous process that are bringing new challenges in terms of the conditions of credit supply, production technology, costs of production, the relative prices of the associated inputs and outputs, which could have impact on the general profitability of enterprises. 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 was conducted with the following objectives.

1. To compare defaulters and non-defaulters in terms of different explanatory variables.
2. To determine the extent of default in the repayment of loan offered to smallholder farmers in the study area.

## **2. RESEARCH METHODOLOGY**

### **2.1. Description of the study area**

The Federal Democratic Republic of Ethiopia (FDRE) is administratively divided into nine national regional states and two administrative councils. The Amhara National Regional State (ANRS) is one of the nine National Regional States. The ANRS is again divided into eleven administrative zones, one of which is South Wollo (CSA, 2005). Kalu is one of the 105 districts in the Amhara National Regional State and one of the 22 districts of South Wollo administrative zone. Kalu is bordered by Werebabo to the North, Dessie district to the West, Albiko to the South and Argoba to the East. The administrative centre for this district is Harbu; other towns in Kalu include Ancharo, and Degaga. The study district, Kalu is divided into 31 rural and 4 urban *kebeles*. As estimated by the District Office of Agriculture (DOA), the district has an area of land of 851.54 square kilometres. About 34% of the district's area is under crop production, and 1% is serving as a grazing land. About 56% of Kalu land area is covered with bushes and shrubs, and 4% is covered with forest. About 2% of Kalu's area is regarded as wasteland and another 3% is taken by physical constructions (KDOA, 2010).

The climate of Kalu varies from dry sub-humid to semi-arid. The annual average rainfall of the district ranges from 750 to 900 mm. The annual temperature also ranges in between 25–35 °C. The altitude of the district ranges from 1400 to 2467 meters above sea level (KDOA, 2010). The district has a total population of 186,181, which increased by 9.18% over the 1994 census, of whom 91,994 (49.41%) were women; 19,810 (10.64%) were urban inhabitants (CSA, 2008). With an area of 851.54 square kilometres, Kalu has a population density of 218.64, which is greater than the zone average of 147.58 persons per square kilometre. A total of 41,648 households were counted in this district. The largest ethnic group reported in Kalu was the Amhara (99.24%) and speaks Amharic. Muslims accounts 96.76% of the population and the rest 3.14% are Christians (CSA, 2008). Ten percent of the rural population of Kalu is engaged in crop production while the rest depends on mixed farming (crop with livestock). Crop production is dependent on rainfall and the major crops produced in the area are sorghum, *teff*, fruits and sugarcane. Livestock are also reared by most families. Oxen provide traction power for the cultivation of the agricultural lands. On the other hand, livestock are kept as a source of income through milk, butter, meat and egg production (KDOA, 2010).

## **2.2. Sampling technique and sample size**

Multi-stage sampling method was used to obtain the necessary information from formal credit users. At the first stage, four *kebeles* of the district was purposively selected because they are the leading user of credit with long years of experience and adequate information for the research at hand. In the second stage, a cluster sampling technique was employed for each selected *kebeles* since some farmers take loan from Amhara credit and saving institute (ACSI) and others from Cooperatives. Finally, the list of the names of farmers who have obtained loans from these credit sources were recorded from each *kebeles* and a total of 130 farm households (62 from ACSI and 68 from cooperatives) were selected randomly using probability proportional to size sampling technique.

## **2.3. Data sources and collection methods**

Both primary and secondary data were used for the study. The primary data was collected from the small holder farmers benefiting from the formal credit service directly through interview. The questionnaire was developed and pre-tested to evaluate for consistency, clarity and to avoid duplication and to estimate the time requirement during data collection. Appropriate training, including field practice, was given to the enumerators to develop their understanding regarding the objectives of the study, the content of the questionnaire, how to approach the respondents and conduct the interview. Secondary data were collected from, Cooperative promotion agency (CPA), kalu district office of Agriculture (KDOA), Amhara credit and saving institute (ACSI).

