

# Determinants of Formal Sources of Credit Loan Repayment of Small Holder Farmers in Wogera Woreda

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## Abstract

There is no doubt about the crucial role of credit in economic development, although the success and repayment of loans in agricultural production are troubled with a number of problems, particularly among smallholder farmers. Therefore, the major concern of this study was to identify borrowers, institutional and loan factors that affect loan default rate of smallholder farmers in Wogera Woreda Amahara National Regional State. To achieve this objective, primary data were collected from a sample of formal credit borrower farmers in the Woreda through a structured questionnaire. A total of 206 farm households' cases were included in the final analysis. Logit model was used to identify and analyze the effect of explanatory variables on the dependent variable. A total of fourteen explanatory variables were included in the regression. Out of these, seven variables were found to be significant in terms of the probability of defaulting. The variables that have a significant relationship with formal credit users' loan default rate are: saving habit, other sources of income, fertilizer use, sector, loan diversion, loan supervision, and repayment period. The rest of the explanatory variables, namely age, sex, education level, family size, dependency ratio, irrigation use and loan size, had no significant effect on the probability of defaulting. Therefore, consideration of these factors is vital as it provides information that would enable one to undertake effective measures with the aim of improving loan repayment in the study area. It would also enable lenders and policy makers to have information as to where and how to channel efforts in order to minimize loan default.

**Keywords:** Loan repayment, logit, smallholder farmers

## 1. INTRODUCTION

A sound financial sector is critical for sustainable economic growth, poverty reduction and food security. Credit has become increasingly accepted as a powerful tool to lift the rural poor out of abject poverty. It plays a crucial role in providing relief for farmers for the purchase of seeds, fertilizer, cattle and farm implements (Perkins and Yusuf, 1994). It also enables smallholders to buy inputs they need to increase their agricultural productivity (Nosiru, 2010). Moreover, credit improves the welfare of the rural poor by financing consumption and reducing the opportunity cost of highly-valued assets and labor-saving technologies (Zeller et al., 1998). Credit further helps to insure the rural poor against the vulnerability of shocks (flood, drought and others) by reducing the cost to the farmers to cope up with these shocks. Credit in general is essential to attain rapid and sustainable development. To obtain a substantial increase in agricultural production, the provision of credit must be accompanied by technical advice and physical inputs.

Microfinance institutions provide medium-sized loans, mostly to business people who cannot afford collaterals to get loans from the main commercial banks. It is obvious that the cycle of repayment should continue in order to have sustainable and viable improvement of the system through loan recovery arrangements. Despite recent growth, the micro-finance sector is faced with the challenge of loan repayment defaults by clients. Individual groups have tried using group equity for collaterals, which is expected to ensure the repayment of money for the benefit of other individual members of the group. However, the chance that a microfinance institution

may not receive its money plus interest rate back from borrowers is the most prevalent and often the most serious susceptibility in microfinance institutions all over the world (Warue, 2012).

Ethiopian institutions experience an equally problematic relationship with loan default. Loans advanced for farmers should be repaid to have a continuous improvement year after year in agriculture. However, the loan repayment of the beneficiaries was found to be very low. The high loan default rate is the primary cause of the failure of MFIs (Maata, 2004).

In Wogera Woreda ACSI and RCASCO organizations extend credit facilities to farming households to decrease the gap between the necessary and the owned capital to use improved agricultural technologies that would improve production and productivity. However, there is a serious loan repayment problem in the area, and formal credit sources have complained about this. This poor loan repayment is a major problem in credit administration, especially with smallholder farmers who have limited collateral capacities in Wogera Woreda

It is additionally true that the factors influencing loan refund ability among borrowers do not only differ by program but also from nation to nation depending on the domestic business and economic environment (Tundui and Tundui, 2013).

