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# CONTENTS

| Sr. No. | TITLE & NAME OF THE AUTHOR (S)   | Page No.   |
|---------|--|------------|
| 1.      | DETERMINING THE CHALLENGES FOR SMALL AND MEDIUM ENTERPRISES (SMEs) IN ACCESSING FINANCIAL RESOURCES IN A RURAL DISTRICT OF ZAMBIA USING MULTIVARIATE ANALYSIS<br><i>BIEMBA MALITI &amp; BRIGHT CHIKWANDA MWEWA</i>                               | 1          |
| 2.      | AGRICULTURAL CREDIT AND FACTORS AFFECTING GROUP LENDING PERFORMANCE OF POOR FARMERS IN ETHIOPIA: THE CASE OF JIMMA ZONE<br><i>YILKAL WASSIE AYEN &amp; WONDAFERAHU MULUGETA DEMISSIE</i>   | 20         |
| 3.      | A STUDY OF IMPACT OF SOCIAL MEDIA ON COLLEGE STUDENTS<br><i>DR. SWATI MISHRA, DR. ABHISHEK MISHRA &amp; RISHABH RAWAT</i>  | 27         |
| 4.      | AGRITOURISM IN INDIA: UNDERSTANDING THE CONSUMER OPPORTUNITY<br><i>GIRISH MUDE &amp; DR. MILIND PANDE</i>  | 35         |
| 5.      | GENDER BASED COMPARATIVE STUDY OF EMOTIONAL INTELLIGENCE AMONG MBA STUDENTS IN BANGALORE<br><i>MOUNICA VALLABHANENI &amp; KATYAYANI JASTI</i>  | 40         |
| 6.      | UNDERSTANDING THE DRIVERS OF HUMAN CAPITAL MANAGEMENT AT NATIONAL THERMAL POWER CORPORATION (NTPC)<br><i>SHILPA WADHWA &amp; DR. DALEEP PARIMOO</i>  | 43         |
| 7.      | PERCEPTION OF STUDENTS ABOUT THE EFFECTIVENESS OF VIRTUAL CLASSROOMS: A STUDY CONDUCTED AT DISTANCE LEARNING CENTRES OF PUBLIC & PRIVATE UNIVERSITIES OF PUNJAB, INDIA<br><i>TEJBIR KAUR, DR. RUBEENA BAJWA &amp; DR. JASKARAN SINGH DHILLON</i> | 48         |
| 8.      | EFFECT OF CUSTOMER SATISFACTION ON BRAND LOYALTY: A STUDY ON MICROSOFT LUMIA<br><i>ANJAN KUMAR JENA, DR. DURGA SHANKAR SARANGI &amp; SAPAN KUMAR PANDA</i>   | 52         |
| 9.      | CAPITAL STRUCTURE, PRODUCTIVITY AND PROFITABILITY ANALYSIS OF SELECT HOUSING FINANCE INSTITUTIONS IN INDIA<br><i>DR. S. THENMOZHI &amp; DR. N. DEEPA</i>   | 55         |
| 10.     | A STUDY OF FINANCIAL PERFORMANCE OF SARASWAT CO-OPERATIVE BANK LTD: A CASE STUDY<br><i>S. V. NAIK &amp; DR. R. A. RATHI</i>  | 61         |
| 11.     | STATE'S REVENUE RECEIPTS: A STUDY IN MANIPUR<br><i>HUIDROM IMOBI SINGH</i>   | 67         |
| 12.     | A STUDY ON CONSUMER PERCEPTION TOWARDS DRINKING PACKAGED WATER WITH REFERENCE TO COIMBATORE CITY<br><i>R. MONISHA</i>  | 76         |
| 13.     | SKILL GAP PITFALLS AND CAUSES: AN ASSESSMENT AMONG SKILL TRAINERS IN CHENNAI CITY<br><i>DR. K. R. DHANALAKSHMI</i>   | 80         |
| 14.     | EFFECT OF DECLARATION OF DIVIDEND ON MOVEMENT OF SHARE PRICES<br><i>DR. KRATI JAIN</i>   | 83         |
| 15.     | BEHAVIOURAL FINANCE: A CHALLENGE TO MARKET EFFICIENCY<br><i>MULLA PARVEEN YUSUF</i>  | 85         |
| 16.     | A STUDY ON REVISITING OF MARKETING STRATEGIES FOR SELF HELP GROUP IN THE RESILIENT OF BUSINESS ENVIRONMENT<br><i>A. S. MAGDUM</i>  | 89         |
| 17.     | MUTUAL FUNDS: AN EMERGING TREND IN FINANCIAL SYSTEM<br><i>NAKATE S. R.</i>   | 92         |
| 18.     | IMPACT OF CULTURE ON BANK: THEORETICAL FRAMEWORK OF SANGLI BANK-ICICI BANK MERGER<br><i>SUHAS SHANKARRAO JADHAV</i>  | 94         |
| 19.     | EMPLOYEE ENGAGEMENT: A LITERATURE REVIEW<br><i>HARSHITHA</i>   | 97         |
| 20.     | RECOGNITION OF INTANGIBLES: A POLICY REVIEW FOR INDIAN COMPANIES<br><i>SHWETA NARANG</i>   | 101        |
|         | <b>REQUEST FOR FEEDBACK &amp; DISCLAIMER</b>   | <b>106</b> |

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## AGRICULTURAL CREDIT AND FACTORS AFFECTING GROUP LENDING PERFORMANCE OF POOR FARMERS IN ETHIOPIA: THE CASE OF JIMMA ZONE