## **2.4. Method of data analysis**

### **2.4.1. Descriptive statistics**

Descriptive statistics, 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 model**

In this study the value of the dependent variable is the percentage of loan paid by the borrowers from the total borrowed from formal sources of credit. Thus, the value of the dependent variable ranges between 0 and 1 and a two-limit tobit model has been chosen as a more appropriate econometric model (Rossett and Nelson, 1975).

## **2.5. Definition of variables and working hypothesis**

### **2.5.1. Dependent variable**

The dependent variable for the econometric model for this study is define as the percentage of loan paid by borrowers during the specified repayment period, which is a continuous variable, calculated from the total amount of loan that a person's took. Its value ranges between zero and one. The borrowers that did not repay the amount of money they borrowed as per credit schedules are considered as complete defaulters (i.e. the value of repayment ratio in this case is zero). Likewise, borrowers that repaid some proportion of the money they borrowed are

considered as non-complete defaulters (takes values between zero and one). On the other hand, borrowers who fully repaid the amount they borrowed are considered as non-defaulters and assume a value of one.

### 2.5.2. Explanatory variables of the study

The main explanatory variables of this study are: Age of the borrower, Sex of respondent, Family size, Education level, Land size, Number of livestock owned, Non-farm income, Expenditure on social festivals, Experience in extension package, Distance from main road, Amount of loan, Purpose of borrowing and Source of credit.

## 3. RESULTS AND DISCUSSION

### 3.1 Descriptive Results

#### 3.1.1. Demographic characteristics

**Age of the respondents:** The average age of the whole sampled household heads was 42.82 years with the minimum and maximum ages of 23 and 70 years, respectively (Table 1). The average age of non-defaulters was 44.58 years while that of defaulters was 41.35 years with mean difference significant at 10% probability level. This implies that non-defaulters are aged than defaulters, which helped them to accumulate better wealth and able to repay their debt in time than defaulters (Table 1).

**Table 1.** Descriptive statistics of age of the head by repayment status of sample households.

| Age     | Non-defaulters (59) | Defaulters (71) | Total (130) | t-value |
|---------|---------------------|-----------------|-------------|---------|
| Mean    | 44.58               | 41.35           | 42.82       | 1.782*  |
| SD      | 10.65               | 11.70           | 11.31       |         |
| Minimum | 24.00               | 23.00           | 23.00       |         |
| Maximum | 70.00               | 70.00           | 70.00       |         |

\*Significant at 10% probability level.

**Sex of house hold head:** The sample was composed of both male and female-headed households. Of the total sample household heads, 78.5 percent were male household heads and 21.5 percent were female household heads. About 50.00 and 55.88 percent of the defaulters were female and male-headed households, respectively, while 50.00 and 44.12 percent of non-defaulters were female and male-headed households, respectively. The proportion difference tests in terms of sex between the two groups were not statistically significant (Table 2).

**Table 2.** Distribution of household head sex by repayment status.

| Sex    | Non defaulters (59) |       | Defaulters (71) |       | Total (130) |      | $\chi^2$ -value |
|--------|---------------------|-------|-----------------|-------|-------------|------|-----------------|
|        | No                  | %     | No              | %     | No          | %    |                 |
| Female | 14                  | 23.73 | 14              | 19.72 | 28          | 21.5 | 3.968           |
| Male   | 45                  | 76.27 | 57              | 80.28 | 102         | 78.5 |                 |

**Family size:** The average family size of the sample households was 5.05. The largest family size was 9 and the smallest was 3. The average family size of non-defaulters was 5.15 while that of defaulters was 4.97 with no significant difference between means of the two groups (Table 3).

