Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.8, No.23, 2017

Determinants of Formal Source of Credit Loan Repayment Performance of Smallholder Farmers: The Case of Lemo District of Hadiya Zone, Southern Ethiopia

Nuri Lefebo Toramo (PhD)
Assistant professor, Wachemo University, Ethiopia

Abstract
As credit is one of the most important factors required for smallholders input utilization, its repayment to the lender is also of paramount importance to have sustainable agricultural development and financial institutions. Therefore, the major concern of this study was to identify the major socio-economic, institutional and natural factors that affect loan repayment capacity of smallholder farmers in Lemo district of Hadiya zone, Southern Ethiopia. The main data used for this study were collected from a sample of formal credit borrower farmers in the zone through structured questionnaire. A total of 118 farm households cases were included in the final analysis. In addition, secondary data were collected from different organizations and pertinent publication in order to elaborate the present situation of rural credit in Ethiopia. Two-limit Tobit model was employed to analyze factors influencing loan repayment and intensity of loan recovery among smallholder farmers in the zone. A total of fifteen explanatory variables were included in the model of which five variables were found to be significant. These were size of land holding, total number of livestock, number of years of experience in agricultural extension services, number of extension contact days, and income from off-farm activities. Therefore, consideration of these factors is vital as it provides information that would enable to undertake effective measures with the aim of improving loan repayment in the district. It would also enable lenders and policy makers to have information as to where and how to channel efforts in order to maximize loan repayment capacity.
Keywords: Credit repayment, farmers, Two-limit Tobit, Lemo district, Hadiya zone, Ethiopia

1. INTRODUCTION

The economic growth of developing countries depends to a great extent on the growth of the agricultural sector. Ethiopia is a country typified by a predominantly subsistence agrarian economy. The nature of farming in Ethiopia is characterized by traditional micro holdings and subsistence type with less than two hectares of land on the average (CSA, 1990). The principal components of the output of the sector are food crops, livestock and livestock products. Small farmers work on 95% of the total cultivated area and produce over 90% of the national crop production, whereas private investors and state farms work on the rest (Solomon, 1993; Getachew, 1995).

Ethiopia has reasonably good resource potential for agricultural development- biodiversity, water resources, minerals, etc. Yet, it is faced with complex poverty, which is broad, deep, and structural. The proportion of the population below the poverty line is 44 per cent in 1999/2000 (MoFED, 2002). In spite of the huge agricultural potential, the growth in agricultural production has not been able to keep pace with that of the demand. Great proportion of cultivated land is held by subsistence farmers who produce about 97% of the national agricultural output (Welday, 1999). The small-scale farmers, however, produce a little 'surplus' over their requirement and, hence, could not adequately feed the population out of the agricultural sector.

The contributing factors to the low level of productivity are many but poor and backward technology is the principal one. Production methods have remained unchanged for thousands of years. Times and methods of sowing crops are the same as those mentioned in the books explaining the history of Ethiopia; the implements and tools for tilling, harvesting, threshing, and winnowing are identical with, if improved a little better than, those described in the ancient books. In brief, Ethiopia's agriculture is characterized by extremely limited capital resources, the use of traditional methods of production and, thus, low productivity of resources.

According to Timmer (1988), the first step for economic development is 'getting agriculture moving'. Moshar (1966) has classified the facilities and services involved in the modernization of agriculture into two groups viz. the essentials and the accelerators. The former, as the name implies, must be present to enable a farmer to adopt an innovation; and the latter are those that may be important to get an innovation adopted. Credit is one of the five accelerators that Mosher (1966) listed.

With introduction of new production technologies, the financial needs of farmers have increased manifold in Ethiopia. Steady agricultural development depends upon the continuous increase in farm investment. Most of the time, especially during the take-off stage of agricultural development, heavy investment cannot be made by the farmers out of their own funds because of their present level of incomes. Moreover, there exists no significant margin of income that can be channeled into the agricultural sector to undertake development activities. Thus, here comes the importance and significance of the availability of rural credit to bridge the gap between owned and required capital (Singh *et al*., 1985).

Delivering productive credit to the rural poor has been a hotly pursued but problem-plagued undertaking. Providing low-cost, efficient credit services and recovering a high percentage of loans granted are the idea and aims in rural finance (Wenner, 1995). Over the last four decades international donor agencies and governments of less developing countries have spent billions of dollars on projects, rapidly expanding the volume of agricultural loan and the number of rural institutions (Adams and Graham, 1981). But, the increasing default rate has been one of the major problems for all financial institutions. 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 thorough 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. In Ethiopia, the current agricultural loan repayment performance is not promising. Therefore, a thorough investigation of the various aspects of loan defaults, source of credit and condition of loan provision are of great importance both for policy makers and lending institutions. Hence, this study was undertaken to analyze the determinants of loan repayment from formal sources in Lemo district of Hadiya zone, Southern Ethiopia.

2. LITERATURE REVIEW

Credit is the key means to have access to inputs in many development programs. This is particularly true for rural development because so long as sufficient credit is not provided to the development programs of weaker sections of the society, the goal of development may not be achieved. As a result of high population pressure in rural areas of developing countries, like Ethiopia, increasing of additional productive land is difficult implying the need of improving farm level productivity through intensification. This involves as pointed out by Jama and Kulundu (1992), use of improved farm inputs such as fertilizers and improved seeds besides improved tillage and husbandry practices. These inputs are not available on the farm and some farmers are not able to purchase them due to lack of finance. Moreover, most of the commercial inputs are expensive and hence smallholder farmers cannot afford to buy them from their own cash earnings. It is, therefore, generally acknowledged that agricultural credit to smallholder farmers can help to improve their farm productivity through use of improved farm inputs.