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### ABSTRACT

*This study analyzed factors that are critical in affecting loan repayment performance of group based agricultural borrowers in Jimma Zone. After judgmental sampling has been considered to identify Woredas, simple random sampling technique was used to select 215 respondents and structured questionnaire was administered to collect data. Descriptive statistics and the Logit model were employed. The result show that 86 % ( 185) respondents were successful to repay their loan back, however 14% (30) of respondents failed to pay. Majority of the respondents do not celebrate social ceremonies and their health status was better. Even though females' participants in credit use were minimal, their efficiency was better as compared to male borrowers. Also, the results show that education, health status, land, and female headed households have positive effects on loan repayment performance. Conversely, family size, celebrating social ceremony and distance from credit sources have negative effects on loan repayment while the effect of age, experience, oxen, machinery, income and loan size are found to be insignificant variables. The study recommended that all farmers should be educated for the importance of having high repayment performance and reduce the factors prevent them from being able to pay for their loan. Since, female borrowers performing better than male counterparts, institutions have to do much on empowerment of women.*

### KEYWORDS

agricultural credit, group lending, loan repayment performance.

### INTRODUCTION

Ethiopia predominantly relies on agriculture with the vast majority of its population directly involved in the production of crops and livestock. Its economy has been hit by several internal and external shocks. Devastating war, frequent drought, high population growth, distorted investment environment, volatile primary product price etc. have been some of the shocks the economy has been experiencing (Abafita, 2003). In addition to the above factors the agricultural sector of Ethiopia is mainly hindered by lack of credit facilities. Due to these factors, the sector has been experiencing low productivity.

Among the various reasons for the low agricultural productivity in the country are: traditional agricultural practices and implements; low inputs and lack of effective extension services; over grazing by a very large livestock herd; serious erosion and depletion of soil fertility; lack of adaptive research; inadequacy of agricultural credit; deficient communication infrastructure; ecological imbalance; inappropriate agricultural policies; poor market integration and political instability (Belay, 2002).

Regarding delivery of financial service, access to agricultural credit was very limited in Ethiopia. Because of this limited access, the majority of the poor get financial services from informal sources; like moneylenders, Iqub<sup>1</sup>, Iddr<sup>2</sup>, merchants, friends and relatives etc. The formal financial institutions are not interested in providing credit services to the poor because of collateral requirements (Abafita, 2003). As a result of the agricultural societies, especially the poor are forced to make group lending from micro finances.

A common characteristic of group lending is that the group obtains a loan under joint liability, so each member is made responsible for repayment of loans of his or her peers. Most schemes give subsequent credit only if the group has fully repaid its previous loan. The joint liability, but possibly more so, the threat of losing access to future credit, incites members to perform various functions, including screening of loan applicants, monitoring the individual borrower's efforts, fortunes, and shocks, and enforcing repayment of their peers' loans (Zeller, 1996).

The reason for group lending is important however these borrowed funds are invested for productive purposes and then generated additional incomes are used to repay to the lending institutions in order to have sustainable and viable production process. 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 ideal aims in rural finance (Wenner, 1995). This is because low repayment performance discourages the lender to promote and extend credit to large and fragmented farm households.

In subsistence agriculture and low income countries like Ethiopia, smallholder farming dominates the overall national economy. Farmers face scarcity of capital due to low level of production lack of capability to adopt new agricultural technologies. Hence, short and medium term credits with favorable terms for seasonal inputs like fertilizer, improved seeds, pesticide and herbicides would generally be favored because better return would be achieved quickly within the cropping season. Moreover, achieving household food security remains a major objective of rural development. This can be materialized by increasing agricultural productivity, off-farm income and by improving the ability of households to stabilize their income and food purchasing power.

Recent studies show the growth rate of investment in agriculture is less than other economic sector. So financing agriculture is one of the most important factors to develop rural areas in developing countries. Generally, credit accessibility is important for improvement of quality and quantity of farm products so that it can increase farmer's income and reduce rural migration (Kohansal and Mansoori, 2008).

Lending to the poor or lower income group raises many debates among practitioners and academicians. The poor are usually excluded from credit facilities because of many reasons. These include insufficient collateral to support their loans, high transaction costs, unstable income, lower literacy and high monitoring costs. Usually they survive through involvement in micro business activities or informal activities that comprises food processing and sales, small scale agriculture, services, crafts and petty trading (Nawai and shariff, 2010). However these small business enterprises are the main source of employment and contribute a significant share of GDP in less developing countries. It is a risky enterprise because repayment of loans can seldom be fully guaranteed (Awoke, 2004). Generally,

<sup>1</sup> Is a financial association basically amid at helping people financially

<sup>2</sup> Is social association through which the local people help each other



in spite of the importance of loan in agricultural production, its acquisition and repayment are fraught with a number of problems especially in the small holder farming.

It has been found in empirical studies that large rate of default has been a perennial problem in most agricultural credit schemes organized or supported by governments. Most of the defaults arose from poor management procedures, loan diversion and unwillingness to repay loans. For this reason, lenders devise various institutional mechanisms aimed at reducing the risk of loan default like pledging of collateral, third-party credit guarantee, use of credit rating and collection agencies, etc. (Kohansal and Mansoori, 2008).

Financial institutions usually require business proposal, borrower past credit information and collateral before approving the loan. They offer credit through group-based lending method to mitigate agency problems, moral hazard and adverse selection and to replace the collateral requirement. In group-based lending, borrowers must form a group before applying loans and they also responsible to other loan members. If one member defaults, the others will be responsible for repaying the loan or they will be denied access for the next loans (Nawai and Shariff, 2010). Thus, the main question of this study was how this group lending mechanisms are functional and what are the factors affecting the repayment performance?