Although a number of studies associated with the impact of rural credit access on farmers' income

growth in the study area have been done, nearly all of them were focused on poverty reduction. To the best of the researcher's knowledge no study has been made to observe determinants of formal sources of credit loan default among smallholder farmers in the study area. Information on the relative importance of the factors which affect smallholder farmers' probability of loan default is expected to generate other useful information that will help in effective credit targeting and enhanced outreach services to large numbers of clients. This is necessary to design appropriate lending strategies and procedures, and create good credit administration in the area and outside of it. It is with regard to this that this study began with the primary objective of analyzing the determinants of formal sources of credit loan default rate among smallholder farmers in Wogera Woreda.

The overall objective of this study was to identify the determinants of formal sources of credit loan default rate of smallholder farmers in Wogera Woreda. And the specific objectives was

- ✓ To examine the characteristics of borrowers that contribute to their default on credit financed by formal sources.
- ✓ To examine project characteristics that determine the borrowers' loan default rate.
- ✓ To identify the loan characteristics that contribute to loan default by the borrowers.

To examine the above-specified objectives the hypotheses that this study attempt to test include:

Borrowers characteristics such as, Age, educational level, family size, dependency ratio, other source of income, saving habit, fertilizer use, irrigation use

project characteristics such as type of the project like engaging in the farming sector or in petty trade and related sector

Loan characteristics such as repayment period, loan size, loan diversion, loan Supervision, contribute to loan default rate of borrowers.

## 2. LITERATURE REVIEW

### 2.1. THEORETICAL LITERATURE REVIEW

Liu and Zhu (2006) argued that credit is granted on faith and defined credit as "the capacity of a business or individual to gain economic value on faith, in return for an expected future payment". Since trust is built on faith to commit to and meet contracted financial obligations, trust, faith, respect and sometimes relationships are compromised if those obligations are not met. Not meeting the obligations is considered default. Prior to 2004, when the Basel II accord was endorsed, financial institutions could adopt their own strategic definitions of default. Client classifications such as good payers, poor payers and bad payers were commonly used and a payment in arrears for more than three months was considered to be a default in the retail context. The fact that every organization could utilize any definition meant different scoring systems, risk measures and jeopardy management practices could be used (Gestel & Baesens, 2009).

Different authors and researchers have different definitions of default. Moody's, a universal rating agency, defined default as any missed or delayed payment of interest and/or principal. Standard and poor, another international rating scale, defined corporate default as follows: "a default is recorded upon the first event of a payment default on any financial duty, rated or unrated".

World Bank defines microfinance as "small scale financial accommodations – primarily credit and savings – provided to inhabitants who farm or fish and who operate small enterprises or microenterprises where goods are generated, recycled, rehabilitated, or sold; who provide accommodations; who work for wages or commissions; who gain income from renting out small amounts of land, vehicles, draft animals, or machinery and implements; and to other individuals and groups at the restricted levels of developing countries, both rural and urban" (Robinson, 2002). Bank Negara Malaysia defined microfinance as the provision of micro loans/financing to microenterprises or self-employed people for their business activities. Therefore, given all definitions, it can be concluded that microcredit is just a small credit given to the poor that engage in microenterprise or for the aim of income-generating activities. On the other hand, microfinance encompasses broad financial accommodations given to the poor and low-income groups for many reasons and not just for income generating activities. Woller & Parsons (2002) explain microfinance as the second revolution in credit theory and policy where the first revolution is microcredit. Microfinance institutions (MFIs) were made to fill the gap in the financial accommodation sector by providing finances to the poor and lower-income groups and thus alleviating poverty and enhancing their business activities.