A number of researchers (Adams &Graham, 1981; Gongalez-Vega, 1977; FAO, 1996) reported the requirement of credit facilities to small holders of less developed countries (LDCs) for production and consumption smoothing. Governments of LDCs and aid agencies have spent a large amount of money to this sector. The motivation has been the belief that loans are an essential part of various input packages that were prescribed as part of agricultural investment projects designed to introduce modern technologies and thus stimulate change and growth in agriculture.

According to Kebede (1995), credit makes traditional agriculture more productive through the purchase of farm equipment and other agricultural inputs, the introduction of modern irrigation system and other technological developments. Credit can also be used as an instrument for market stability. Rural farmers can build their bargaining power by establishing storage facilities and providing transport system acquired through credit. Credit plays a key role in covering consumption deficits of farm households. This would, in turn, enable the farm family to work efficiently in agricultural activities. Credit can farther be used as an income transfer mechanism to remove the inequalities in income distribution among the small, middle, and big farmers. Moreover, credit encourages savings and savings held with rural financial institutions that could be channeled to farmers for use in agricultural production. Credit also creates employment opportunities for rural farmers.

Rural households in Ethiopia need credit for investment in a range of on-farm, off-farm and off_farm activities. There is potentially a huge demand for credit from 10-12 million rural families, which is hardly met at present (IFAD, 2001). Most productive activities are seasonal and there is equally strong credit demand for consumption smoothing.

A major economic problem in developing countries is financial intermediation, the mobilization of capital from one group (savers/lenders) and its simultaneous allocation to meet the needs of another group (borrowers/entrepreneurs) (Christensen, 1993). Critical for efficient capital mobilization and allocation, financial intermediation can be performed through various forms of instrument. The three most important ones are equities (stocks), long-term (bonds), and short-term loans (credit) (Stiglitz, 1989). In most developing countries, because of the relative under-development of first two forms of instruments, credit markets for short term loans become the major means of financial intermediation. The capital mobilization function of credit markets is, however, constrained by several factors. First when there is a lack of macroeconomic stability, as experienced by many Latin American countries during the 1970s and 1980s, people prefer to invest in fixed assets- real estate, jewelry, etc… or to save in foreign currencies overseas, instead of depositing local currencies in domestic institutions.

Second, savers are willing to deposit money in saving institutions only if they believe that they will be able to withdraw the money according to pre specified terms. The risk of bank closure and the availability of deposit insurance become important considerations for potential depositors. In many countries, governments establish banking regulations such as capital and reserve requirement to ensure the ability of banks to meet withdrawal

demand.

Third, government regulations create opportunities for political abuses. In some developing countries, for example: banking system is tightly controlled by government officials who see it as a convenient source of cheap credit for their own expenditure projects and their favored political clients (Hanke and Walters, 1991). Offering mostly negative real interest rates to depositors, the banking system is not an attractive saving avenue for most people (McKinnon, 1973). The limitation of the formal banking system may be compensated by informal credit arrangements that offer higher returns for depositors, but these informal arrangements are usually limited in scale and lack legal protection for depositors.

Knowledge of determinants of loan repayment is undoubtedly important for it provides information to be the lender on the incentives available for the borrower to comply with repayment schedules. Loan repayment performance is affected by a number of socioeconomic, institutional and natural factors. Some of which are believed to impact on repayment negatively while others have positive impact. Various studies have been carried out concerning loan repayment performance of borrowers in several countries. The following presents the findings of studies on loan repayment performance.

Major socioeconomic variables that affect credit repayment include education, age of household head, family size, gender of household head, etc…. Family size is expected to affect loan repayment performance positively. This is because farmers with more families may have more labor force for more diversified sources of income. For instance, Schreiner and Nagarajan (1997), in a case study in Gambia,reported that large households are better in credit risks. Where as Bhenda (1983) in his Indian case study, revealed that households with large family were more prone to defaults. Also, Kashuliza(1993) reported a negative but statistically insignificant relationship between household size and repayment performance.

Educational level of household head is another socioeconomic variable that affects loan default rate both positively and negatively. For instance, Mengistu (1997) conducted a study on the Market Town Development Program (MTDP) Credit Scheme of Bahir Dar and Awassa towns using a binomial probit model. The study indicated that education has positive impact on loan repayment. In addition, Ike (1986), in his economic and financial analysis on the problem of loan default in Nigeria recommended that to improve loan recovery, educational level of borrowers should be improved. On the other hand, Matin (1997), in his study on loan repayment performance of borrowers in Bangladesh obtained a significant and negative relationship between education status of the household and loan default rate. Bekele *et al* (2003), in his Ethiopian case study revealed that, even if the variable was statistically insignificant there was a negative relation ship between educational status of household head and household's loan repayment performance. According to him the reason was that literate farmers were on average younger than the illiterate ones and that older farmers have the tendency to accumulate more wealth and were better able to pay the loans they borrowed. Similar findings were also reported by other researchers. For instance, Njaku and Obasi (1991), in their Nigerian case study and Yaqub (1995), in his Bangladesh case study indicated that education was negatively related with loan repayment.