The general objective of this study was to investigate the agricultural credit and factors impeding group lending performance of poor farmers in Jimma Zone, southwestern Ethiopia. Specifically, the study tried to address the loan repayment performance of farmers in the area, and identified the socio-economic and institutional factors affecting group lending performance; finally it provided recommendations based on the findings.

## EMPIRICAL LITERATURE

Agricultural credit activities in many developing countries suffer from the problem of a high incidence of default rate among borrowers. Many of these credit agencies are inefficient or heavily subsidized to remain in business. In order to understand the reasons behind this problem, it is crucial to evaluate the agricultural credit agencies based on borrowers' repayment performance.

The agricultural production process in many developing countries has been negatively impacted by poor loan repayment. Most of public credit agencies in such countries suffer from this critical problem. According to Koopahi and Bakhshi (2002) from a study in Iran, use of machinery, length of repayment period, bank supervision on the use of loan had significant and positive effect on the agricultural credit, while natural disasters, higher level of education of the loan recipient and length of waiting time for loan reception had a significant and negative effect.

Ugbomeh (2008) revealed that credit was available for agricultural production, processing and petty trading among group of women farmers. Women as household heads, interest rate and household size have negative and significant effect. Price stability of farm proceeds and commitment to self help groups have significant and positive effect on the loan repayment performance of women farmers in self group in Bayelsa state, Nigeria.

Durguner (2007), using a balanced panel of 264 farmers from 2000 to 2004, farmer-specific effects, one year lagged debt-to-asset ratio and soil productivity are both found to be significantly correlated with the coverage ratio at the 5% significance level using random effects. The finding is significant because it can enhance agricultural lenders' ability to assess creditworthiness, screen borrowers, manage loan loss reserves, and price loans, thereby decreasing lenders' costs associated with defaulted loans and ultimately reducing the costs borne by the government and taxpayers.

Aneke (1999), attempts to assess the credit system within the framework of the supervised agricultural credit scheme in Enugu State of Nigeria. The results show that high repayment rate farmers had a larger loan size, larger farm size, higher gross income, shorter distance between home and source of loan, higher level of formal education, larger household size, and higher level of adoption of innovations than low repayment rate farmers. Abula et al., (2013), using the multi-stage random sampling techniques, Empirical results revealed that volume of loan borrowed, annual household income and size of farm affected repayment by beneficiaries and were significant in Kogi State, Nigeria.

Awunyo-Vitor (2012) in five districts within Brong Ahafo region of Ghana, the study employed Probit model to investigate factors that influence farmer's loan repayment default. The results showed that farm size, and engagement in off-farm income generating activities reduces the likelihood of loan repayment default significantly. On another token, Saleem et al., (2009) examines the impact of farm and farmers' characteristics on repayment of farm credit. The result was significant for impact of age, education, marital status, farm type, farm size, farm status and numbers of times credit obtained. But regression result showed significant influence of marital status, farm type and numbers of times credit attained on repayment of farm credit. Collectively all farm and farmers characteristics used in present study are significantly affecting repayment of credit.

Kohansal and Mansoori (2009) have done a study on factors influencing on repayment performance of farmers in Khorasan-Razavi province of Iran during 2008. The Logit model was used to explain the probability of loan on time repayment as a result of any of the identified independent variables. The signs of the coefficient of independent variables and significance of the variables were used determining largely the impact of each variable on probability of dependent variable. Results showed that farmer's experience, income, received loan size and collateral value have positive effect while loan interest rate, and total application costs and number of installment implies a negative effect on repayment performance of recipients.

Duy (2013) compares the repayment performance of farmers and non-farmers who borrow credit in individual and group-based schemes from formal banks in Vietnam. The Probit model was applied to analyze the determinants of repayment performance of borrowers. Scheduled repayment was analyzed with loan size instrumented by a Tobit model. Results show that, among the borrowers, farmers have a statistically significant higher repayment performance than non-farmers. Repayment in group schemes seems to be positively affected by educational level and by loans to farmers, and negatively by the loan amount, while repayment by independent borrowers is positively affected by the loan amount, farmers as borrowers, and the gender of borrowers.

Absanto and Aikaruwa (2013) examine the contribution of credit rationing in loan repayment performance. A case study design was adopted in which Victoria Saving and Credit Cooperative Society (SACCOS), found out that among the factors that were used for credit rationing age influenced loan repayment performance. Olagunju and Adeyemo (2008), based on Tobit regression farm experience, farm location, cost of obtaining loan, visitation, borrowing frequency, and education were very important factors in determining the repayment performance of beneficiaries. Whereas Akepan et al., (2013), examined the determinants of access and demand for credit based on multi stage random sampling; farmers age, gender, farm size, membership of social organization, extension agents visits, distance from the borrowers (farmer) resident to lending source, year of formal education and household size are important determinants of access to credit in Ikat Ekpen area of Akwa Ibom state in southern, Nigeria.

Belay (2002) in Eastern Ethiopia used primary data were collected from 92 randomly selected borrowers out of 23 saving and credit groups of credit beneficiaries residing in 10 PAs. A binary Logit model was used to analyze factors influencing loan repayment performance of rural women. A total of twelve explanatory variables were included in the empirical model and out of these, six were found to be statistically significant. Location of borrowers from lending institution, loan diversion, annual farm revenue and celebration of social ceremonies were highly important in influencing loan repayment performance. The other critical variables include initial credit group formation and farm size.

According to Abafita (2003), on Oromia credit and saving share company in Kuyu based on primary data, the estimated results of the descriptive statistics and the Probit model shows that education, income, loan supervision, suitability of repayment period, availability of other credit sources and livestock are important and significant factors that enhance the loan repayment performance, while loan diversion and loan size are found to be not significant. On his study female borrowers found to better in terms of loan repayment.