The MFIs provide money for start-up business or for working capital. In all, some MFIs in addition provide funds for non-business activities such as education and emergencies. In the credit market, moral hazard and adverse selection subsist because of information asymmetries. Information asymmetries are the main impediment for MFIs to give loans to clients. Financial institutions customarily require a business proposal, borrowers' past credit information and collateral before approving the loan. MFIs offer credit through group lending methods to mitigate agency troubles, moral hazard and adverse selection and to supersede the requisite collateral. In group lending, borrowers must form a group before applying for loans and they are also responsible to other loan members. If one member fails to pay, the others will be responsible to pay the loan, or they will be

denied access for future loans. MFIs are conventionally non-governmental organizations (NGOs) who are not profit-oriented. NGOs believe poverty is created through social processes that deprive the poor of their rightful access to social resources, including credit. These NGOs help the poor to find credits to fortify their small enterprises or income-generating activities. These institutions act as a form of monetary intermediation like formal banks. The distinction between formal banks and microfinance institutions (MFIs) is the former's focus on wealthy clients, while the latter's clients are usually impoverished. According to Remenyi (2000), subsidized credit and subsidized banking with the poor are inimical to "greatest performance in microfinance". MFIs additionally offer skills training and marketing advice to their clients. The most prosperous MFI is the Grameen Bank in Bangladesh founded by Professor Mohammed Yunus, who won the Nobel Peace Prize in 2006.

## 2.2. EMPIRICAL LITERATURE REVIEWS

Most of the available empirical evidence on the determinants of loan repayment have been carried out in different countries. These studies found that gender of the household head, age of the household head, farm size, education, saving habit, training duration, non-farm income, borrower's business experience, loan size, interest rate, total number of livestock units, family size, cultivated area, repayment period, etc., are some of the factors that influence loan repayment positively or negatively Roslan and Zaini (2009), (Oladebo & Oladebo, 2008), Vigano. (1993), Temesgen (2013), Jemal (2003), Abebe (2011), Abreham (2002), Mengistu (1997), Amare (2005).

The research done by Roslan and Zaini (2009) investigates the loan repayment of agro-bank micro-credit schemes through independent variables such as gender, marital status, race, level of education, age, vocation, number of dependents, experience, membership in business society and training, ownership structure of the project, type of the project, distance of the project from most proximate agro-bank office, revenue from project, amount of loan and length of repayment period. The data utilized in the study is primary data, which was accumulated through a survey carried out among agro-bank micro-credit scheme borrowers in 86 branches of an agro-bank in Malaysia. Self-explanatory questionnaires were provided to the respondents, where 2,630 borrowers were selected for the analysis by a simple arbitrary sampling. In order to determine the effect of borrowers' characteristics on the probability of default, an econometric approach that relies on both probit and logit models was employed. The result of the study shows the variable "gender" is positive and significant. This implies that the chance to default is higher for male than for female borrowers. The coefficient for the variable "type of the project" is negative and significant. This result suggests that the probability of default is lower for borrowers that engage in accommodation/support activities as compared to those in other activities. The coefficient for the variable "training" is additionally negative and significant. This result suggests that borrowers that did not have any training in connection to their business activity/project had a higher probability of default compared with those borrowers who had some training. The "coefficient for loan amount" variable is negative and significant as well, which suggests that the higher the loan amount, the lower the probability for default. The coefficient for the variable "period of repayment" is positive and significant. This shows that the probability to default is higher for a longer repayment period. In general the results of the research from both probit and logit models suggests that the probability to default is not influenced by race, education, age, antecedent, vocation, number of dependents, experience, membership in business society, the distance of the business/project from the most proximate agro-bank office or revenue from the business/project

Vigano (1993), in his study about the case of development bank of Burkina Faso, employed a credit-scoring model. He found out that being female, married and aged, having business experience, value of assets, timeliness of loan release, medium repayment periods, project diversification and being a pre-existing depositor are negatively related with loan default rate or positively related to loan repayment performance. On the other hand, loan in kind, smaller loan than required, long waiting period from application to loan release and availability of other sources of credit were found to have a negative relation to loan repayment performance.