As far as gender of household head is concerned, an empirical study made in Guyana by Hunte (1996) using logistic regression model showed that male borrowers generate low default risks, minimum or low credit rationing (giving nearly the amount the borrower requested or demanded) and high repayment performance. Where as, the finding of Yaqub (1995) showed that women were better than their male counter parts in loan repayment performance.Another socioeconomic variable that affects loan repayment is farm size. Belay (2002), used maximum likelihood estimates of the logistic regression model and showed that farm size was important factor influencing the loan repayment performance of rural women in Eastern Ethiopia. That is, the total farm size, which is a proxy for a host of factors including wealth and income, has a significant and positive impact on loan repayment performance. Similarly, Sharma and Zeller (1997) in their Bangladesh case study revealed that land holding had negative and significant effect on the delinquency. Like wise, Matin (1997) by his study of repayment performance in Grameen Bank, reported that the total operated land holding of the households was negatively associated with default after a certain level.

Livestock ownership is another socioeconomic variable that affects repayment performance. Belay and Belay (1998) in a case study at Alemegena District (Ethiopia) found out a significant positive relation ship of livestock ownership and loan repayment performance of farmers. Accordingly, animal production was found to be important source of cash income during sharp fall of crop prices. Also, Bekele (2001) in his Ethiopian case study using logit model revealed that value of total livestock holding has positive impact on loan repayment performance of smallholder farmers. According to the study, farmers who owned more livestock were able to repay their loans even when their crops failed due to natural disaster.

With regard to the relationship between off-farm activities income and loan repayment performance, Sharma and Zeller (1997) reported that off- farm income negatively influenced loan repayment performance of group-based borrowers of Bangladesh. According to the authors, off-farm income might increase willful default, as income was generated from various sources, the borrowers might become reluctant and might not give more emphasis to loan repayment. Similarly Bekele(2001), in his Ethiopian case study, revealed that off-farm income

influenced the loan recovery of farmers negatively. According to him, larger proportion of defaulter households participated in off-farm activities than the non-defaulters. Households who exercise off-farm activities probably gave less attention to farm affairs as income was generated from different angles. In other words, households who generate income form off-farm sources tend to be will full defaulters, because the punishment, which could be inhibition of access to credit in the following season, may be less painful to them as they are less dependent on farm activities. The other possible explanation is that households who take part on off-farm activities may divert input loans to supplement the off-farm business.

Institutional variables were another factors, which could affect loan repayment performance of smallholder farmers. Possible institutional factor that affect loan repayment include extension contact, source of credit, loan amount etc… As far as source of credit is concerned, Miller (1997) indicated that the principal reasons for some loans not to be repaid are: borrowers anticipate a change in credit policies or because they lack confidence in the ability of credit institutions' to provide credit in the following year. Wenner (1995) stated that, formal lenders find difficult and costly to ascertain accurately the likelihood of defaults; and monitor closely how borrowers use funds and what technologies they choose for project implementation. Thus, borrowers may not take actions that make repayment more likely (moral hazard). Weak legal system, lack of secured collateral, and pervasive views that government bank loans are patronage magnify loan enforcement costs for formal loans. In contrast, informal lender faces substantially lower screening and monitoring costs because of social proximity and multi-stranded relationships with clients. Thus, credit obtained from informal sources has high likelihood of being repaid than credit obtained from formal sources. For instance, Bhende (1983) reported that defaults were endemic in institutional credit; they were infrequent in informal credit. Absolutely speaking, the largest defaulters were those households who have borrowed most from institutional sources.

Loan amount is also another prominent factor that affects loan repayment performance. Vigno (1993) in a case study of Burkina Faso stated that large loan amount receivers were better payers than less amount of loan receivers. This result is in complete agreement with that of Bekele et al. (2003) who in a case study of Ethiopia using logit model, stating that farmers who took larger loans had better loan repayment performance. According to them, this could be attributable to the effectiveness of local leaders in screening loan applications. The results of Belay and Belay (1998) also strengthen the finding of negative relation ship between loan default and loan amount. Similarly, Sharma and Zeller (1997) used Tobit model and found that, in Bangladesh the grater the loan size, the greater the probability of unwilling default. This was because in the event of project failure, the borrower or group of borrowers will find it more difficult to meet repayment obligations out of their personal funds. Berhanu (1999) also reported that loan size contributed to reduction of the probability of full loan repayment in Ethiopia.
Different researchers emphasized the influence of the frequency of farmer's contact with development agents on loan repayment performance. Logically, the higher the linkage between farmers and development agents, the more the information flow and the technological (knowledge) transfer from the later to the former. Therefore, the farmers who have frequent contacts with development agents are likely to settle their debt timely as opposed to those who have no or less contacts. Jama and Kulundu (1992) analyzed small farmers' credit repayment performance in Kenya and found that, inadequate supervision and advice to farmers were positively related to the proportion of loan diverted. The proportion of loan funds diverted to non-intended purposes was also positively related to the proportion of arrears on loan given to the farmers and was significant at 5 percent level. Similarly, Belay and Belay, 998) also reported that, those farmers who made frequent contact with development agents were those who paid their loans back to the lenders in time where as those who had less or no contact were defaulters. In this study an attempted was to place more emphasis than earlier studies on continuity characteristics of dependent variable and method of data analysis.

3. METHODOLOGY

3.1. Description of the Study Area

Lemo is one of the 10 rural Districts of Hadiya Administrative Zone in Southern Ethiopia. It is bordered on the south by the Kembata Tembaro Zone, on the southwest by Duna and Soro Districts, on the west by Gomibora District, on the northwest by Misha District, on the north by Gurage Zone, on the northeast by Ana Lemo District, and on the southeast by Shashogo District. It is located some 230 km south of Addis Ababa and 175 km west of Hawassa town. There are a total of 33 *kebeles* in the District. Rural towns in the District are Belesa and Lisana. It has a total land of 34,973 hectare. The town of Hosanna is surrounded by Lemo District. Based on the 2007 Census conducted by the CSA, the District has a total population of 118,594, of whom 58,666 were men and 59,928 were women; 2,049 or 1.73 percent of its population were urban dwellers. However, based on 2012/13 annual household survey of the District, it has a total population of 150,719, of whom 74,574 were men and 76,145 were women. The majority of the inhabitants were Protestants, with 74.07 percent of the population, 12.37 percent were Muslim, 7.2 percent were Ethiopian Orthodox Christian, and 6.14 percent were Catholic.