**Table 3.** Descriptive statistics of family size by repayment status.

| Family size | Non-defaulters (59) | Defaulters (71) | Total (130) | t-value |
|-------------|---------------------|-----------------|-------------|---------|
| Mean        | 5.15                | 4.97            | 5.05        | 0.718   |
| SD          | 1.25                | 1.55            | 1.43        |         |
| Minimum     | 3.00                | 3.00            | 3.00        |         |
| Maximum     | 8.00                | 9.00            | 9.00        |         |

**House head educational level.** Descriptive results showed that the average educational level of household heads was 2.17 grades with the minimum and maximum grade of 0 and 10, respectively (Table 4). The average level of year of schooling of non-defaulters was 3.14, while that of defaulters was 1.37 with mean difference significant at 1% level of probability (Table 4). The implication of the result is that non-defaulters are educated than defaulters, this enable them to acquainted with agricultural technologies, get written agricultural materials and more aware of the importance of loan and hence these reduced default (Table 4).

**Table 4.** Distribution of educational level of the head by repayment status.

| educational level<br>(Grades) | Non-defaulters (59) | Defaulters (71) | Total (130) | t-value  |
|-------------------------------|---------------------|-----------------|-------------|----------|
| Mean                          | 3.14                | 1.37            | 2.17        | 4.140*** |
| SD                            | 2.93                | 1.91            | 2.57        |          |
| Minimum                       | 0.00                | 0.00            | 0.00        |          |
| Maximum                       | 10.00               | 9.00            | 10.00       |          |

\*\*\*Significant at 1% probability level.

### 3.1.2. Socio-economic characteristics

**Land ownership:** Land is the basic asset of farmers. The average size of own cultivated land was nearly 0.85 ha, the minimum and maximum being 0.32 and 1.50 ha, respectively (Table 5). Non-defaulters cultivated on average larger area of land (1.01 ha) than defaulters (0.65 ha) (Table 5). The mean difference between the land holding by non-defaulters and defaulters was statistically significant at 1% level of probability level (Table 5). This indicates that non-defaulters have large farm size as compared to defaulter, and that enable to produce more farm output which helped them repaid their loan, being other factors *ceteris paribus*.

**Table 5.** Descriptive statistics of farm size (in hectare) by repayment status.

| Farm size(ha) | Non-defaulters (59) | Defaulters(71) | Total(130) | t-value  |
|---------------|---------------------|----------------|------------|----------|
| Mean          | 1.01                | 0.65           | 0.85       | 7.669*** |
| SD            | 0.16                | 0.20           | 0.25       |          |
| Minimum       | 0.48                | 0.32           | 0.32       |          |

|         |      |      |      |
|---------|------|------|------|
| Maximum | 1.50 | 1.50 | 1.50 |
|---------|------|------|------|

\*\*\*Significant at 1% probability level.

**Livestock holding:** Sample households in the study area on average owned 3.460 TLU, with a minimum of 0.026 and a maximum of 9.360 TLU. The mean TLU of non defaulters and defaulters households are 5.11 and 2.09, respectively (Table 6). The survey result demonstrated that the mean differences between livestock holding by non-defaulters and defaulters were statistically significant at 1% level of probability (Table 6). 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, economical and legal expense, but also contribute to secure cash to pay debts.

**Table 6.** Descriptive statistics of livestock holding (in TLU) by repayment status.

| Livestock(TLU) | Non-defaulters (59) | Defaulters (71) | Total (130) | t-value  |
|----------------|---------------------|-----------------|-------------|----------|
| Mean           | 5.11                | 2.090           | 3.460       | 8.934*** |
| SD             | 1.88                | 1.950           | 2.440       |          |
| Minimum        | 2.80                | 0.260           | 0.026       |          |
| Maximum        | 9.36                | 4.745           | 9.360       |          |

\*\*\*Significant at 1% probability level

**Nonfarm income:** The income generated from non-farm activity ranges from no income to a maximum of Birr 15,000.00 (Table 7). The mean annual non-farm income of sample households was found to be Birr 3,673.07 (Table 7). About 60 percent of the sample household heads reported that at least one of their family members was engaged in non-farm activities, which helped them to earn additional income. On average, defaulters earned 1239.40 Birr/year from non-farm income sources while the non-defaulter earned 6,957.60 Birr (Table 7). There was a significant difference in mean annual non-farm income between defaulters and non-defaulters at 1% probability level (Table 7). The implication is that non-defaulters have better opportunities to generate income from non-farm activities which resulted in reducing default.