One empirical study conducted in Ethiopia by Jemal (2003), concerns the microfinance loan repayment performance in the case of the Oromia Credit and Savings Share Company in Kuyu district. In this thesis, the author employed a tobit econometrics model to find the factors influencing loan repayment performance in the micro-finance institution. The parameters utilized in the research include age of borrower, sex of borrower, educational level of borrower, loan size in Birr, timeliness of loan release, loan diversion rate (ratio of loan diverted to total loan received), income from activities financed by loan (annual), annual income from other activities (not financed by the loan), value of livestock in Birr, suitability of repayment period, utilization of financial records, adequacy of supervision visits made to a borrower, location of residence of borrower, number of dependents, and number of times borrowed. The results of the descriptive statistics and the tobit model show that education, income, loan supervision, suitability of repayment period, availability of other credit sources and livestock are significant factors that cause the probability of loan default rate to decline or enhance loan repayment performance, whereas loan diversion and loan size are found to significantly increase loan default.

Abreham (2002) employed a tobit model to examine loan repayment and its determinants in small-scale

enterprise financing in Ethiopia, specifically in the case of private borrowers around Zeway area. The results showed other sources of income, education, and work experience in related economic activities beforehand affected full loan repayment positively, or negatively affected the probability of loan default rate. On the other hand, extended loan repayment period influenced the repayment performance negatively. A study conducted by Mengistu (1997) on the Market Town Development Program (MTDP) credit scheme for Bahir Dar and Awassa towns employ a binomial probit model. For Bahir Dar, the author found that repeated loans and number of workers employed by the credit beneficiary were positively related to full loan repayment, while loan diversion and access to additional credit sources were positively related to loan default rate or negatively related to repayments. On the other hand, his findings for Awassa show that variables like the number of workers employed by the lender, level of education and weekly repayment period have a positive impact on loan repayment while having a negative influence on loan diversion.

Abebe (2011) applied the tobit model in examining the determinants of credit repayment and fertilizer use by cooperative members in Ada District, Oromia Region. The result of the model showed that family size, livestock ownership, on-farm income, nonfarm income and saving habit were statistically significant factors influencing the probability of loan default negatively or timely loan repayment performance positively.

### 3. RESEARCH METHODS

#### 3.1 THE DATA COLLECTION AND METHODOLOGY

For this study both primary and secondary data was collected, of both qualitative and quantitative types in order to address the objective of the study.

#### 3.2. SAMPLE SIZE AND METHOD OF SAMPLING

Wogera Woreda was purposefully selected, as the problem of this study had been previously observed. For this study, a multi-stage random sampling method was used to select the sample of respondents. In the first stage, from 41 *kebeles* found in Wogera Woreda, 25 *kebeles* which have access to formal financial sources were identified in the study area. In these *kebeles*, there are rural credit access, agricultural extensions, similar farming activities, no safety-net program users, and a relatively similar way of life and standard of living. Therefore, these 25 *kebeles* are homogenous in terms of the above criteria. Of these, 3 *kebeles* were selected randomly. One *kebele* from each of the three agro-ecological zones (Dega, Woinadega and Kola) were represented, respectively. In the second stage, the list of farmers who obtained loans from formal credit sources was recorded from each *kebele* and a total of 206 farm households were selected out of 423 target population in 3 *kebeles* randomly based on probability proportional to sample size. A sample size of 206 farmers represented the total population at a confidence level of 95% and at a level of precision of 5%, as derived from Yamane's formula (1967), cited in Isreal (2012).

#### 3.3. METHODS OF DATA ANALYSIS

Formal sources of credit loan repayment were expected to depend on the characteristics of borrowers, characteristics of the specific project, and characteristics of the loan. The econometric model that was used to empirically identify the factors behind formal sources of credit loan repayment was **Logit Model**. This model was selected because credit loan repayment performance, in which the dependent variable is binary, takes the value 0 and 1 for defaults and non-defaults respectively. Hosmer and Lemeshew (1989) indicated that the logistic distribution (logit) has the advantage over the others in the analysis of dichotomous outcome variables; it is very flexible and the most easily-used model from a mathematical perspective, given its simplicity of calculation. Its probability lies between 0 and 1 and results in a meaningful interpretation. Hence, the logistic model was chosen for this study. The cumulative logistic probability model is econometrically defined as follows (Pindyek and Rubinfeld, 1981):

$$Y_i = \alpha + \sum_{i=1}^n \beta_i X_i + U_i$$

Where  $Y_i$ =the dependent variable that means probability of Loan default Rate

$X_i$  = Vector of explanatory Variables.