The Loan Services/Products that provided by financial institutions are: agricultural loan, petty trade loan, handicraft loan and service loan. Annual lending rate is 15 percent for all loan types and no other additional charges.

the institutions have adopted some policy regarding loan term. These include: loan term for all agricultural and micro-business loans ranges between three months and two years depending on the type of activities financed; loan term for small investment and working capital loan on the other hand extends from a minimum of two years to the maximum of 5 years depending on the nature of the business being financed; working capital loans are provided only for a maximum of one year; it is only for investment loans that the policy of 2 to 5 years repayment terms applies; a grace period is only ten days for all installment loans; and for trade activities where returns are expected fairly rapidly, monthly repayment is required, while agricultural loans may have longer periods.

3.2. Sampling procedures and Data Sources

3.2.1. Sampling procedure

To select sampled respondent farmers, two-stage simple random sampling technique was employed. Use of administrative units is necessary to select representative study sites within the District. The smallest administrative unit in the District is *Kebele*. There were 33 *Kebeles* in the District. All *kebeles* in the District were the beneficiaries of financial institutions services, particularly credit service. Since 95 percent (about 31 *Kebeles*) of the District are midland and 5 percent (only 2 *Kebeles*) of the District are highland which is insignificant (meaning very small in number), the sampled *Kebeles* were selected out of those midland *Kebeles* by assuming the midland *Kebeles* would represent the District. Three *Kebeles* namely: Ambicho Gode, Jawe and Shurmo were randomly selected. The reasons for choosing the simple random sampling technique are its simplicity and existence of similarity in farmers' socio-economic conditions in all midland *Kebeles* of the District. Thus, those chosen *kebeles* were assumed to be representative of Lemo district. By taking the list of farm household heads from each selected *Kebeles* as a sample frame, 118 representative farm household heads were randomly selected in probability proportion to size of each *Kebele's* population (Table 1). Representative sample size was determined using the formula which is developed by Yamane (1967): $n = \frac{N}{1 + N(e)^2}$

Where, n is sample size, N is target population and e is level of precision, in this case it is 9%.

Table 1. Total number of the sampled farmers and population in the sampled *kebeles*

Kebele	Total number of households	Sampled farmers
Ambicho Gode	889	39
Jawe	904	39
Shurmo	922	40
Total	2715	118

Source: Own computation, 2014 from LDOARD

3.2.2. Data Sources and Methods of Data Collection

In this study, both primary and secondary data sources were used to gather necessary data regarding determinants of formal source of credit loan repayment performance of smallholder farmers. The data used for this study were collected from a sample of formal credit borrower farmers through structured questionnaires, which were prepared for the study. Information pertaining to respondents, socio-economic characteristics and institutional situations etc. were obtained directly through the interview, which was conducted at household level. Secondary data were obtained from published and unpublished documents of different organizations

Methods of Data Analysis: Descriptive statistics like means, frequencies, percentages, maximum, minimum, and range were used to describe the descriptive result while a two-limit Tobit model was employed to analyse determinants of formal source of credit loan repayment performance of smallholder farmers.

Specification of the model: The two-limit Tobit was originally presented by Rossett and Nelson (1975) and discussed in detail by Maddala (1992) and Long (1997). The model derives from an underlying classical normal linear regression and can be represented as:

$y^* = \beta' x_i + \varepsilon_i$,

$\varepsilon \sim N[0, \sigma^2]$.

Denoting Yi as the observed dependent (censored) variable

$$Yi = \begin{cases} L & \text{if } Y^* \le L \\ Y^* = X\beta + \varepsilon_i & \text{if } L < Y^* < U \\ U & \text{if } Y^* \ge U \end{cases}$$

Where, Y_i = the observed dependent variable, in our case repayment ratio (ratio of amount repaid to the amount borrowed), Y_i^* = the latent variable (unobserved for values smaller than 0 and greater than 1), X_i = is a vector of independent variables (factors affecting loan repayment and intensity of loan recovery), β_i = Vector of unknown parameters , ε_i = Residuals that are independently and normally distributed with mean zero and a

common variance σ^2 , and i= 1,2,…n (n is the number of observations).

By using the two-limit Tobit model, the ratio of repayment was regressed on the various factors hypothesized to influence loan repayment performance of smallholder farmers in the study area.