Reta (2011) conducted a research with the objective of analyzing and identifying factors that influence the loan repayment performance of the beneficiaries of Addis Credit and Saving Institutions (AdCSI). Age and five business types (baltina & petty market, kiosk & shop, services providing, weaving and tailoring and urban agriculture) were important in influencing loan repayment performance of the borrower. In addition, sex and business experience of the respondents were found to be significant determinants of loan repayment rate.

Fikirt (2011) conducted a research with the objective of analyzing and identifying factors that influence the loan repayment performance of the beneficiaries of Addis Credit and Saving Institutions (AdCSI). In order to achieve this objective, primarily data were collected from 200 randomly selected clients (100 defaulters and 100 non-defaulters) by using structured interview. Age and five business types (baltina and petty market, kiosk and shop, services providing, weaving and

tailoring and urban agriculture) were important in influencing loan repayment performance of borrowers. In addition, sex and business experience of the respondents were found to be significant determinants of loan repayment rate.

## METHODOLOGY

For this study, primary data was collected for a sample of farmers who benefited from group lending in 2013. By using structured interview information was obtained from head of the family's socio-economic characteristics like family resource level, response to loan repayment, experience in credit uses, access to extension services, marketing, source of credit, etc., and individual characteristics like age, marital status, education level, family size are obtain through questionnaires.

The study area is on Jimma zone, southwester Ethiopia. Sixteen Woredas are benefited from Oromia credit and saving institutions. Except Jimma branch, 15 Woredas are functionally giving agricultural loan to the rural poor. These Woredas are clustered based on environmental and social-economic characteristics. Of which, 5 Woredas are undertaking both cash and cereal crops. The other 6 Woredas are cereal crop producing with some mixed farming. The rest 4 Woredas are mainly relies on cash crop production.

Total numbers of clients that have been used agricultural credit service during 2013 were 30,000, with 6,000 groups (five members in each group), for which 98 million birr were distributed. Based on the economic and socio-cultural characteristics of the study area, Woredas are clustered in to three categories (mixed farming, cereal crop and cash crop producers). By using convenient sampling technique three Woredas were drawn from the total, and each Woredas from each cluster. 215 representative respondents were interviewed based on simple random sampling.

## EMPIRICAL MODEL

Regression which involves yes or no is dummy dependent variable regression models. Which are applicable in a wide variety of fields and are used extensively in survey or census-type of data (Gujarati, 1995). The dependent variable in this study is dummy variable, which take a value of zero or one depending on whether or not the borrower defaults. When one or more of the explanatory variables in a regression model are binary, we can represent them as dummy variables and proceed to analysis. The loan repayment performance is a dependent variable, which is dichotomous taking on two values, one if the borrower is a non-defaulter and zero otherwise. Estimation of this type of relationship requires the use of qualitative response models. In this regard, the non-linear probability models, Logit and Probit are the possible alternatives.

The Ordinary Least Square (OLS) regression, when the dependent variable is binary, produces parameter estimates that are inefficient. Consequently, hypothesis testing and construction of confidence interval become inaccurate and misleading. To alleviate these problems and produce relevant empirical outcomes, the most widely used qualitative response models are the Logit and Probit models.

This study is intended to analyze which and how much the hypothesized regression is related to the loan repayment performance of poor farmers. As already noted, the dependent variable is a dummy variable, which took a value of zero or one depending on whether or not a borrower defaulted. However, the independent variables are of both types that are continuous or categorical.

In the analysis of studies involving qualitative choices, usually a choice has to be made between Logit and Probit models. According to Amemiya (1981), the statistical similarities between Logit and Probit models make the choice between them difficult. However, Maddala (1983) and Kmenta (1986) reported that many authors tend to agree in that the Logit and cumulative normal functions are very close in the mid-range, but the Logit function has slightly heavier tails than the cumulative normal functions. Pindyck and Rubinfeld (1981) and Gujarati (1988) illustrated that the logit and Probit formulations are quite comparable, the main difference being that the former has slightly fatter tails; that is, the normal curve approaches the axes more quickly.

Hosmer and Lemeshew (1989) pointed out that Logit model has got advantage over the others in the analysis of dichotomous outcome variable in that it is extremely flexible and easily used model from mathematical point of view and results in a meaningful interpretation. Hence, the Logit model is selected for this study.

Therefore, the cumulative Logit probability model is econometrically specified as follows:

$$P_i = F(Z_i) = F(\alpha + \sum B_i X_i) = \frac{1}{1 + e^{-Z_i}} \quad [1]$$

Where,  $P_i$  is the probability that an individual is defaults or does not default given  $X_i$ ;  $e$  denotes the base of natural logarithms, which is approximately equal to 2.718;  $X_i$  represents the  $i^{\text{th}}$  explanatory variables; and  $\alpha$  and  $\beta$  are parameters to be estimated.

The Logit model could be written in terms of the odds and log of odds, which enables one to understand the interpretation of the coefficients. The odds ratio implies the ratio of the probability ( $P_i$ ) that an individual would choose an alternative to the probability ( $1-P_i$ ) that he/she would not choose it.