**Table 7.** Descriptive statistics of non-farm income by repayment status.

| Non-farm income | Non-defaulters (59) | Defaulters (71) | Total (130) | t-value  |
|-----------------|---------------------|-----------------|-------------|----------|
| Mean            | 6957.60             | 1239.40         | 3673.07     | 6.999*** |
| SD              | 6077.44             | 2954.20         | 5270.55     |          |
| Minimum         | 600.00              | 0.00            | 0.00        |          |
| Maximum         | 15000.00            | 5000.00         | 15,000.00   |          |

\*\*\*Significant at 1% probability level.

**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 100.00 and Birr 3000.00, respectively (Table 8). Average

amount of money spent for social ceremonies, was Birr 1660.70 for the defaulters' which was higher than the non-defaulters' Birr 414.36 with mean difference significant at 1% probability level (Table 8). This indicates that defaulters had spent more on occasional ceremonies than non-defaulters, and that expenditure on social festivals is negatively related to loan repayment performance.

**Table 8.** Descriptive statistics of expenditure on social festivals by repayment status.

| Expenditure on social festivals | Non-defaulters (59) | Defaulters (71) | Total (130) | t-value    |
|---------------------------------|---------------------|-----------------|-------------|------------|
| Mean                            | 414.36              | 1660.70         | 1082.75     | -10.509*** |
| SD                              | 199.04              | 892.12          | 905.57      |            |
| Minimum                         | 100.00              | 200.00          | 100.00      |            |
| Maximum                         | 900.00              | 3000.00         | 3000.00     |            |

\*\*\*Significant at 1% probability level.

**Purpose of borrowing:** Rural households usually borrow money for a wide range of purposes. About 98.30 and 5.63 percent of non-defaulters and defaulters respectively used the borrowed money for purchase of agricultural inputs (Table 9). The survey result demonstrated that the proportion difference between the purpose of borrowing by non-defaulters and defaulters was statistically significant at 1% level of probability (Table 9). The implication is that non-defaulter households used the loan for productive purpose instead of consuming it and generated more income which helped to repay their loan.

**Table 9.** Distribution of purpose of borrowing by repayment status.

| purpose        | Non defaulters (59) |      | Defaulters (71) |       | Total (130) |      | $\chi^2$ -value |
|----------------|---------------------|------|-----------------|-------|-------------|------|-----------------|
|                | No                  | %    | No              | %     | No          | %    |                 |
| productive     | 58                  | 98.3 | 4               | 5.63  | 62          | 47.7 | 111.1***        |
| Non-productive | 1                   | 1.7  | 54              | 94.36 | 68          | 52.3 |                 |

\*\*\*Significant at 1% probability level

### 3.1.3. Institutional factors

**Source of credit:** Farmers in the study area get credit mainly from two institutions Amhara credit and saving institute (ACSI) and farm multiservice cooperative (FMSC). Out of the total 130 interviewed households 59 (45.38%) were non-defaulters and the remaining 71 (54.62%) were defaulters (Table 10). Among defaulters, 13 (18.31 %) were non-complete defaulters (Table 10). With regard to the sources of credit, out of the total respondents 52.31 percent, borrowed from cooperatives and the rest 47.69 percent borrowed from Amhara credit and saving institute (Table 10). The performance of credit repayment varied with respect to sources of credit. Larger proportion of defaulters (76.06 percent) borrowed from cooperatives as compared to ACSI (23.94 percent) (Table 10). Chi-square analysis showed that the difference between defaulters and non- defaulters in terms of source of credit was significant at 1% probability level (Table 10). This indicates that those households who 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 10.** Distribution of source of credit by repayment status.