The log likelihood function for the general two-limit Tobit model can be given as follow:

$$\log L = -\frac{1}{2}\sum_{j\varepsilon c} w_j\left[\left(\frac{y_i - x\beta}{\sigma}\right)^2 + \log 2\pi\sigma^2\right]$$

$$+\sum_{j\varepsilon L} w_j \log\Phi\left(\frac{y_{Lj} - x\beta}{\sigma}\right)$$

$$+\sum_{j\varepsilon R} w_j \log\left[1-\Phi\left(\frac{y_{Rj} - x\beta}{\sigma}\right)\right]$$

$$+\sum_{j\varepsilon I} w_j \log\left[\Phi\left(\frac{y_{2j} - x\beta}{\sigma}\right) - \Phi\left(\frac{y_{1j} - x\beta}{\sigma}\right)\right]$$

Where C's are point observations, L's are left censored observations, R's are right-censored observations, and I's are intervals. And Φ is the standard cumulative normal distribution, and the w_j is the normalized weight of the j^{th} observation. 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 (Amemiya, 1984; Goodwin, 1992; Maddala, 1985). The Tobit model has an advantage in that its coefficients can be farther disaggregated to determine the effect of a change in the i^{th} variable on changes in the probability of being non-defaulter (Mc Donaled and Moffit, 1980) as follows:

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

$$\frac{\partial\Phi(\delta)}{\partial Xi} = \phi(\delta)\frac{\beta_i}{\sigma}$$

2. The change in intensity of loan recovery with respect to a change in an explanatory variable among non-complete defaulters is:

$$\frac{\partial E(Y_i / U > Y_i^* > L, X)}{\partial X_i} = \beta_i\left(1+\frac{\delta_L\phi(\delta_L)-\delta_U\phi(\delta_U)}{\Phi(\delta_U)-\Phi(\delta_L)} - \left[\frac{\phi(\delta_L)-\phi(\delta_U)}{\Phi(\delta_U)-\Phi(\delta_L)}\right]^2\right)$$

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

$$\frac{\partial E(Y / X_i)}{\partial X} = \beta i\left(\Phi(\delta_u) - \Phi(\delta_L)\right)$$

Where, X_i = explanatory variables, Φ (δ) = the cumulative normal distribution $\delta = \frac{\beta_i X_i}{\sigma}$ = the Z-score for the area under normal curve, βi = a vector of Tobit maximum likelihood estimates, σ = the standard error of the error term.

$$\delta_L = \frac{L - X_i\beta}{\sigma}$$

$$\delta_U = \frac{U - X_i\beta}{\sigma}$$

L and U are threshold values (L =0 and U =1), ϕ and Φ are probability density and cumulative density functions of the standard normal distribution, respectively.

3.3 DEFINITIONS AND HYPOTHESIS OF VARIABLES.

The dependent variable of the econometric model for this study is the proportion of formal loan repaid during the specified repayment period. This was calculated as the ratio of the total amount of credit repaid to the total amount of due. Its value ranges between 0 and 1. Those borrower farmers that did not repay any amount of money they borrowed are considered as complete defaulters (i.e., the value the repayment ratio in this case is zero). On the

other hand, those farmers that repaid back some proportion of the money they borrowed with in the stated time are considered as non-defaulters.

Based on the literatures reviewed and discussion held with stakeholders, the explanatory variables selected for this study were broadly categorized under socioeconomic, institutional and natural factors. In what follows, a brief explanation of the explanatory variables selected for this study and their likely influence on the loan repayment performance is presented below.

Family size (FAM_SIZE): Refers to the number of people under the same roof. 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 (Schereiner & Nagarajan, 1997). Based on this, families with sufficient labor-force would be expected to low probability of defaulting. On the other hand, large family size may imply self-insufficiency in terms of food consumption because large households consume more than do small households. This is usually true if the dependency ratio of the household is large. Therefore, the effect of family size, on formal loan repayment capacity may be indeterminate a priori.

Gender of the household head (GENDER): This is dummy variable in the model, which takes a value 1 if the household head is male and 0, if the household head is female. Gender differentials in the farm households play a significant role in economic performance of a given household. Some empirical studies have demonstrated that gender is important in defining the economic role of rural people in Africa (McSweeney, 1979; Dey, 1980). More specifically, Gender differentials can be related to access to credit and one may expect that female-headed households are less experienced in formal credit and hence will be defaulters for they know little about the consequences of loan default. The opposite expectation may be that female borrowers tend to be more loyal to the lenders than male borrowers. This may arise from the fact that females are more responsible for childcare and home management and hence they may be concerned more than males about the possible undesirable consequences arising from the default. Therefore, it is expected that Gender of household head would have either positive or negative impact on loan repayment performance of the respondents.

Age of the borrower (AGE) : These variables were measured in years. Through time household heads acquire experience in the farming business and/or credit use. Moreover, older borrowers may accumulate more wealth than younger ones. Therefore, this variable is hypothesized to have positive impact on loan repayment performance of respondents.

Education level (EDUCTLVL): This is a dummy variable, which takes a value 1 if the household head is literate and 0 otherwise. Education increases farmers' ability to get, process and use information. For example, literate farmers may seek information on prices more than the illiterates ones and consequently sell their produce at reasonable prices. Moreover, education may enable farmers to be more aware of the importance of formal loan and hence may reduce willful default. Therefore, *ceteris paribus*, education is expected to reduce the rate of loan default.

Land holding (LNDHOLD): Refers to the total farm size (in hectares) owned by the family. A farmer with more hectares of land is expected to be better off in loan repayment performance. This is because, if augmented with other factors of production, large farm size will give higher production that will enable the borrower to repay his/her loan. Therefore, this variable is expected to have positive relation with the dependent variable.

Number of livestock owned (LIVSTKNO): This variable defined in terms of Tropical Livestock Unit (TLU) and may serve as a proxy for the capacity to bear risks of using credit for the purchase of new technology such as fertilizer and capture wealth effect. Livestock may also serve as a proxy for oxen ownership, which is important for farm operations. It is expected that this variable would have positive influence on loan repayment performance.

Income from off-farm activities (**OFF_FARM**): This is dummy variable, which takes a value 1 if any member of the household was involved in off-farm activities and 0, otherwise. Off-farm activities generate additional sources of income for smallholders. The cash generated from these activities would back up the farmers' income to settle debt. Therefore, off-farm income, is hypothesized to have positive impact on loan repayment rate.