$\beta_i$  = Vector of Unknown parameters.

$U_i$  = Disturbance or Error term, that represent all factors that affect the probability loan Default rate but those which are not taken in to account explicitly.

#### 3.4. VARIABLES SPECIFICATION

**Dependent Variable:** The dependent variable of this study was the probability of loan default

rate of the rural household from formal credit sources. It is a binary or dichotomous variable representing the payment status of households. This study was coded 0 for defaulter household and 1 for non-defaulter households. Based on the literature reviewed and conversation held with stakeholders, the explanatory variables have already been selected. The following independent variables were identified as the principal ones in discriminating between non-defaulters and defaulters.

**Age:** This variable can be measured in years in which the younger the age the higher may be his/her productivity and/or knowledge, and the higher the age the lower his/her productivity may be. These situations lead to non-default and default respectively. On the other hand, the older person may have a lot of experience in farm business, which may lead to non-default, and the younger one may have limited experience attributed to his age which may lead to default. Hence, either a positive or a negative relationship was expected.

**Sex of Borrower:** There are controversial statistics among many microfinance specialists that uphold that females are better payers than male borrowers, taking into consideration their being more entrepreneurial, which results from more responsibilities in the internal affairs of a household. However, others expect that female-headed households are less knowledgeable in formal credit and hence could be defaulters for they know little about the punishment of loan default. Hence this variable was expected to have either a positive or a negative relationship with loan default rate.

**Education** is the number of years of schooling attained by the borrowers. There were illiterate borrowers, borrowers in the primary educational level, borrowers in the secondary educational level, and borrowers in the tertiary educational level. This factor was expected to have a negative relationship with loan default rate, because higher educational levels enable borrowers to realize more complex information, go on business records, perform basic cash flow analysis, and make the right business decisions. Hence, borrowers with higher level of education were expected to have higher repayment rates. So this variable would have a negative relationship with loan default rate.

**Total family size** is the total number of family members in the household. The higher the number of family members, the greater was the accessible workforce for production purposes, and therefore the probability to default was expected to be less. Therefore, families with sufficient labor force were expected to be non-defaulters and families with inadequate labor force were expected to default. So this variable was expected to have a negative relationship with loan default rate.

**Irrigation use:** Irrigation enables farmers to diversify their production, plant multiple crops, and supplement moisture deficiency. In doing so, it helps the farmer to increase production, income and consumption. It was expected to have a negative relationship with loan default rate.

**Fertilizer use:** The wise usage of fertilizer is one of the best investments a farmer can make. That means, with efficient use of fertilizer, the farmer expects a higher return on each unit of money spent on fertilizer. Therefore, this variable was expected to have a negative relationship with the loan default rate.

**Saving habit:** Farmers usually save from their proceeds for the purpose of consumption facilitation throughout the year, accumulation of wealth, and for contingency purposes in case of bad harvest or accident. Saving in the form of livestock, grain, jewelry and cash enables the farmers to easily liquidate them and fulfill the contract entered when prices of agricultural products are not conducive. The higher the amount of savings, the greater the capacity to repay, as opposed to the case in which farmers have a low amount of savings. Therefore this variable was expected to have a negative relationship with loan default.

**Availability of Other Sources of Income:** Some borrowers may have other sources of income. Borrowers who have another source of income were expected to cover his/ her other expenses from that income which is outside of the project, and it was assumed that this would result in higher deposit of money from the outcome of the project, which would in turn help the borrower

to reduce loan default rate. Therefore this variable was expected to have a negative relationship with loan default. **Dependence ratio** is the ratio of children below 10 years, disabled members and elders above 60 years, or other economically non-active members in relation to the number of economically active members in the household. A higher dependency ratio brings a higher risk to the household. Therefore the higher the dependency ratio, the lower the repayment rate, so this variable was expected to have a positive relationship with loan default.