| Source      | Non defaulters (59) |       | Defaulters (71) |       | Total (130) |       | $\chi^2$ -value |
|-------------|---------------------|-------|-----------------|-------|-------------|-------|-----------------|
|             | No                  | %     | No              | %     | No          | %     |                 |
| ACSI        | 45                  | 76.27 | 17              | 23.94 | 62          | 47.69 | 36.893***       |
| Cooperative | 14                  | 23.73 | 54              | 76.06 | 68          | 52.31 |                 |

\*\*\*Significant at 1% probability level

**Distance from main road:** The distance in kilometers that the borrowers travelled to get main road for accessing different services. In line with this, the average distance traveled by the respondents to the main road was about 6.92 kilometers (Table 11). On average, non-defaulters traveled about 6.24 kilometers while defaulters traveled on average about 7.49 kilometers to reach the main road (Table 11). The mean difference between the distances traveled by non-defaulters and defaulters was not statistically significant (Table 11).

**Table 11.** Descriptive statistics of distance from main road (in km) by repayment status.

| Distance from main road | Non-defaulters (59) | Defaulters (71) | Total (130) | t-value |
|-------------------------|---------------------|-----------------|-------------|---------|
| Mean                    | 6.24                | 7.49            | 6.92        | -1.069  |
| SD                      | 6.39                | 6.91            | 6.69        |         |
| Minimum                 | 1.00                | 1.00            | 1.00        |         |
| Maximum                 | 18.00               | 18.00           | 18.50       |         |

**Experience in agricultural extension package:** Experience in agricultural extension package varied among the sample borrowers from minimum of 3 years experience to a maximum of 18 years experience (Table 12). Non-defaulters participated on average for higher number of years 12.10 as compared to the defaulters who participated on average for 7.82 years (Table 12). 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 12.** Descriptive statistics of experience in agricultural extension package by repayment Status.

| Experience on extension package | Non-defaulters (59) | Defaulters (71) | Total (130) | t-value  |
|---------------------------------|---------------------|-----------------|-------------|----------|
| Mean                            | 12.10               | 7.82            | 9.76        | 5.875*** |
| SD                              | 4.40                | 3.90            | 4.65        |          |
| Minimum                         | 3.00                | 3.00            | 3.00        |          |
| Maximum                         | 18.00               | 18.00           | 18.00       |          |

\*\*\*Significant at 1% probability level.

**Amount of loan:** The sample households on average borrowed Birr 1876.84 (Table 13). However, the loan size varied in accordance with the type of financial institution. The survey result also revealed that on average Birr 1885.60 was borrowed by non-defaulters and defaulters borrowed Birr 1869.60 with no significant mean difference among the groups (Table 13).

**Table 13.** Descriptive statistics of amount of loan by repayment status.

| Amount of loan | Non-defaulters (59) | Defaulters (71) | Total (130) | t-value |
|----------------|---------------------|-----------------|-------------|---------|
| Mean           | 1885.60             | 1869.60         | 1876.84     | 0.119   |
| SD             | 816.69              | 714.78          | 759.73      |         |
| Minimum        | 650.00              | 352.00          | 352.00      |         |
| Maximum        | 3000.00             | 3000.00         | 3000.00     |         |

### 3.2. Results of the Econometric Model

#### 3.2.1. Determinants of probability of being non-defaulter and degree of loan recovery

The estimated results of the two-limit tobit model of the maximum likelihood and the marginal effects are shown in tables 14 and 15, respectively. A total of 14 explanatory variables were considered in the econometric model out of which six variables were found to significantly influence the probability of being non-defaulter and intensity of loan recovery among the farm households. These were total land holding size of the family (hectare), total livestock holding (TLU), expenditure on social festivals, number of years of experience in agricultural extension services, purpose of borrowing and source of credit. The remaining variables were found to have no significant effect on the loan recovery of smallholder farmers (Table 14).