Therefore,

$$\left(\frac{P_i}{1-P_i}\right) = \left(\frac{1+e^{Z_i}}{1+e^{-Z_i}}\right) = e^{Z_i} \quad [2]$$

Or,

$$\left(\frac{P_i}{1-P_i}\right) = \left(\frac{1+e^{Z_i}}{1+e^{-Z_i}}\right) = e^{(\alpha + \sum B_i X_i)} \quad [3]$$

If the disturbance term ( $u_i$ ) is taken into account, the Logit model becomes

$$Z_i = \alpha + \sum_{i=1}^m B_i X_i + u_i \quad [4]$$

$X_1$ = age of respondent

$X_2$ = education level of the respondents

$X_3$ = experience of respondent

$X_4$ = income of respondent

$X_5$ = family size

$X_6$ = total farm land

$D_1$ = whether respondent owned farm machinery (yes=1, no=0)

$X_7$ = loan size

$X_8$ = number of oxen

$D_2$ = social ceremonies

$X_9$ = distance from the lenders

$D_3$ = head of the household

$D_4$ = health status of the respondents

## DEFINITIONS OF VARIABLES

Among a number of factors, which have been related to borrowers' loan repayment performance, in this study, some demographic, socio-economic and institutional factors are hypothesized to explain loan default situations of poor farmers in the study area.

Loan repayment performance of borrowers is the binary dependent variable in this model, which assumes a value of one if the borrower is non-defaulter and zero otherwise. However, there are several variables that are hypothesized to affect the loan repayment performance of farmers. Age is among the significant variables that affect the loan repayment performance of farmers. Younger people are likely to be at career stages where higher future incomes are expected. It may also be argued that the growth rate of income increases in the early stage of the earning life cycle but then declines, as one gets older. On the other side, at older age a borrower may acquire stability, may gain a lot of experience in running a business or may feel a sense of more responsibility hence could be positively related to loan recovery. Therefore it will be ambiguous to hypothesis the sign.

Farm size reflects ownership of important farm assets, it is expected that it would enhance the capacity of the borrower to repay on time. Furthermore, numbers of Oxen are the most important source of traction power in the area. Therefore, borrowers who own more oxen would be in a position to undertake farm activities on time and when required. However, location of borrowers is another variable that affect the default rate of borrowers. The more remote borrowers from lending institutions are hypothesized that less likely to repay the loan back.

In addition there are variables that are expected to be significant in affecting the loan repayment performance. Income of the household head: means income from crop and livestock activities may result in a better repayment capacity of borrowers. Moreover, adequacy of loan (loan size) is the other important variable that affects the repayment performance. When the supply of credit is equivalent to the demand for it, there is no rationing problem and borrowers acquire the amount they demand. Therefore, borrowers are more likely to repay on time. Education status of the borrowers is also expected to have positive contribution for the loan repayment performance of farmers. The more the educated household head the better the loan repayment performance is hypothesized.

Illness of family members increases health care expenditures of the household and would be the source of loan diversion. Therefore, health related expenses are expected to reduce borrowers' capacity to repay it back. Moreover, expenses on social ceremonies are sometimes too large relative to borrowers' economic status and may negatively affect the loan repayment performance. However, borrowers who acquired extensive experience in similar economic activity before the loan knows how to run a profitable business than new ones hence could have better repayment record.

**DESCRIPTIVE RESULTS**

This survey was conducted by distributing questionnaires to group based borrowers. In which several variables like education level of the respondents, age of the borrower, head of the household, distance from credit sources, social ceremony, use of machinery, experience, family size, total loan obtained, total income, number of oxen and other variables are considered to analysis. A sample of 215 borrowers was selected randomly for this study. Out of the total respondents 185 (86%) have settled their loans in full while 30(14%) failed to repay their loans in full.

**TABLE 1: CATEGORICAL VARIABLES**

|   |        | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|--------|-----------|---------|---------------|--------------------|
| <b>Social Ceremony</b>                      |        |           |         |               |                    |
| Valid                                       | no     | 119       | 55.3    | 55.3          | 55.3               |
|   | yes    | 96        | 44.7    | 44.7          | 100.0              |
|   | Total  | 215       | 100.0   | 100.0         |                    |
| <b>Taking Medical Care Service per Year</b> |        |           |         |               |                    |
| Valid                                       | no     | 125       | 58.1    | 58.1          | 58.1               |
|   | yes    | 90        | 41.9    | 41.9          | 100.0              |
|   | Total  | 215       | 100.0   | 100.0         |                    |
| <b>Loan Repayment Performance</b>           |        |           |         |               |                    |
| Valid                                       | no     | 30        | 14.0    | 14.0          | 14.0               |
|   | yes    | 185       | 86.0    | 86.0          | 100.0              |
|   | Total  | 215       | 100.0   | 100.0         |                    |
| <b>Head of the Household</b>                |        |           |         |               |                    |
| Valid                                       | female | 30        | 14.0    | 14.0          | 14.0               |
|   | male   | 185       | 86.0    | 86.0          | 100.0              |
|   | Total  | 215       | 100.0   | 100.0         |                    |
| <b>Applying Machinery</b>                   |        |           |         |               |                    |
| Valid                                       | no     | 151       | 70.2    | 70.2          | 70.2               |
|   | yes    | 64        | 29.8    | 29.8          | 100.0              |
|   | Total  | 215       | 100.0   | 100.0         |                    |

Source: 2014 Survey

From the above table out of 215 respondents 119(55.3%) did not celebrate social ceremonies during 2013. However, 96(44.7%) of the respondent celebrated social ceremonies and expend some of their loan for this purpose. Social ceremony and its expenditure are financed from a credit they borrowed and it is the source for loan diversion and credit default.