Expenditure on social festivals (CRMEXPNS): 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 a proxy for use of income for non-productive purposes, it is expected to have a negative impact on loan repayment performance of the farmer

Experience in Extension package (PKGEXPRC): is the number of years a farmer participated in extension program. Participating in Extension program play a great role in agitating farmers to repay institutional loans in time. Participation in extension programs is helpful as such farmers could have better income as a result of the use of new agricultural technologies. Therefore, the more number of years the farmers participated in Extension program, the better would be the loan repayment performance.

Contact with development agents (DACONTCT): This is the number of days per three months time a farmer contacts a development agent for technical guidance. The higher the linkage between farmers and development agents, the more the information flow and the technological (knowledge) transfer from the later to the former. Thus, those farmers who have frequent contacts with development agents are likely to settle their debt timely as

opposed to those who have no or few contacts.

Distance from main road (RODDIST): This is measured in kilometers from the respondent's residence to the main road; and is used as a proxy for market access and different institutions. Borrowers near by the main road have a location advantage and can sell their farm produce at good price and can contact the lender and development agent easily and frequently than those who live in more distant locations. Therefore, nearness to main road is expected to increase the repayment performance of smallholders.

Amount of loan (LNAMNT): are the value of a loan (in Birr). The greater the loan size, the greater the probability of unwilling default (negatively relate with loan repayment). This is because in the event of production failure, the borrower will find it more difficult to meet repayment obligations out of his/her personal funds.

Purpose of borrowing (BORWPURP): This is a dummy variable, which takes a value 1 if the household borrowed loan for purchase of farm inputs and 0, otherwise. The expenses on variable agricultural inputs purchase such as chemical fertilizers and improved seeds are used to produce enterprises that would give maximum benefits to the farmer. As this variable proxies the use of the loan for productive purposes, it is expected to have positive impact on loan repayment performance of small holders.

4. RESULTS AND DISCUSSION

4.1. Results of Descriptive Statistics Analysis.

The descriptive statistics analysis made use of tools such as mean, percentage, standard deviation and frequency distribution. In addition, T-test and Chi-square test statistics were employed to compare defaulter and non-defaulter groups with respect to some explanatory variables.

Out of the total 118 interviewed households 85 (72%) were non-defaulters, and the remaining 33 (28%) were defaulters. Among the defaulters, 18 (55 %) were complete defaulters while 15(44) repaid 30-70 percent of the total loan of which they borrowed. The average age of household heads was 43 years with the minimum and maximum ages of 21 and 73 years, respectively. The average age of non-defaulter household heads was 45 years, while that of defaulters was 41 years with mean difference significant at 1% level. On the other hand, the average family size of the sample households was 5.87; higher than the national average of 5 persons (CSA, 1994). The largest family size was 14 and the smallest was 1. The average family size of non-defaulters was 5.84, while that of defaulters was 5.74 with no significant difference between means of the two groups.

The survey results also revealed that 74 percent of the sample household heads were illiterate, whereas 26 percent of the house holds heads were literate (Table 3). Of the total sample respondents, 74 percent of the non-defaulters and 72 percent of defaulters were illiterate respectively. There was no significant difference between defaulters and non-defaulters in terms of their literacy level. The sample was composed of both male and female-headed households. Of the total sample household heads 82 percent were male household heads and 18 percent were female household heads. 15 percent of the defaulters and 19 percent of the non-defaulters were female-headed households respectively. The differences in terms of gender among the two groups was not significant (Table 3).

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 4.17 km. On average, non-defaulters traveled about 4.65 Km while the defaulters traveled on average about 6.42 km to reach the main road. The mean difference between the distances covered by non-defaulters and defaulters was statistically significant at 5 % level of probability (Table 2). Land is the basic asset of farmers. The average size of own cultivated land was nearly 1.49 ha, the minimum and the maximum being 0.25 and 5 ha, respectively. Non-defaulters cultivated on average larger area of land (1.51ha) than defaulters (1.07ha). The mean difference was significant at 1 % level.

Table2. Socio-economic and institutional characteristics of the households (continues variables)

Characteristics	Non-defaulters (N=85)		Defaulters (N=33)		T- value	Total Sample (N=118)	
	Mean	St.dev	Mean	St.dev		Mean	St. dev
Age	45	12	41	13.04	2.881***	43	11
Family Size	5.84	2.27	5.74	2.05	0.241	5.87	2.15
Total land holding	1.51	0.95	1.07	0.93	4.473***	1.49	0.83
Total live stocks in TLU	3.71	4.27	2.12	2.59	2.400**	3.77	4.03
Amount of money spent for social ceremonies	40.55	244.70	86.76	177.23	0.594	64.81	234.91
Amount of Money Borrowed	426.90	369.60	321.90	256.38	1.554	404.17	350.19
DA contact days/ months	1.86	1.46	0.97	1.36	2.611**	1.52	1.46
Experience in agri. ext	2.99	1.81	2.00	0.24	3.121***	2.73	1.65
Distance	4.65	3.71	6.42	4.841	2.215**	5.28	4.171