**Table 14.** Maximum likelihood estimates of the two-limit tobit model and the effects of explanatory variables on probability of being non-defaulter.

| Variable  | Coefficient         | Robust standard. error | t-ratio  | Probability of being non-defaulter |
|-----------|---------------------|------------------------|----------|------------------------------------|
| AGE       | 0.00190             | 0.0014                 | 1.34     | 0.00090                            |
| EDUC      | 0.00470             | 0.0052                 | 0.91     | 0.00220                            |
| SEX       | 0.01630             | 0.0263                 | 0.62     | 0.00770                            |
| FS        | -0.00170            | 0.0085                 | -0.20    | -0.00080                           |
| LANDH     | 0.12870             | 0.0492                 | 2.62*    | 0.06060                            |
| LIVSTOCKO | 0.03180             | 0.0076                 | 4.17***  | 0.01500                            |
| NOFINC    | 2.37e <sup>-6</sup> | 2.36e <sup>-6</sup>    | 1.01     | 1.12e <sup>-6</sup>                |
| EXPSC     | -0.00030            | 0.0001                 | -5.86*** | -0.00020                           |
| EXPEXETN  | 0.00550             | 0.0029                 | 1.88*    | 0.01260                            |
| RAODDIST  | -0.00004            | 0.0023                 | 1.18     | 0.00120                            |
| LNAMNT    | -0.00003            | 0.0001                 | -0.99    | -0.00001                           |
| PURBOR    | 0.62470             | 0.0431                 | 14.50*** | 0.29420                            |
| CRDTSRCE  | 0.05000             | 0.0284                 | 1.76*    | 0.02360                            |

|         |                     |                     |      |                     |
|---------|---------------------|---------------------|------|---------------------|
| LNAMNT2 | 5.42e <sup>-9</sup> | 7.84e <sup>-9</sup> | 0.69 | 2.55e <sup>-9</sup> |
| _cons   | 0.11025             | 0.1598              | 0.69 |                     |

\*\*\*, \* Represent level of significance at 1% and 10 %, respectively

**Size of land holding in hectar:** It was one of economic factors, which positively affected loan recovery of smallholder farmers (significant at 10% probability level). Each additional hectare of land holding increases the probability of being non-defaulter by 6.06 percent (Table14). On average, each additional hectare of land holding of smallholder farmers increases the rate of loan repayment by 0.0787 for the entire sample and by 0.0805 among non-complete defaulters *ceteris paribus* (Table 15). 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. This is consistent with the study result of (Bekele,2001), (Belay, 2002), (Daniel, 2006) and (Worku, 2008).

**Total livestock ownership:** It has positively related to the dependent variable and significant at 1% probability level. Each additional TLU increases the probability being non-defaulter by 1.5 percent (Table14). Also, for each additional unit of TLU the rate of loan repayment increases by 0.0184 for the whole borrowers and by 0.0199 among non-complete defaulters (Table 15). 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. This result is consistent with the study result of (Belay, 1998), (Jemal, 2003), (Worku, 2008), (Mohammad, 2009) and (Kebede, 2010) which states that having larger number of livestock is positively related to loan repayment performance.

**Expenditure on social festivals:** This 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 0.02 percent (Table 14). Each additional birr of expenditure on social festivals decrease the rate of repayment by 0.0022 for the entire sample and by 0.0103 among non-complete defaulters, *ceteris paribus* (Table 15). 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. 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. (Miller, 1977), (Mwinijilo, 1987), (Belay, 1998) (Belay 2002) and (Kebede, 2010) also reported the negative effect of this variable on loan repayment.

**Experience in agricultural extension service:** This variable has strongly influenced smallholder farmer's loan recovery. This was positively related to the dependent variable at 10% level of significance. Each additional year of agriculture extension package experience increases the probability of being non-defaulter by 1.26 percent (Table 14). On average, one year additional experience in the extension package increases rate of loan repayment

by 0.0034 for the whole respondents and by 0.0135 among non-complete defaulters, ceteris paribus (Table 15). 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 this repay loans timely. This is consistent with the study result of (Oladeebo, 2008).