Illnesses of family members increase expenditures in consumption and credit need from other source of finance medicaments and health care. Therefore, health related expenses are expected to reduce borrowers' capacity to repay it back. Out of 215 respondents 90(41.9%) went to hospital the year 2013. However, 125(58.1%) of the respondents were free from health related expenditures. In addition among 215 respondents 185 (86%) replied that they did not have problems of credit default in the current loan cycle. Based on the result, a minority (30 or 14%) of the respondents did have problems of credit default in their current loan cycle. 86% of the sampled Jimma zone farmers are males and 14% are females. It also shows that only few females in the region take farming as their business and a source of employment.

The group member used the loan for the purpose of they borrowed it. So the effectiveness of the group lending and its loan repayment performance is increased as the group member did applied modern technologies. Of the total 215 respondents only 64(29.8%) were applied machinery for their farm products. Majority of the respondents are involved in their traditional farming without applying modern technologies and machineries.

**TABLE 2: CONTINUOUS VARIABLES**

|                       | N   | Minimum | Maximum | Mean     | Std. Deviation | Variance      |
|-----------------------|-----|---------|---------|----------|----------------|---------------|
| age of the respondent | 215 | 19      | 59      | 35.16    | 8.186          | 67.015        |
| educational level     | 215 | 0       | 15      | 2.88     | 3.159          | 9.982         |
| Experience            | 215 | 0       | 8       | 2.88     | 1.495          | 2.234         |
| family size           | 215 | 1       | 12      | 4.35     | 2.141          | 4.585         |
| Income                | 215 | 1000    | 500000  | 25980.44 | 36019.856      | 1297430018.14 |
| land size per hectar  | 215 | 0       | 24      | 9.00     | 6.191          | 38.332        |
| number of oxen        | 215 | 0       | 6       | 2.06     | 1.152          | 1.328         |
| distance from credit  | 215 | 3       | 480     | 148.92   | 75.908         | 5762.073      |
| total loan obtained   | 215 | 550     | 25000   | 4060.58  | 2403.035       | 5774575.011   |
| Valid N (listwise)    | 215 |         |         |          |                |               |

Source: 2014 survey

All respondents/borrowers are above 19 years old and the maximum older borrower is 59 years old. The average age of beneficiaries is 35 years old. The respondents are both illiterate and literate. At the maximum the respondent attain first degree (Joined University), but some of the borrowers are not attaining modern schooling.

Experience in credit use and management has positive contribution for loan repayment performance. Some respondents have used credit up to 8 time, where as some others are the first time beneficiaries. The family size of the respondents is not more than 12, however single borrowers have benefited within the group.

The minimum income level including off-farm income is 1000 Birr, and the maximum income is 500,000 Birr. On average respondents in Jimma zone generate 25980.44 Birr in a year.

Given the productivity of land, large farm size hypothesized to be positive contribution for loan repayment performance of farmers. Some of the respondents are having credit benefit without land available with them. On the maximum respondents are having 24 hectares land with the estimated average of 9 hectares.

Number of oxen is the most important source of traction power in the area. Therefore, borrowers who own more oxen would be in a position to undertake farm activities on time and when required. Therefore, large numbers of oxen positively contribute to the repayment performance of borrowers. From table 2 above the maximum number of oxen owned by borrowers are six but some of them have no oxen, however these borrowers are having two oxen on average.

Most borrowers lived in rural areas, far from the credit sources. To the minimum it takes three minutes, and to the maximum 480 minutes. The other variable that affects loan repayment performance is total loan size obtained. Group borrowers within the group accessed 550 Birr at the minimum, however some others having 25,000 Birr at the maximum. However the source of income for these borrowers is many.

**EMPIRICAL RESULTS**

The study also used empirical model and hence discussed empirical results. Before going to use the Logit results for interpretation the study has undertake diagnostic tests. The Hosmer-Lemeshow (HL) test for Logit regression is widely used to answer the model fitness;  $R^2$  is a measure of predictive power, that is how well can predict the dependent variable based on the independent variables. That may be an important concern, but it doesn't really address the question of whether the model is consistent with the data. By contrast, goodness-of-fit tests help to decide whether the model is correctly specified or not. Hosmer and Lemeshow produced a  $p$ -value if it is below 0.05 the model is rejected. If it's higher than 0.05, then the model is good fitted (Allison, 2013). Based on the above evidence the model used is fitted with the chi-square of 7.985, degree of freedom 8 and significance level of .435. (See appendix table 3)

Correlation is a way to measure two variables are associated with or related to each other. Pearson correlation matrixes provide information on the degree of relationship between dependent and independents variables or independent and independent variables (Gujarati, 2004). As a rule of thumb, if the correlation coefficient between the two independent variables is greater than 0.8, one can conclude that there is a series problem of multicollinearity. Accordingly the test result shows that the correlation coefficient between all variables under consideration is less than 0.8 implying that the explanatory variables can separately contribute to the variation in the dependent variable. (See appendix table 4)