**Loan diversion:** Sometimes borrowers use production credit for purposes of consumption facilitation, as credit by its nature is flexible and may not be used for intended purposes. Defaulters would tend to divert more production credit into consumption purposes than the nondefaulters group. Therefore, loan diversion is expected to increase the rate of default. Hence this variable was expected to have a positive relationship with loan default.

**Loan size:** If the amount of loan released is enough for the purposes intended, it has a positive impact on the borrower's capacity to repay. If, on the other hand, the amount of loan exceeds what the borrower needs and can handle, it is more of a burden than a help, thereby undermining loan repayment. Therefore this variable was expected to have either a positive or a negative relationship with loan default rate.

**Loan supervision:** If there is continuous follow-up and supervision visits to evaluate the loan utilization and repayment, this makes borrowers examine their responsibility and improve the proper utilization of the loan,

thereby improving repayment performance. Therefore this variable was expected to have a negative relationship with loan default.

**Repayment Period** is the period of time during which the entire loan must be repaid. It is a dummy variable, taking 0 for short- and long-term repayment periods, and 1 for medium-term repayment periods. Short repayment periods may have caused the borrower not to have enough revenue to make loan repayments. On the other hand, long repayment periods were detrimental to borrowers if they could not access future loans until the existing loan was paid back. Hence both short- and long-term repayment periods had negative effects on loan repayment. However, if the repayment period was medium, it was expected that the borrower would have an opportunity to repay his/her loan. Therefore this variable was expected to have a negative relationship with loan default.

**Sector:** It is argued that different types of projects have different levels of risk and profitability. Borrowers with different types of projects, such as poultry, milk production, fattening of cattle, bee keeping, crop growing, irrigation, etc., may have different repayment rates. Therefore this variable was expected to have either a positive or a negative relationship with loan default.

#### 4. RESULTS AND DISCUSSION

To determine the best subset of explanatory variables that are good predictors of the dependent variable, the logistic regressions were estimated using the Statistical Software Program (SPSS) Version 16.

Table 1. Logit Model Estimation for Factors Affecting the Probability of Loan Default Rate.

Variable	B	R.S.E.	Wald	Sig.	Odd ratio	Marginal effect
Ageofres	-.101	.3000	.179	.672	.904	-.0131
Sexofres	.682	.0627	1.823	.177	1.977	.0886
Educlev	.014	.0311	.004	.953	1.014	.0017
Famsiz	-.239	.0399	.515	.473	.787	-.0310
Depratio	-.477	.0541	1.169	.280	.621	-.0619
Sector	-1.494	.0634	8.209	.004*	.224	-.1941
Loansize	.733	.0960	.607	.436	2.082	.0952
Loandiv	1.833	.0638	11.192	.001*	6.251	.2381
Loansup	-1.921	.0675	13.499	.000*	.147	-.2496
Repperio	-2.126	.1004	5.043	.025**	.119	-.2762
Savhab	-1.069	.0671	5.317	.021**	.343	-.1389
Otherinc	-1.412	.0585	6.527	.011**	.244	-.1835
Firtuse	-2.121	.0576	14.509	.000*	.120	-.2756
Irriuse	-.270	.0836	.117	.732	.763	-.0350
Constant	14.123	.2339	28.945	.000	1.360E6	-----

The logit model results used to study factors influencing the loan default of smallholder farmers are shown in Table 1. Among the 14 variables used in the model, 7 variables were significant with respect to the probability of loan default of smallholder farmers with less than 5% of the probability level in the study area is discussed below:

**1. Other sources of income (otherinc):** The variable “other sources of income” refers to the amount of income generated from activities other than crop and livestock production. These additional sources of income may help the farmers to repay the loan during bad harvesting time or agricultural product price fall. Therefore, other sources of income are a very important source of cash for farm households, especially to purchase inputs and repay their credit. Other sources of income have a negative relationship with loan default, as expected, and are statistically significant at 5%. The results show that for the borrower who has another source of income, his/her loan default rate will decrease. From Table 1 the results indicate that as the borrower’s availability to other sources of income increases, with all other things remaining constant, the marginal effect of his/her probability to loan default rate will reduce by 0.1835 or 18%, or as the borrower’s availability to other sources of income increases, his/her capacity to repay his/her loan successfully will also increase. This result confirms the study done by Abreham (2002).