Source. Computed from the field survey data

*** and ** represent level of significant at 1% and 5% level respectively.

Farmers in the study area undertake both crop and livestock production activities. Though livestock holding

size varied among the sample farmers, 84.75 percent of the total respondents owned livestock. Livestock are kept for various economic and social reasons in the study area. The major economic reasons include provision or supply of draught power, generation of cash income, food and animal dung (as an organic fertilizer and fuel). Based on Storck *et al*. (1991) standard conversion factors, the livestock population number was converted into Tropical Livestock Unit (TLU), so as to facilitate comparison between the two groups. On the average, a household had 3.77 TLU with standard deviation of 4.03 (Table 3). The minimum number of livestock kept was 1 whereas the maximum was 35.5 TLU. Non-defaulters owned a larger number of livestock (on average 3.71 TLU) compared to the defaulters (on average 2.12 TLU) with mean difference significant at 5% significant level. The implication is that non-defaulters have more access to financial capital by selling their livestock to recover their loan (Table 2). Expenditure on social festivals includes expenditure for social ceremonies such as wedding, circumcision, funeral of a family member or close relative and engagement. Of the total respondents 10.50 percent reported that they had celebrated one or more of the above occasional ceremonies and 89.50 percent stated that they had not celebrated any of them during the study period. Meanwhile, amount of money spent for social ceremonies were 40.55 percent of non-defaulters and 86.76 percent of defaulters. The minimum and maximum expenditures for such ceremonies were Birr 100 and Birr 2535, respectively. Average amount of money spent for social ceremonies, was higher for the defaulters' group than the non-defaulters' group, although the difference was not found to be statistically significant (Table 2). Experience in agricultural extension package varied among the sample borrowers from minimum value of one-year experience to a maximum of 10 years experience. Non-defaulters participated on average for higher number of years (2.99) as compared to the defaulters who participated on average for 2 years (Table 2). 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. The results of the survey also indicate that 76.40 percent of the respondents had extension contact, while 23.60 percent did not have any contact with extension agents. An average number of extension contact days were 1.86 for non-defaulters and 0.97 for defaulters, respectively. The differences between the two groups, was significant at 5% probability level. That is, respondents who had frequent contacts with development agents settled their debt timely as compared to those who had no or few contacts (Table 2). The sample households on average borrowed Birr 404.17. However, the loan size varied in accordance with the type of financial institution. The survey result also revealed that on average Birr 426.90 was borrowed by non-defaulters and defaulters borrowed Birr 321.90 with no significant mean difference among the groups (Table 2). Another sources of income for the farmers of the area, other than livestock and crops production, were off-farm activities. About 28.00 percent of the 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. The survey results also indicated that larger proportion of non-defaulter households (32 %) sent their members to off-farm activities as compared to the defaulter households (14 %), with significant percentage difference at 10 % probability level.

Table 3. Socio-economic and institutional characteristics of farmrs (discrete variables)

	Non-defaulters		Defaulters		χ^2-value	Total	
	No.	Percent	No.	Percent		No.	Percent
Illiterate	63	74	24	72	5.157***	87	74
Literate	22	26	9	28		31	26
Male	69	81	28	85	2.172	97	82
Female	16	19	5	15		21	18
Benefited Yes	75	88	22	67	7.481***	96	82
No	10	12	11	33		22	18
Income off-farm Yes	27	32	5	14	3.756*	34	28
No	58	68	28	86		84	72
Saving Money Yes	8	7	0	0.00	2.814	9	5
No	77	93	33	100.00		109	95
Purpose of borrowing					0.165		
For agri. Input purchasing	49	58	18	56		67	57
For other purposes	36	42	15	44		51	43

Source. Computed from the field survey data

*** and * Represents significant at 1% and 10 %level

The sample farmers were asked about their perception of the benefit of credit. Out of the total respondents, 88 percent of the non-defaulters and 67 percent of defaulters replied that they have benefited from the credit service (Table 3). The difference in perception of credit benefits was significant between the two categories.

4.2. Results of the Econometric Model

This section presents and briefly discuss Two-limit Tobit regression results on the relationship of major socio-

economic, institutional and natural factors that affect loan repayment capacity of smallholder farmers is presented. Two-limit Tobit was used to identify factors affecting loan repayment capacity of smallholder farmers. A VIF for continuous variables and contingency coefficient values for discrete variables were computed to check the existence of multicollinearity problem. The results revealed that no significant problems of multicollinearity and high degree of association among discrete variables were detected; then all the variables were included in the model. Besides, Breusch-Pagan test for checking the existence of heteroscedasticity problem was carried out; and the result (Prob > chi2 = 0.31) revealed that the problem of heteroscedasticity was not significant. The regression model was also checked if important variables are omitted from the model. The result of 'ovtest' (Prob>F = 0.47) showed that the model has no omitted variables.

The estimated results of the Tobit model and the marginal effects are shown in tables 4 and 5 respectively. A total of fifteen explanatory variables were considered in the econometric model out of which five variables were found to significantly influence the probability of being non-defaulter and intensity of loan recovery among the farm households. On the other hand the size of land holding in hectare (LNDHOLD) is 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 52.82 percent (Table 4). On average, each additional hectare of land holding of smallholder farmers increases the rate of loan repayment by 0.0619 for the entire sample and by 0.0765 for non-complete defaulters (borrowers who paid a certain amount of loan but not all), *citrus paribus.* 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 (LIVSTKNO) is, as expected, positively related to the dependent variable (significant at 10% level). Each additional TLU increases the probability being non-defaulter by 10.70 percent. Also, for each additional unit of TLU the rate of loan repayment increases by 0.0125 among the whole borrowers and by 0.0155 among non-complete defaulters. 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.