**TABLE 3: LOGIT REGRESSION RESULTS**

|                     | B           | S.E.  | Wald   | df     | Sig.    | Exp(B)  | 95% C.I. for EXP(B) |       |       |
|---------------------|-------------|-------|--------|--------|---------|---------|---------------------|-------|-------|
|                     |             |       |        |        |         |         | Lower               | Upper |       |
| Step 1 <sup>a</sup> | Age         | -.036 | .036   | .977   | 1       | .323    | .965                | .899  | 1.036 |
|                     | Edu         | .247  | .078   | 10.033 | 1       | .002*** | .781                | .671  | .910  |
|                     | Exper       | .039  | .215   | .032   | 1       | .857    | 1.039               | .682  | 1.584 |
|                     | Familysiz   | -.114 | .142   | .641   | 1       | .042**  | .892                | .675  | 1.179 |
|                     | Income      | .000  | .000   | .029   | 1       | .864    | 1.000               | 1.000 | 1.000 |
|                     | Cermony(1)  | -.946 | .565   | 2.809  | 1       | .094*   | .388                | .128  | 1.174 |
|                     | Health(1)   | .999  | .484   | 4.264  | 1       | .039**  | 2.715               | 1.052 | 7.005 |
|                     | Land        | .038  | .063   | .367   | 1       | .045**  | 1.039               | .918  | 1.176 |
|                     | Oxen        | -.060 | .260   | .053   | 1       | .818    | .942                | .565  | 1.569 |
|                     | Dist1       | -.020 | .006   | 11.219 | 1       | .001*** | .981                | .970  | .992  |
|                     | Head(1)     | -.927 | .581   | 2.543  | 1       | .011*** | .396                | .127  | 1.237 |
|                     | Loan        | .000  | .000   | .127   | 1       | .721    | 1.000               | 1.000 | 1.000 |
|                     | Mchinary(1) | -.196 | .553   | .126   | 1       | .722    | .822                | .278  | 2.428 |
| Constant            | 5.435       | 1.519 | 12.794 | 1      | .000*** | 229.230 |                     |       |       |

Variable(s) entered on step 1: Age = age of the respondents, Edu = education level of the respondents, Exper = experience of the respondents, Familysiz = family size of the borrower, Income = total income of the household, Cermony = social ceremony, Health = health status of the respondents, Land = total land owned by the borrower, Oxen = number of oxen having the respondents, Dist1=distance from lending institutions , Head = head of the household, Loan = total loan obtained, Mchinary = application of machinery by respondents.

Table 3 above showed that factors that affected loan repayment performance of group borrowers and were calibrated as determinants of loan repayment. It indicated that out of 13 explanatory variables, seven were the most potent factors.

**Education Level:** - This variable is expected to have a positive impact on repayment performance in general. Considering normal circumstances, a more educated borrower is expected to use the loan more effectively as compared to a less educated one. In this case we expect a positive sign for the variable. It is assumed that as the borrower gets educated, he/she could acquire more knowledge so that his/her efficiency in allocation of resources increases and so does the proper utilization of the loan. On the other hand, farmers who did not receive formal education and are likely to have inadequate knowledge of loan acquisition and management, are less likely to repay the loans given to them. In this study education level is statistically significant at 1%, and positive as hypothesized. This shows that the probability of efficiency and its impact on repayment is 0.781 units the group members educated than none educated. This suggests that as the level of education improved the beneficiary also improved the ability to read and write and in the process, improved dexterity in the occupation, which concomitantly improved profit and the capacity to repay loans.

**Family Size:** - Large family sizes could likely raise their total expenses and negatively affect their loan repayment ability. Conversely, large family could serve as a source of labour which will increase the output of the farmers and hence positively affect the farmer's ability to repay the loan. The result showed that family size is negative and statistically significant at 5%. This shows that the probability of the efficiency of group lending and its impact on repayment performance is 0.892 units higher when the group members have small family size than those with large family size.

**Social Ceremony:** - The expenses on social ceremonies are sometimes too large relative to borrowers' economic status and may negatively affect the loan repayment performance. Based on the questioners, from the total 215 respondents only 96(44.7%) of the respondents celebrated social ceremonies. Based on the model's result this variable is negative and statistically significant at 10%. This means, those borrowers that did not celebrate social ceremony are only 0.388 times as effective repaying their loan as those who celebrated.

**Health Status:** - Illness of family members increase expenditures in consumption and credit need from other source of finance medicaments and health care. Therefore, health related expenses are expected to reduce borrowers' capacity to repay it back. In this study health variable is a categorical variable, positive and statistically significant at 5%. This implies that healthy people are 2.715 times better contributes (repay back their loan) as compared borrowers with poorer health.

**Land Sizes:** - Land size is the amount of land owned by each group members. In this study the land owned by group members had minimum of zero and a maximum of 24 hectares. The Logit model shows that land size variable has positive and significant effect on the effectiveness of group borrowers' ability to repay back their loan. This implied that as the group members acquire more land the effectiveness of group lending performance increased 1.039 times as compared to those borrowers with small land size.

**Distance:** - The variable distance measure how the group members far from each other in their lending institutions. This variable had a negative and significant influence on the effectiveness of group lending and its impact on repayment performance at 1%. This means that the more remote the location of credit services, the lower the borrowers likely to repay their loans. The effectiveness of group lending and its impact on repayment is higher when the distance between the members is less than when it is long by 0.981 units.

**Head of the Household:** -There is a belief among many microfinance specialists that female borrowers are better payers than their male counterparts, taking into consideration their being more entrepreneurial that results from assuming more responsibilities in the internal affairs of a household (Vigano, 1993). Based on the result this variable is statistically significant at 1%. This shows that female borrowers are 0.396 times better than male borrowers.

## CONCLUSION

This study evaluated the factors influencing on agricultural credit and group lending performance of farmers in Jimma zone. The main objective of this research was to assess and analyze the effectiveness of group lending and its impact on loan repayment performance. Data was collected from 215 group based borrowers in Jimma Zone, Ethiopia.

The Logit model seeks to explain the probability of loan on time repayment as a result of the identified independent variables. The signs of the coefficient of independent variables and significance of the variables were used to determining the impact of each variable on the dependent variable. Results showed that 86 % (185) respondents were successful to repay their loan back, however 14% (30) of respondents failed to pay. Majority of the respondents did not celebrate social ceremony and their health was better. Even though females' participation in credit use was minimal, their efficiency was better as compared to male borrowers. Also, the results show that education, health status, land, and female headed households have positive effects on loan repayment performance. Conversely, family size, celebrating social ceremony and distance from credit sources have a negative effect on loan repayment while the effect of age, experience, oxen, machinery, income and loan size are found to be non significant variables.