**2. Saving habit (savhab):** It is expected that the saving behavior of the household influences the loan default rate negatively and significantly. The study also shows that saving can negatively influence the probability of

loan default rate at less than 5% significance level. This result suggests that those farm households who developed increased saving habits have a decreased probability of loan default. Sampled households who have an increase in saving behavior but where all other factors remain constant have a marginal effect of loan default rate that is reduced by 0.1389 or 14%; this indicates that households who save their money had a greater ability to repay their loan on time than households who do not save. This result confirms the study done by Abebe (2011).

**3. Fertilizer use (firtuse):** Fertilizer means any substance which is intended or offered to be used for improving or maintaining the growth of plants or the productivity of the soil. The wise usage of fertilizer is one of the best investments a farmer can make. That means, with efficient use of fertilizer, the farmer expects a higher return on each unit of money spent on fertilizer. It is expected that fertilizer use by household has influenced the loan default rate negatively and significantly. The study was also negatively influenced by the probability of loan default rate at less than 1% significance level. This result suggests that, for those farm households that are fertilizer users, the probability of loan default will decrease. This means that sampled households that are fertilizer users, where all other factors remain constant, the marginal effect of loan default rate will be reduced by 0.2756 or 27%. This indicates that households who use fertilizer have a greater ability to repay the loan on time than households who do not use fertilizer.

**4. Sector (sector):** Different sectors or projects have different levels of risk and gain. In this study the variable sector has a negative relationship with the probability of loan default rate and is statistically significant at 1%. The result indicates that borrowers who engage in the farming sector have a low probability of loan default relative to borrowers who engage in petty trade and related sectors like cattle fattening, poultry trade, etc. The marginal effect (Table 1) indicates that, as the borrower's engagement in farming sectors increased, where all other factors remain constant, the marginal effect of his/her probability of loan default decreased by 0.1941 or 19%. This result agrees with the study carried out by Roslan and Zaini (2009).

**5. Loan supervision (loansup)** is a continuous follow-up and supervision visit to evaluate the loan utilization and level of loan repayment. This makes borrowers observe their obligations and improve their proper utilization of the loan, thereby improving repayment performance. Ineffective supervision almost invariably results from lack of knowledge of a borrower's affairs over the life of the loan. It is coupled with one or more of the causes of loan problems. In this study, the variable "loan supervision" affected the probability of loan default negatively at less than 1% significance level. This negative relationship indicates that if there is increased continuous supervision and follow-up by formal credit institute experts, with all other factors being held constant, the marginal effect in favor of loan default rate of the borrowers will decrease by 0.2496 or 25%. On the other hand, if there is increased continuous supervision and follow-up by formal credit institute experts, the repayment states of borrowers will also increase. This result agrees with the study carried out by Jemal (2003).

**6. Loan Diversion (loandiv):** Loan diversion is defined as the quotient of the difference between the total amount of loan received and the amount of loan used for the proposed purpose. Alternatively, diversion of loan use is equal to 1 less the value of the ratio of the amount of loan used in the proposed activity and total amount of loan received. The model result indicates that the variable of loan diversion has positively and significantly influenced the loan default rate of smallholder farmers at less than 1% significance level. From this result it can be stated that those farmers who divert their loan for other purposes are more likely to default their loan than those who use their loan for the proposed purpose. The model showing loan default rate with regard to loan diversion implies that, with all other factors being held constant, when smallholder farmers increased diversion of their loans for other purposes then the marginal effect in favor of loan default rate increased by 0.2381 or 24%. Earlier studies also reveal that loan diversion is one of the factors that affect the probability of loan default rate (Mengistu, 1997).