Variables representing institutional service have strongly influenced smallholder farmer's loan recovery. For instance, number of years of experience in agricultural extension services (PKGEXPRC) is the factor, which was positively related to the dependent variable (significant at 1% level). Each additional year of agriculture extension package experience increases the probability of being non-defaulter by 31.72 %. On average, one year additional participation experience in the extension package increases rate of loan repayment by 0.0372 among the whole respondents and by 0.0460 among non-complete defaulters, *citrus paribus*. 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 beneficiers of the use of improved agricultural technologies that would increase their income generating capacity and these repay loans timely. Contact with DAs (DACONTCT) is another important institutional factor, which was positively related to the dependent variable (significant at 10 % level). Each additional contact increases a probability of being non-defaulter by 14.98 percent. Each additional DAs contact days increases the rate of repayment (repayment ratio) by 0.0171 for the entire sample and by 0.0216 for non-complete defaulters (Table 5). This implies that farmers with more accesses to technical assistance on agricultural activities were able to repay their loan as promised than those who had less or no assistance at all. The reason for this is that farmers who have frequent contact with development agents are better informed about markets and production technologies. As a result, they are motivated to timely repay their loans compared to those with less or no contact with DAs. Getting income from off-farm activities (OFF-FARM) is another economic factor that was positively and significantly affected loan repayment performance of smallholder farmers. This might be due to the fact that; off-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. Each additional unit of Off-farm income increases probability of being non-defaulter by 90.59 percent and on average increases the rate of loan repayment by 0.1061 for the entire respondents and by 0.131 among non-complete defaulters(Table 5). However, this result is contrary to Bekele's (2001), findings that, off-farm income was negatively related with loan repayment performance of farmers.

Table 4. Maximum Likelihood Estimates of the Two-limit Tobit Model and the Effects of Explanatory Variables on Probability of being Non-defaulter.

Variable		St. Error	T-ratio	Effect of change
AGE	7.52	1.26	0.591	0.0459
GENDER	-7.69	5.97	-1.287	0.4705
FAM_SIZE	-1.63	1.31	-1.249	-0.1000
EDUCTLVL	2.14	4.83	0.044	0.0131
RODDIST	-1.51	5.31	-0.283	-0.0092
LANDHOLD	8.65	2.58	3.371***	0.5282
LIVSTKNO	1.75	9.64	1.818*	0.1070
PKGEXPRC	5.20	1.53	3.454***	0.3172
DACONTCT	2.44	1.45	1.742*	0.1498
BROWPURP	7.18	4.85	1.493	0.4388
LNAMNT	-8.88	1.52	-0.581	-0.0005
OFF_FARM	5.11	1.48	3.451***	0.905
CRMEXPNS	3.50	9.41	0.371	90.8021
Saving	1.41	5.32	0.281	0.0091
Purpose	5.10	5.53	0,921	0.3184
Constant	7.48	4.12	0.181	0.0004

Source. Computed from the survey data
***, **, * Represent level of significance at 1%, 5% and 10 %, respectively

Table 5. Marginal effects of Independent variables on rate of loan repayment in Lemo district, Hadiya zone.

Variable	Effect of change in independent Variable on dependent Variable for observations at the lower limit	Effect of change in independent Variable on dependent Variable for observations at the Upper limit	Effect of change in independent variable on dependent variable for non-complete defaulters	Effect of Change in Independent variable on dependent variable for all observations
	$(L-E(Y))(\frac{\partial\Phi(\delta)}{\partial Xi})$	$(E(Y)-U)(\frac{\partial\Phi(\delta)}{\partial Xi})$	$\frac{\partial E(Y/U>Y>L,X)}{\partial X_i}$	$\frac{\partial E(Y_i)}{\partial X_i}$
FAM_SIZE	-0.0146	-0.0104	-0.0144	-0.0118
GENDER	-0.0694	-0.0490	-0.0681	-0.0558
AGE	0.0068	0.0048	0.0066	0.0051
EDUCTLVL	0.0019	0.0014	0.0019	0.0015
RODDIST	-0.0014	-0.0010	-0.0013	-0.0011
LANDHOLD	0.0780	0.0551	0.0765	0.0619
LIVSTKNO	0.0158	0.0111	0.0155	0.0125
PKGEXPRC	0.0469	0.0331	0.0460	0.0372
DACONTCT	0.0220	0.0156	0.0216	0.0171
BROWPURP	0.0648	0.0457	0.0635	0.0514
CRDTSRCE	0.0764	0.0539	0.0749	0.0606
LNAMNT	-8.0182	-0.0001	-0.0001	-0.0001
SAVING	0.0014	0.0010	0.0013	0.0011
PURPOSE	4.0424	2.8543	3.9623	3.2126
OFF_FARM	0.1337	0.0944	0.1310	0.1061
CRMEXPNS	3.1632	2.2331	3.1002	2.5131

Source: Owen computed data

5. CONCLUSIONS AND POLICY IMPLICATIONS.

Delivering productive credit to the rural poor has been a hotly pursued but problem-plagued undertaking. No other concern than loan default has an acute effect on the success of credit programs in rural areas. Loan default is a crucial problem of rural financial services. Therefore, the major concern of this study was to identify the major socio-economic, institutional and natural factors that affect loan repayment capacity of smallholder farmers in Lemo district of Hadiya zone, Southern Ethiopia. Two-limit Tobit model was employed to analyze factors influencing loan repayment and intensity of loan recovery among smallholder farmers in the zone. A total of fifteen explanatory variables were included in the model of which five variables were found to be significant.

These were size of land holding, total number of livestock, number of years of experience in agricultural extension services, number of extension contact days, and income from off-farm activities. Therefore, consideration of these factors is vital as it provides information that would enable to undertake effective measures with the aim of improving loan repayment in the lemo district. 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.

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