Based on the results obtained in this study, it is recommended that credit institutions or lending agencies should look out for the factors that significantly influence loan repayment before granting loans to group based agricultural credit to reduce the incidence of loan defaults.

The study recommends that all farmers should be educated on the importance of having other sources of income apart from their farm so that they can use the loans they acquire for farming activities only. This will help them to have a better output and hence a better repayment capacity. Again, farmers in Jimma Zone should be encouraged to higher education, practice factors that encourage a higher repayment rate and reduce the factors that prevent them from being able to pay for their loans like huge social ceremony expenditure.

On the other hand, the evidence in this study show that female borrower has performed better in terms of loan repayment than their male counterparts. But we have seen that the number of women being served particularly in the rural parts of the Woreda is very small. This is also in conflict with one of the objectives of the establishment of such an institution; i.e., empowerment of women. So the institution has to do much in this direction.

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APPENDIX

TABLE 4: CORRELATION MATRIX

|        | Constant    | Age   | Edu   | Exper | Familysiz | Income | Cermony(1) | Health(1) | Land  | Oxen  | Dist1 | Head(1) | Loan  | Mchinary(1) |       |
|--------|-------------|-------|-------|-------|-----------|--------|------------|-----------|-------|-------|-------|---------|-------|-------------|-------|
| Step 1 | Constant    | 1.000 | -.595 | -.446 | -.075     | .047   | -.265      | -.403     | -.106 | .184  | -.101 | -.342   | -.241 | -.097       | -.359 |
|        | Age         | -.595 | 1.000 | .217  | .091      | -.493  | -.064      | .093      | .008  | -.214 | -.050 | .143    | .079  | -.068       | -.097 |
|        | Edu         | -.446 | .217  | 1.000 | -.029     | .123   | -.203      | -.018     | -.086 | -.033 | .051  | .390    | .160  | -.054       | .062  |
|        | Exper       | -.075 | .091  | -.029 | 1.000     | -.271  | -.003      | .161      | .020  | .051  | -.106 | .059    | -.037 | -.595       | -.105 |
|        | Familysiz   | .047  | -.493 | .123  | -.271     | 1.000  | .047       | -.177     | -.013 | .215  | -.165 | .089    | .052  | -.015       | .106  |
|        | Income      | -.265 | -.064 | -.203 | -.003     | .047   | 1.000      | .543      | .074  | -.042 | -.199 | -.113   | .119  | .112        | -.043 |
|        | Cermony(1)  | -.403 | .093  | -.018 | .161      | -.177  | .543       | 1.000     | -.166 | -.257 | .099  | .008    | .031  | -.042       | .155  |
|        | Health(1)   | -.106 | .008  | -.086 | .020      | -.013  | .074       | -.166     | 1.000 | .143  | .107  | -.122   | .055  | -.068       | -.146 |
|        | Land        | .184  | -.214 | -.033 | .051      | .215   | -.042      | -.257     | .143  | 1.000 | -.479 | -.311   | -.138 | -.325       | .022  |
|        | Oxen        | -.101 | -.050 | .051  | -.106     | -.165  | -.199      | .099      | .107  | -.479 | 1.000 | .076    | .135  | .037        | .051  |
|        | Dist1       | -.342 | .143  | .390  | .059      | .089   | -.113      | .008      | -.122 | -.311 | .076  | 1.000   | -.151 | -.159       | .196  |
|        | Head(1)     | -.241 | .079  | .160  | -.037     | .052   | .119       | .031      | .055  | -.138 | .135  | -.151   | 1.000 | .105        | .013  |
|        | Loan        | -.097 | -.068 | -.054 | -.595     | -.015  | .112       | -.042     | -.068 | -.325 | .037  | -.159   | .105  | 1.000       | .208  |
|        | Mchinary(1) | -.359 | -.097 | .062  | -.105     | .106   | -.043      | .155      | -.146 | .022  | .051  | .196    | .013  | .208        | 1.000 |

TABLE 5: CLASSIFICATION TABLE<sup>a,b</sup>

|                    | Observed                   | Predicted                  |       | Percentage Correct |
|--------------------|----------------------------|----------------------------|-------|--------------------|
|                    |                            | loan repayment performance |       |                    |
| Step 0             | loan repayment performance | yes                        | no    |                    |
|                    |                            | yes                        | 0     |                    |
| no                 | 0                          | 185                        | 100.0 |                    |
| Overall Percentage |                            |                            |       | 86.0               |

a. Constant is included in the model.

b. The cut value is .500

TABLE 6: MODEL SUMMARY

| Step | -2 Log likelihood    | Cox & Snell R Square | Nagelkerke R Square |
|------|----------------------|----------------------|---------------------|
| 1    | 140.157 <sup>a</sup> | .145                 | .261                |

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

TABLE 7: HOSMER AND LEMESHOW TEST

| Step | Chi-square | df | Sig. |
|------|------------|----|------|
| 1    | 7.985      | 8  | .435 |

TABLE 8: CLASSIFICATION TABLE<sup>a</sup>

|                    | Observed                   | Predicted                  |      | Percentage Correct |
|--------------------|----------------------------|----------------------------|------|--------------------|
|                    |                            | loan repayment performance |      |                    |
| Step 1             | loan repayment performance | yes                        | no   |                    |
|                    |                            | yes                        | 6    |                    |
| no                 | 2                          | 183                        | 98.9 |                    |
| Overall Percentage |                            |                            |      | 87.9               |

a. The cut value is .500

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