**7. Repayment period (repperio):** The variable "repayment period" has a negative relationship with loan default rate as expected and it is statistically highly significant at 5%, as expressed in Table 11. This indicates that as the borrower takes a loan to be repaid within the medium repayment period, his/her loan default rate will decrease. The marginal effect (Table 1) also indicates that as the borrower takes a loan to be repaid within the short or long repayment periods, his/her loan default rate will increase 0.2762 or 28%. On the other hand, a borrower who takes a loan to be repaid within the medium repayment period will increase his/her probability to repay his/her loan. Vigano (1993) also came up with similar results in his study.

## 5. CONCLUSION AND RECOMMENDATIONS

### 5.1. CONCLUSION

An effective financial system provides the foundation for a successful poverty alleviation program and low repayment performance discourages the lenders to promote and extend credit to large and fragmented farm households. Because of this, the objectives of the study were to identify the determinants of formal sources of credit loan repayment of smallholder farmer borrowers in Ethiopia, Amhara Region, in the case of Wogera Woreda. Simple random sampling method has been used to identify the required sample. The primary data were

collected from 206 respondents. Accordingly, the respondents were divided into defaulter and non-defaulter households. Based upon their proportion, 55 defaulters and 151 non-defaulters were taken for the study. Quantitative and qualitative data were collected using personal interviews, direct observations, etc. Logit model was used for analysis. According to the logit model results among 14 variables used in the model, 7 variables were statistically significant with less than 5% of the probability level. Those variables (other sources of income, saving habit, fertilizer use, sector, loan supervision, repayment period) had a statistically significant impact at a different significance level than the probability of being a defaulter. However, the other 7 explanatory variables such as sex, age, family size, dependency ratio, education, irrigation use and loan size were found to have no significant influence on the probability of loan default rate.

## 5.2. RECOMMENDATIONS

There is a serious loan repayment problem in the area, and formal credit sources have complained about this. This poor loan repayment hence becomes a major problem in credit administration. The following recommendations are to provide solutions for the above credit-provider institutions.

From these survey results, we can observe that saving habits, other sources of income and fertilizer use had a significant and negative relationship with loan default. Therefore, the institution should motivate the savers to save more money and attract the borrowers who do not save by creating awareness about the importance of saving and by providing incentives like high interest rate, etc. Additionally, the lending intuitions should give credit priority to those who have other sources of income and to fertilizer users. Good advice must be given to borrowers, as well as training during follow-up or within another arranged time. This will help the borrowers to reduce their loan default rate or to repay their loan successfully. The significant relationship between sectors and loan default rate of the borrowers is negative. Therefore we recommend that credit providers' institutions should give credit to those borrowers who are engaged in farming projects. Those credit providers should critically appraise the feasibility of the farming projects before disbursal, and strong follow-up is required for these projects. Additionally, the credit policy of the institutions should consider farming projects as priority projects. The current repayment periods for rural borrowers are either not long enough or are too long and they do not match with the cash availability of the client. During the repayment period agricultural products are not demanded by the market and not all products are harvested. In consideration of this, the institution should make the repayment period long enough but not overlong and flexible according to the clients' need. Giving continuous follow-up and supervision may also reduce the probability of loan default; therefore the institution should give training and continuous follow-up for borrowers. This study has shown that an increase in loan diversion can positively and significantly affect the loan default rate. Therefore, in order to reduce the probability of loan default rate, the institutions should give education and special attention to borrowers before giving credit to them. Additionally, institutions should assist in business plans to encourage borrowers to use loans for the intended purpose. Education should focus on the risk of loan diversion and institutions should establish rules, regulations and consequences for those borrowers who do not use credit for the intended purpose.

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