**Purpose of borrowing:** It is another economic factor that was positively and significantly affected loan repayment performance of smallholder farmers at 1% probability level. This might be due to the fact that; households who used the loan for productive purpose such as purchased chemical fertilizers, livestock and improved seeds which produce enterprises that would give maximum benefits to the farmer. These farmers are the beneficiary of the use loan that would increase their income generating capacity and repay their loans timely. Each additional unit of available loan for productive purpose, increases probability of being non-defaulter by 29.42 percent (Table 14) and on average increases the rate of loan repayment by 0.3819 for the entire respondents and by 0.3904 among non-complete defaulters (Table 15). (Mohammad, 2009) also came up with similar results in his study on factors affecting on loan repayment performance of farmers.

**Source of credit:** 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 ACSI. 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 cooperatives. It is consistent with the study result of (Amare, 2005). Being a borrower from ACSI increases the probability of being non-defaulter by 2.36 percent (Table 14). Similarly, it increases loan repayment rate by 0.0306 for the entire sample and by 0.1313 among non-complete defaulters (Table 15).

**Table 1.** Marginal effects of significant explanatory variables on rate of repayment.

| Variable  | Change among non-complete defaulters<br>$\frac{\partial E(Y/U > Y > L, X)}{\partial X_i}$ | Total change<br>$\frac{\partial E(Y_i)}{\partial X_i}$ |
|-----------|-------------------------------------------------------------------------------------------|--------------------------------------------------------|
| AGE       | 0.00120                                                                                   | 0.00110                                                |
| EDUC      | 0.00300                                                                                   | 0.00290                                                |
| SEX       | 0.01020                                                                                   | 0.00990                                                |
| FS        | -0.00110                                                                                  | -0.00100                                               |
| LANDH     | 0.08050                                                                                   | 0.07870                                                |
| LIVSTOCKO | 0.01990                                                                                   | 0.01840                                                |
| NOFINC    | 1.48e <sup>-6</sup>                                                                       | 1.45e <sup>-6</sup>                                    |
| EXPSC     | -0.01030                                                                                  | -0.00220                                               |
| EXPEXETN  | 0.01350                                                                                   | 0.00340                                                |

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|          |                     |                     |
|----------|---------------------|---------------------|
| RAODDIST | 0.00160             | 0.00150             |
| LNAMNT   | -0.00002            | -0.00001            |
| PURBOR   | 0.39040             | 0.38190             |
| CRDTSRCE | 0.13130             | 0.03060             |
| LNAMNT2  | 3.39e <sup>-9</sup> | 3.31e <sup>-9</sup> |

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#### 4. Summary and conclusion

This study were conducted to identify socio-economic and institutional factors affecting loan repayment performance and to determine the extent of default in the repayments of loan offered to smallholder farmers in Kalu district south Wollo zone. Both primary and secondary sources were used to carry out the study. A multi-stage sampling procedure was used and a total of 130 household heads were selected by a simple random sampling method from four *kebeles* of the district. The descriptive statistics results showed that about 54.62 and 45.38 percent of sample households were defaulters and non-defaulters respectively.

The t- test showed that there is a significant difference between the defaulter and non defaulter group in terms of age of the head, education level, non-farm income, land size, livestock owner ship, expenditure on social festivals and experience on extension package at various levels of probability. The chi-square tests also revealed that purpose of borrowing and source of credit have significant relationship with loan repayment performance at 1 percent probability level.

The result of two-limit tobit econometric model showed that, from a total of 14 explanatory variables used in the regression model, six variables (land holding size, livestock ownership, experience agricultural extension package, expenditure on social festivals, source of credit used and purpose of borrowing) had statistically significant influence on the loan repayment performance of the sample households. The result of the econometric model showed that, farmers who had taken loan from 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 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 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. It is important, however, that the borrowed funds are invested for productive purposes and this would enable farmers to generated income and the loan would be repaid to the lending institutions than those who used for consumption purposes.

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